Piedras Negras Archaeology, 1931-1939


Throne 1, as assembled and slightly restored.

# Piedras Negras Archaeology, 1931-1939 

Piedras Negras Preliminary Papers<br>Piedras Negras Archaeology: Architecture

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## Contents

Figures ..... viii
Tables ..... xii
Introduction ..... 1
Piedras Negras Preliminary Papers ..... 3
Piedras Negras Archaeology: Architecture ..... 4
University Museum and the Maya Area ..... 4
Preparation for Publication ..... 5
Acknowledgments ..... 7
Notes ..... 7
Part I Piedras Negras Preliminary Papers ..... 9
1 Description of the Site, With Short Notes on the Excavations of 1931-1932 ..... 10
Introduction (J. Alden Mason, 1933) ..... 10
Description of the Site With Short Notes on the Excavations of 1931-1932 (Linton Satterthwaite, 1933) ..... 11
Notes ..... 29
2 The South Group Ball Court (Structures R-11-a and R-11-b); With a Preliminary Note on the West Group Ball Court (Structures K-6-a and K-6-b) (Linton Satterthwaite, 1933) ..... 30
Field and Structures; General Description ..... 30
Stone Markers and Two Carved Stones ..... 34
Periods of Building ..... 36
Details of Construction ..... 37
Positions of Objects ..... 47
Date ..... 47
Preliminary Note of West Group Ball Court ..... 48
Terminology ..... 48
Notes ..... 49
3 Palace Structures J-2 and J-6; With Notes on Structure J-6-2 ${ }^{\text {nd }}$ and Other Buried Structures in Court 1 (Linton Satterthwaite, 1935) ..... 50
Preliminary Note ..... 50
Acropolis Palaces: Introductory Remarks ..... 53
Structure J-2 ..... 55
Details of Construction ..... 58
Structure J-6 ..... 65
Conclusions ..... 84
Notes ..... 88
4 Piedras Negras Pottery ..... 90
4.1 Pottery Vessels (Mary Butler, 1935) ..... 90
4.2 Figurines, Ornaments, and Miscellaneous Objects (Mary Butler, 1935) ..... 121
5 A Pyramid Without Temple Ruins (Structure J-3)(Linton Satterthwaite, 1936) ..... 140
General Description ..... 140
Periods of Building ..... 145
Stelae ..... 146
Lintel 5 ..... 149
Objects ..... 150
Date ..... 152
Details of Construction ..... 152
Notes ..... 153
Part II Piedras Negras Archaeology: Architecture ..... 154
6 Architecture: Introduction (Linton Satterthwaite, 1943). ..... 155
General Remarks ..... 155
Authorship ..... 155
Difficulties ..... 156
Acknowledgments ..... 157
Personnel ..... 158
Comparative Data ..... 158
General Objectives ..... 159
Location ..... 159
Materials ..... 162
Labor and Its Tools ..... 163
Plan of Publication ..... 164
The Map ..... 170
Miscellaneous Notes ..... 180
Cross sections Through Main Groups ..... 181
Acropolis Restoration Drawing ..... 181
Reconstruction Without Specific Evidence ..... 181
Point of View ..... 182
Accuracy ..... 182
Sources Giving Original Data on Archaeology of Piedras Negras ..... 183
Other Sources Cited ..... 183
7 Temples ..... 184
7.1 Structure R-9 (Temple and Associated Constructions) (Linton Satterthwaite, 1944) ..... 184
8 Ball Courts ..... 205
8.1 Ball Court Terminology (Linton Satterthwaite, 1944) ..... 205
8.2 Structure R-11 (South Group Ball Court)(Linton Satterthwaite, 1944). ..... 210
8.3 Structure K-6 (West Group Ball Court)(Linton Satterthwaite, 1944) ..... 228
9 Sweathouses ..... 241
9.1 Recognition of Sweathouses at Piedras Negras: Diagnostic Traits and Terminology (Linton Satterthwaite, 1950) ..... 241
9.2 Structure N-1 (Linton Satterthwaite, 1950) ..... 267
9.3 Six Partially Excavated Sweathouses: (Structures S-19, J-17, O-4, S-2, S-4, and R-13) (Linton Satterthwaite, 1950) ..... 281
9.4 Structure P-7 (Linton Satterthwaite, 1950) ..... 293
10 Unclassified Buildings and Substructures ..... 318
10.1 Structure F-3 (Linton Satterthwaite, 1944) ..... 318
10.2 Structure F-4 (Linton Satter thwaite, 1944) ..... 323
10.3 Structure O-18 (Linton Satterthwaite, 1952) ..... 328
10.4 Structure O-7 (Linton Satterthwaite, 1952) ..... 332
10.5 The Plazuela of Structure V-1 (Linton Satterthwaite, 1952) ..... 343
10.6 Sub-Acropolis Structures 1, 3, 4 (Linton Satterthwaite, 1953) ..... 363
10.7 Structure P-6 (Linton Satterthwaite, 1952) ..... 373
10.8 Structure O-2 (Linton Satterthwaite, 1952) ..... 377
10.9 Structure J-19 (Linton Satterthwaite, 1952) ..... 378
10.10 Structure J-24 (Linton Satterthwaite, 1952) ..... 380
10.11 Structure S-5 (Linton Satterthwaite, 1952) ..... 381
10.12 Structure O-3 (Linton Satterthwaite, 1949) ..... 383
Appendices ..... 384
Appendix 1 Personnel of the Piedras Negras Expedition, 1931-39 ..... 385
Appendix 2 Piedras Negras: An Opportunity and an Emergency in American Archaeology (Linton Satterthwaite, 1938) ..... 388
Appendix 3 Maya Thrones and Benches (Frank M. Cresson, 1939) ..... 390
Appendix 4 Carved Orange and Carved Gray Wares at Piedras Negras (Frank M. Cresson, 1939) ..... 395
Appendix 5 Pottery Types of Yucatan in the Usumacinta Area (Frank M. Cresson, 1939) ..... 398
Appendix 6 Piedras Negras Site Plan (Section Details) ..... 401
References ..... 410
Index ..... 419

## Figures

Frontispiece Throne 1, as assembled and slightly restored.
1.1 Ruins of Piedras Negras ..... 12
1.2 Sections A-B through West and East Groups and C-D through South and East Groups ..... 14
2.1 Structure R-11-b from the northerly end of R-11-a ..... 31
2.2 Structures R-11-a and R-11-b. ..... 33
2.3 Structures R-11-A and R-11-b ..... 35
2.4 Piedras Negras South Group Ball Court Structures R-11-a and R-11-b ..... 38
2.5 Piedras Negras South Group Ball Court ..... 40
2.6 Field drawings of South Group Ball Court field markers and sculptured stones ..... 43
2.7 Objects ..... 45
3.1 Structure J-2 plan, sections, and interior elevations ..... 51
3.2 Structure J-2 medial wall, end of Room 1, interior vaulted doorway, and portion of medial molding and upper zone ..... 52
3.3 Structure J-2: Room 2, Room 3, and cross sections ..... 53
3.4 Structure J-6 and J-6-2nd plan, section, and interior elevations ..... 54
3.5 Structure J-6 exterior stairway, section through end of Room 1-a, Structures J-6 and J-6-2nd ..... 61
3.6 Structure J-6, various. ..... 64
3.7 Structure J-6, various. ..... 66
4.1 Polychrome sherds showing geometric and naturalistic designs ..... 91
4.2 Polychrome sherds showing geometric designs ..... 92
4.3 Polychrome sherds showing geometric designs: variations of scroll and glyph forms ..... 95
4.4 Sherds showing incised, carved, and modeled decoration ..... 97
4.5 Sherds and miniature vessels ..... 98
4.6 Vessels. ..... 99
4.7 Vessel shapes, actual and reconstructed, in their relation to wares ..... 100
4.8 Vessel shapes, actual and reconstructed, in their relation to wares ..... 102
4.9 Vessel shapes, actual and reconstructed, in their relation to wares ..... 104
4.10 Part of the plan of the city of Piedras Negras ..... 109
4.11 Map of the Maya area ..... 114
4.12 Human figurines with Form A heads ..... 123
4.13 Human and animal figurines, personal ornaments, and miscellaneous objects ..... 125
4.14 Human and animal figurines, personal ornaments, and miscellaneous objects ..... 126
5.1 Structure J-3 plan ..... 142
5.2 Composite section at top ..... 143
5.3 Lower southwesterly corner of main stairway and masonry altar, Second Terrace ..... 147
5.4 Structural retaining wall under latest main stairway exposed by cut through steps ..... 148
5.5 Objects ..... 151
6.1 Acropolis at Piedras Negras ..... 156
7.1 Isometric reconstruction: Series Two, Phase G ..... 186
7.2 Isometric reconstruction: Series Two, Phase F ..... 186
7.3 Isometric reconstruction: Series Two, Phase E ..... 186
7.4 Isometric reconstruction: Series Two, Phase D ..... 186
7.5 Isometric reconstruction: Series Two, Phase C ..... 186
7.6 Isometric reconstruction: Series Two, Phase B ..... 186
7.7 Isometric reconstruction: Phase A of Series One ..... 191
7.8 Partial plan, Series One, Phase A ..... 192
7.9 Composite section, including Sections E-F, G-H, and I-J ..... 194
7.10 Section K-L ..... 194
7.11 Section M-N ..... 194
7.12 Composite section, Sections O-P and Q-R ..... 194
7.13 Section U-V ..... 194
7.14 Section S-T ..... 194
7.15 Section W-X ..... 194
7.16 Small plain stela ..... 198
7.17 Masonry of pyramid (Unit Z) ..... 199
7.18 Masonry of pyramid stair, side wall ..... 200
7.19 Masonry of building platform (Unit X) and ruined piers (Unit W) ..... 200
7.20 Pier masonry of building (Unit W) ..... 201
7.21 Masonry of basal platform units ..... 202
8.1 Structure R-11-2nd-B isometric reconstruction ..... 206
8.2 Structure R-11-1st-B isometric reconstruction ..... 207
8.3 Structure R-11-2nd-A isometric reconstruction ..... 209
8.4 Structure R-11-1st-B isometric reconstruction ..... 215
8.5 Structure R-11-2nd-A isometric reconstruction ..... 216
8.6 Structure R-11a cross section ..... 217
8.7 Cross section: on long axis, southerly alley marker to Structure R-7b-2nd ..... 218
8.8 Cross section: southerly End-field, Units Ls and H ..... 219
8.9 Cross section: southerly End-field, Units H, Db, and Bs ..... 219
8.10 Structure R-11-1st-A plan ..... 220
8.11 Drawings of markers ..... 222
8.12 Structure R-11a playing surfaces of Structure R-11a, looking west ..... 223
8.13 Playing surfaces of Structure R-11b ..... 223
8.14 Cut section through alley floor exposing veneer slabs of Structure R-11b bench face ..... 224
8.15 Apron marker (Stela 45) ..... 225
8.16 Trench through late fill and debris of Structure R-11b and Structure R-12 ..... 227
8.17 Phase C of West Group Ball Court isometric reconstruction ..... 229
8.18 Phases B and A of West Group Ball Court isometric reconstruction ..... 230
8.19 Structures K-6a and K-6b cross section ..... 230
8.20 Plan of West Group Ball Court ..... 231
8.21 Diagram showing projection of points on Units Ca and Cb ..... 232
8.22 Drawing of fragments of stop surface marker from Structure K-6 ..... 235
8.23 General view of West Group Ball Court ..... 238
8.24 Southerly outer corner of Unit Ca ..... 239
8.25 Corresponding corner of Unit Cb ..... 240
9.1 Isometric section and drawings: sweathouse at Aguacatán, Guatemala ..... 243
9.2 Modern sweathouse at Tepoztlán, Mexico ..... 244
9.3 Modern sweathouse at San Martín de los Pirámides, near Teotihuacán, Mexico ..... 245
9.4 Modern sweathouse No. 1 at Chichicastenango, Guatemala ..... 245
9.5 Modern sweathouse No. 1 at Milpa Alta, Mexico ..... 246
9.6 Modern sweathouse No. 2 at Chichicastenango, Guatemala ..... 246
9.7 Modern sweathouse at Aguacatán, Guatemala ..... 247
9.8 Structure N-1-1 st-B isometric reconstruction ..... 267
9.9 Structure N-1-1 st-A isometric reconstruction ..... 268
9.10 Structure N-1-1st-A plan ..... 268
9.11 Isometric reconstruction of sweatroom and firebox of Structure N-1-1st-A ..... 269
9.12 Structure N-1-1 st-A cross sections through firebox ..... 270
9.13 General view, enclosing building and sweatroom ..... 271
9.14 Structure N-1-1st-A partly excavated sweatroom and firebox ..... 272
9.15 View similar to that of Figure 9.14 ..... 273
9.16 Looking down on sweatroom ..... 274
9.17 Front of firebox ..... 274
9.18 Longitudinal cut section through debris in firebox; note closely packed sherds in quantity, fallen from sherd wall still to be reached ..... 275
9.19 Surviving base of sherd wall ..... 276
9.20 Interior of firebox seen through its front opening ..... 277
9.21 Structure N-1-1st-B pier and building platform wall ..... 278
9.22 Structure $\mathrm{N}-1-1 \mathrm{st}-\mathrm{B}$ wall and semi-vaulting interior of sweatroom ..... 279
9.23 Structure $\mathrm{N}-1-1 \mathrm{st}-\mathrm{B}$ exterior face of wall ..... 279
9.24 Structure N-1-1st-B cut section through debris in sweatroom. ..... 279
9.25 Structure S-19 isometric reconstruction ..... 281
9.26 Structure J-17 isometric reconstruction. ..... 282
9.27 Structure O-4 isometric reconstruction. ..... 283
9.28 Structure S-2 isometric reconstruction ..... 284
9.29 Structure S-4 isometric reconstruction ..... 285
9.30 Structure R-13 isometric reconstruction ..... 286
9.31 Structure S-19 cross section at center with reconstruction. ..... 287
9.32 Structure J-17 cross section ..... 287
9.33 Structure O-4 cross section ..... 288
9.34 Structure $\mathrm{S}-2$ cross section ..... 289
9.35 Structure S-4 cross section ..... 290
9.36 Structure R-13 cross section ..... 291
9.37 Structure J-17 interior of sweatroom ..... 291
9.38 Structure O-4 doorway and sunken passage of sweatroom ..... 292
9.39 Structure S-4 lintel and doorway of sweatroom ..... 292
9.40 Structure R-13 lintel and doorway of sweatroom ..... 293
9.41 Structure P-7-3rd isometric reconstruction ..... 294
9.42 Structure P-7-2nd-F isometric reconstruction ..... 294
9.43 Structure P-7-2nd-E isometric reconstruction ..... 294
9.44 Structure P-7-2nd-C isometric reconstruction. ..... 294
9.45 Structure P-7-2nd-A isometric reconstruction ..... 294
9.46 Structure P-7-1st-A isometric reconstruction ..... 294
9.47 Drawings of Structure P-7-1st-A ..... 295
9.48 Structure P-7 composite longitudinal section ..... 296
9.49 Composite longitudinal section of units exposed near right front $(\mathrm{W})$ corners of platform units shown ..... 297
9.50 Longitudinal section near left rear (E) corner of final sweatroom ..... 297
9.51 Longitudinal section in final sweatroom ..... 297
9.52 Longitudinal section through left (SE) half of final sweatroom. ..... 297
9.53 Composite front-rear, left section ..... 301
9.54 Composite front-rear, right section ..... 302
9.55 Front-rear section through front wall of sweatroom of final period (Unit 8) ..... 302
9.56 Front-rear section on line through sweatroom of final period ..... 302
9.57 Isometric reconstruction of enclosing building, sweatroom, and firebox of Structure P-7-1st-A ..... 304
9.58 Structure P-7-1st-B and -A ..... 305
9.59 Structure P-7-1st showing ruin of central and right (observer's left) portions ..... 307
9.60 Structure P-7-1st-B showing right front corner of enclosing building ..... 307
9.61 Structure P-7-1st looking down into front room or gallery ..... 308
9.62 Structure P-7-1st-B front façade of sweatroom ..... 309
9.63 Structure P-7-1st seen from right rear. ..... 310
9.64 Structure P-7-1st ruin of firebox ..... 311
9.65 Structure P-7-1 st, seen from right ..... 313
9.66 Structure P-7-1 st right front corner of enclosing building ..... 314
9.67 Structure P-7-1 st broken section through right end of wall of enclosing building ..... 314
9.68 Structure P-7-1st inner faces of walls and semivaulting above sweatroom ..... 315
9.69 Structure P-7-1 st showing Ruin of semivaulting over sweatroom ..... 316
10.1 Structure F-3 isometric perspective reconstruction ..... 318
10.2 Structure F-3 plan and sections ..... 319
10.3 Inner building-wall masonry ..... 319
10.4 Cut section through debris in room of Structure F-3 ..... 320
10.5 Capstones from debris of Structure F-3 ..... 321
10.6 Structure F-3 masonry of Unit C, front center ..... 322
10.7 Masonry of all units, at rear ..... 323
10.8 Structure F-4 isometric perspective reconstruction ..... 324
10.9 Structure F-4 plan and section ..... 324
10.10 General view of Structure F-4 excavation ..... 325
10.11 Structure F-4 partition masonry ..... 325
10.12 Structure F-4 capstones from debris ..... 326
10.13 Structure O-18 isometric reconstruction ..... 329
10.14 Structure O-7-1st isometric reconstruction ..... 333
10.15 Structure O-7 plan ..... 336
10.16 Row of seven altars in position on corridor ..... 337
10.17 Rule on surface of Unit 4 ..... 338
10.18 Rectangular column replaced in Cist 1 ..... 338
10.19 Excavated part of Unit 4 ..... 339
10.20 Structures V-1-3rd-A and B isometric reconstruction ..... 343
10.21 Structure V-1-2nd-B isometric reconstruction ..... 343
10.22 Structure V-1-2nd-A isometric reconstruction ..... 344
10.23 Structure V-1-1st-B isometric reconstruction ..... 346
10.24 Structure V-1-2nd-B and -A plan. ..... 347
10.25 Structure V-1-1st-B plan ..... 348
10.26 Composite front-rear section (Sections C-D and E-F) ..... 349
10.27 Longitudinal section through units of all structural periods ..... 349
10.28 Rear-front section through units of all structural periods ..... 349
10.29 Longitudinal section through units of Structure V-1-1st and Structure V-1-2nd-B ..... 349
10.30 Front-rear section of Pit 6 ..... 349
10.31 Section of Pit 5 ..... 349
10.32 Section of Pit 4 ..... 349
10.33 Section of Pit 2 ..... 349
10.34 Plan and Section of Burial 1 ..... 355
10.35 Sub-Acropolis Structures 1, 2 and 3 isometric reconstructions ..... 363
10.36 Cross section of Sub-Acropolis Structure 3 and remnant of Structure 4 ..... 364
10.37 Hypothetical reconstructed section, medial wall of Structure 3-C ..... 371
10.38 Masonry at left front corner of Structure 3 ..... 372
10.39 Remains of building platform of Structure 3 and of facing of high terrace in Pit 2 ..... 372
10.40 General view of excavation showing Structure 3 below floor of Structure J-7-1st and -2nd ..... 372
10.41 Structure P-6 isometric reconstruction ..... 373
10.42 Structure P-6 cross section ..... 374
10.43 Longitudinal section (in overlapping segments) ..... 375
10.44 Megalithic lower flight of stairway ..... 376
10.45 Structure O-2 composite cross section ..... 377
10.46 Structure J-19 cross section ..... 379
10.47 Structure J-24 cross section ..... 381
10.48 Structure S-5 partial isometric reconstruction ..... 382
10.49 Structure S-5 composite cross section ..... 383

## Tables

3.1 Decipherment of the inscription on Throne 1 ..... 72
3.2 Index of wall thickness and room width, Structures J-2, J-6, and J-9 ..... 85
3.3 Cross section and façade measurements, Structures 2, 6, and 9 ..... 86
4.1 Relationship of decoration to wares ..... 106
4.2 Frequency of sherds by stratigraphic unit ..... 110
4.3 Pottery associated with dated monuments ..... 111
4.4 Pottery associated with tentatively dated building levels ..... 111
4.5 Pottery considered late from position as final deposit ..... 111
4.6 Distribution of heads and complete figurines ..... 129
6.1 Comparison of stratigraphic designations between Uaxactun and Piedras Negras ..... 176
6.2 Association of stela and structures ..... 180
7.1 Structure R-9 adopted scheme of temporal sequences ..... 185
7.2 Structure R-9 stratification table ..... 187
7.3 Structure R-9 average dimension tables: platform units ..... 189
7.4 Structure R-9 average dimension tables: terraces ..... 190
7.5 Structure R-9 average dimension tables: aprons ..... 190
7.6 Structure R-9 average dimension tables: stages (latest phase) ..... 191
7.7 Structure R-9 average dimension tables: Building (Unit Z) ..... 193
7.8 Structure R-9 object table (Operation S-21) ..... 195
8.1 Structure R-11 adopted scheme of temporal sequences ..... 211
8.2 Structure 20 stratification table ..... 212
8.3 Structure R-11 playing alley dimensions ..... 214
8.4 Structure R-11 apron dimensions ..... 221
8.5 Structure R-11 average dimension table: structures ..... 225
8.6 Structure R-11 average dimension table: alley ..... 226
8.7 Structure R-11 average dimension table: end fields ..... 226
8.8 Structure R-11 object table (Operation S-1) ..... 226
8.9 Structure K-6 metric dimensions. ..... 233
8.10 Structure K-6 alley dimensions ..... 234
8.11 Structure K-6 average dimensions table: structures ..... 234
8.12 Structure K-6 average dimensions table: alley ..... 236
8.13 Structure K-6 object table (Operation W-7) ..... 236
9.1 Metric dimensions for archaeological and ethnographic sweathouses. ..... 253
9.2 Comparative trait table of ethnographic sweathouses ..... 254
9.3 Comparative trait table of archaeological sweathouses (N-1, S-19, J-17, O-4, S-2, and S-4) ..... 257
9.4 Comparative trait table of archaeological sweathouses (R-13 and P-7) ..... 258
9.5 Comparative trait table of archaeological sweathouses (P-7) ..... 260
9.6 Summary tabulation of the ABCYZ Complex ..... 262
9.7 Scheme of temporal sequences (Structure N-1) ..... 264
9.8 Scheme of temporal sequences (Structure N-1) ..... 264
9.9 Structure N-1-2nd metric dimensions. ..... 277
9.10 Structures J-20, P-7-1st, and N-1-2nd dimensions ..... 277
9.11 Average dimension tables: platform units ..... 278
9.12 Average dimension tables: building units ..... 278
9.13 Structure N-1 object table ..... 280
9.14 Average dimension tables: platform units (building platforms, probably limiting the dimensions of enclosing buildings) ..... 284
9.15 Average dimension tables: building units (sweatrooms). ..... 286
9.16 Distribution of pottery and stucco (Structures S-2, S-19, J-17, and O-4) ..... 293
9.17 Structure P-7 scheme of temporal sequences. ..... 298
9.18 Table of selected stratifications ..... 308
9.19 Structures P-7-1st, J-11-1st, and F-4 vaulted buildings ..... 309
9.20 Average dimension tables: basal platform units. ..... 311
9.21 Average dimension tables: supplementary platform units ..... 312
9.22 Average dimension tables: building platform units. ..... 312
9.23 Average dimension tables: building units of Structure P-7-1st-B and A ..... 313
9.24 Operation E-2 object table ..... 317
10.1 Average dimension tables: platform units ..... 320
10.2 Average dimension tables: stage elevation ..... 321
10.3 Average dimension tables: building (Unit A) ..... 321
10.4 Object table (Operation NE-2) ..... 322
10.5 Average dimension table: platform units ..... 325
10.6 Average dimension table: stage elevation ..... 326
10.7 Average dimension table: building (Unit A) ..... 326
10.8 Operation NE-3 object table ..... 327
10.9 Structure O-18 masonry pier measurements ..... 329
10.10 Structure O-7 scheme of temporal sequences ..... 334
10.11 Positions and dimensions of altars ..... 335
10.12 Average dimension table (Structure O-7-1st) ..... 341
10.13 Object table ..... 342
10.14 Structure V-1 scheme of temporal sequences ..... 345
10.15 Objects recovered with Burial 2 ..... 350
10.16 Average dimension table: platform units ..... 351
10.17 Structure V-1 building units: section table. ..... 352
10.18 Operation SE-1 object table: time of abandonment? ..... 353
10.19 Operation SE-1 object table: time of Burials 1-3. ..... 354
10.20 Operation SE-1 object table: time of Burials 1-3 or of B-1-1st-B ..... 356
10.21 Operation SE-1 object table: time of V-1-1st construction ..... 359
10.22 Operation SE-1 object table: time of V-1-2nd construction ..... 360
10.23 Operation SE-1 object table: before V-1-2nd ..... 361
10.24 Operation SE-1 object table: miscellaneous positions ..... 362
10.25 Average dimension tables: platform units ..... 365
10.26 Structure 3-C, average dimension tables: section table ..... 366
A-1 Thrones at Piedras Negras ..... 391
A-2 Benches at Piedras Negras ..... 392

## Introduction

Located in the karst and broken topography of the Middle Usumacinta River valley, Piedras Negras, Guatemala, was once the dynastic seat of a large Maya kingdom that included an urban core as well as numerous smaller centers located throughout the region. The site was occupied as early as 500 BC , but it was in the period from approximately AD 450-810 that the extent of settlement and the sheer monumentality of the architecture at Piedras Negras reached their apogee. By the 5th century AD, the rulers of Piedras Negras were major figures in the power politics of the Usumacinta drainage, involved in conflict, marriage alliances, and the control of client lords. By AD 808, however, the fortunes of the local dynasty had run their course, and the grand architecture of Piedras Negras ceased to serve as a seat of royal power. An ever-dwindling group of people continued to live amidst the remains of the dying city, with the last significant population abandoning the area before the end of the 9th century (see Houston, Escobedo, Child, Golden, and Muñoz 2003 for a detailed description of settlement history at Piedras Negras). Visitors, including Lacandon Maya, continued to venerate the ruins through the centuries, leaving pottery effigy vessels and burials amidst the crumbling buildings (Houston, Escobedo, Child, Golden, and Muñoz 2001:84-85), but Piedras Negras had largely passed out of living memory until the end of the 19th century.

The earliest published mention of Piedras Negras is in the travel writings of Ludovic Chambon (1994 [1892]:89-92). ${ }^{1}$ As Chambon wrote in 1892, "In all, I am the first aficionado that has visited the site to give a brief description [of the site]. I have, therefore, the right to baptize the site. We'll leave it with the name of the little logging camp nearby, that is to say, Piedras Negras."

Chambon's description is cursory, and he provides his impressions of only two monuments and one building, although others were surely visible. ${ }^{2}$ Unfortunately for Chambon, his book did not reach as wide an audience as he might have hoped. The site, therefore, remained apparently unknown to archaeologists and the wider public until 1894, when logger Emiliano Palma brought it to the attention of Teobert Maler (1901). ${ }^{3}$ Maler's initial
reconnaissance and photography were not followed up until Sylvanus Morley's (1937-38) documentation of the monuments of Piedras Negras in the 1910s and 1920s.

In the late 1920s, Horace Jayne, director of the University of Pennsylvania Museum, and American Section Curator J. Alden Mason were developing plans for a large expedition to the Maya area, in hopes of bringing monuments back to Philadelphia for display. Sylvanus G. Morley, head of the extensive Carnegie Institution of Washington's Maya program in Central America, and A. V. Kidder, a prominent archaeologist working in the American Southwest and Morley's successor at the Carnegie Institution, suggested to Jayne and Mason that Piedras Negras had particularly fine monuments and that the logistics of transporting them might not prove too difficult (Mason 1933).

Initially under the direction of Mason, the University Museum embarked upon an archaeological project that lasted from 1931 until 1939. Linton Satterthwaite, Jr., took over as director of the project in 1932 and continued in that capacity through its conclusion in 1939. The University Museum project focused its excavation efforts on the monumental architecture of the site, documenting building sequences in the site's palaces, ballcourts, temples, and sweatbaths. The results of the University Museum's excavations, along with contemporary work at sites such as Yaxchilán, Chichén Itzá, and Uaxactún, played an important role in the development of modern archaeology in the Maya area (see Black 1990 for details of this era in Maya archaeology). Satterthwaite's own attempts to wrestle with issues of building function and stylistic development sequences were, in many ways, groundbreaking works for their day (Satterthwaite 1939, 1940).

Some scholars (Coe 1992:169; Hammond 1982:55) have suggested that, other than preliminary reports, Satterthwaite and his colleagues issued few publications following the close of excavations in 1939. In some sense, their critique is justified. Indeed, apart from the Piedras Negras Architecture series, the archaeologists who actually directed work at the site produced little in the way of finished published material. As the editors of this
reissue, with the ability to look back over the body of published materials, we recognize, as did Satterthwaite himself, that there are serious problems with the form, content, and completion of excavations and publication of data. Satterthwaite is extremely forthcoming in the Preliminary Reports and Architecture series, noting in detail the problems in recording, excavation oversight, and publication, and we leave commentary in such matters to him.

Despite any such shortcomings, though, a brief glance through the list of monographs, dissertations, theses, journal articles, and essays in edited volumes provides abundant evidence of the significance of the work at Piedras Negras and indicates that there is a great deal of information concerning the University Museum's project available in the public domain.

Although Satterthwaite and his associates never published fully the results of their project, the material they excavated provided the basis for several important pieces of work.William Coe's (1959) doctoral dissertation on the caches and burials uncovered during the 1930s at Piedras Negras represents a groundbreaking attempt to provide a coherent typology of burials and caches in the Maya lowlands, as well as providing insight into the meaning of these remains in their cultural context. Several other doctoral and master's theses that followed (Bachand 1997; Holley 1983; Schlosser 1978) were also produced on the basis of materials recovered from Piedras Negras during the 1930s. Most important among these for more recent work at Piedras Negras is George Holley's dissertation (1983). Building on foundations laid by Mary Butler (1935) and Robert Rands (1973), Holley developed a type-variety ceramic chronology for Piedras Negras that has been expanded upon and refined, but not replaced (Bachand 1997).

Though not directly the result of excavation at Piedras Negras, perhaps the most important insight into Classic period Maya civilization inspired by the University Museum's project came from the epigraphic work of Tatiana Proskouriakoff. Proskouriakoff was a trained architect who was first introduced to archaeological fieldwork at Piedras Negras. Her role during the course of the project had been to assist in the completion of the site map and to make reconstruction drawings of the buildings that were excavated (see Solomon 2002 for details of Proskouriakoff's life and work). It was through her work as an artist, first with the University Museum and later with the Carnegie Institution, that Proskouriakoff initially made her mark on the field (Proskouriakoff 1946).

Proskouriakoff had developed an interest in epigraphy relatively early on in her career, and she had published an article in 1944 that, on the basis of an inscription, identified a jade recovered from the Great Cenote at Chichen Itza
as an object from Piedras Negras (Proskouriakoff 1944). But it was her recognition that a series of dates on stelae at Piedras Negras referred to the birth, death, and accession of Maya rulers that fundamentally changed Maya archaeology (Proskouriakoff 1950, 1960, 1961). Not only did her work represent a breakthrough in decipherment, it also represented a profound change in the thinking of archaeologists who could no longer deny that Maya hieroglyphs recorded, among other things, events in the lives of historical figures.

Although the excavations of the 1930s resulted, directly or indirectly, in these and other important publications, no further research was conducted at Piedras Negras for the next 58 years. ${ }^{4}$ The logistics of mounting a project at the site were enormous, and with the outbreak of a 30 -year civil war in Guatemala (Jonas 2000; Schirmer 1998; Stoll 1993) the Usumacinta River basin became a region of banditry and full-scale combat. With the cessation of hostilities and the official end of the Guatemalan civil war in 1996, a project at Piedras Negras became possible once again. After a complex series of negotiations with both the Guatemalan government and the leadership of the guerilla forces that still occupied the area around Piedras Negras, Stephen Houston of Brigham Young University and Héctor Escobedo of the Universidad del Valle de Guatemala initiated the Proyecto Arqueológico Piedras Negras, a four-year project of archaeological research at the site (Houston, Escobedo, Forsyth, Hardin, Webster, and Wright 1998; Houston, Escobedo, Hardin, Terry, Webster, Child, Golden, Emery, and Stuart 1999; Houston, Escobedo, Terry, Webster, and Emery 2000a; Houston, Stephen, Héctor Escobedo, Richard Terry, David Webster, and Kitty Emery 2000b).

Beginning in 1997, a bi-national team conducted excavation, mapping, and soil chemical research at the site of Piedras Negras itself (Houston, Escobedo, Forsyth, Hardin, Webster, and Wright 1998; Houston, Escobedo, Hardin, Terry, Webster, Child, Golden, Emery, and David Stuart 1999; Houston, Escobedo, Terry, Webster, and Emery 2000a; Houston, Stephen, Héctor Escobedo, Richard Terry, David Webster, and Kitty Emery Houston, Escobedo, Terry, Webster, and Emery 2000b; Parnell, Terry, and Golden 2001), while reconnaissance of peripheral sites explored the boundaries of the Piedras Negras polity (Golden 2003; Golden, Barrientos Q., Hruby, and Muñoz 1998; Golden, Escobedo, and Houston 2000; Houston, Escobedo, Hardin, Terry, Webster, Child, Golden, Emery, and David Stuart 1999; Houston, Escobedo, Terry, Webster, and Emery 2000a). Research included a strong focus on monumental architecture, but this was complemented by the excavation of smaller household-groups within the site core (e.g., Urquizú, Wells, Aguirre, Monterroso, Arredondo, and Román
1999), as well as settlement survey in the near-periphery of the site (e.g., Kovak and Webster 1999; Webster and Kovak 1999), producing a more complete picture of the range of variation in site use through time.

## Piedras Negras Preliminary Papers

This reprint of the Preliminary Papers of the University Museum's archaeological project at Piedras Negras makes these important pieces of work widely available for the first time. The original run of these papers was extremely limited: approximately twenty copies were circulated to interested scholars (Danien 1991). Today only six original copies exist in academic libraries (see the Preparation for Publication section below). The originals of the five-part Preliminary Papers are, on first glance, unimpressive. Typewritten, with hand-scrawled corrections on standard $8.5 \times 11$ inch sheets, they were never intended for wide distribution, and it shows. For their primary author and editor, Linton Satterthwaite, they represented a stopgap measure in the process of publishing the abundant data being produced by researchers at Piedras Negras. Satterthwaite recognized the shortcomings of the Preliminary Papers, but he also knew that dissemination of this work was crucial and that there was little hope of a more luxurious venue for the results of this research during the height of the Great Depression (Danien 1991).

Although they are unbecoming, the original Preliminary Papers nonetheless represent seminal works in the field of Mesoamerican archaeology that often go unrecognized for their significant contributions. Preliminary Paper 1 outlines the methodology of recording excavation data used at Piedras Negras. In this paper Satterthwaite elaborates for the first time his hierarchy of construction phase and building names. Modified slightly during the University Museum's later Tikal Project (Shook and Coe 1961) this system of nomenclature is the basis for recording methods used on many archaeological projects in the Maya area to this day.

Preliminary Paper 2 presents the results of excavation in the South Group Ball Court, Structures R-11-a and R-11-b, along with early results of work in the West Group Ball Court, Structure K-6-a and K-6-b. The excavation of such structures is commonplace for archaeologists today, taken for granted as part and parcel of any research at a Mesoamerican site. But Satterthwaite, working on the suggestion of Morley based upon his work at Yaxchilán with Karl Ruppert (Morley 1931), as well as the work of Frans Blom (1930) and Maler (1903:134), was one of the first archaeologists to excavate a Classic period Maya ballcourt as a ballcourt, rather than a grouping of two buildings. Satterthwaite was among the first archaeologists
in the Maya area to strive for an understanding of architecture in terms of its ancient social and cultural functions and meanings rather than merely as examples of ancient masonry.

Similarly, Preliminary Paper 3 identifies the function and social role of two of the structures in the Piedras Negras Acropolis as "palaces." This was an interpretation that caused Satterthwaite some difficulties, which he was not able to resolve to his satisfaction. Lacking decipherment of the hieroglyphic inscriptions on the many monuments found in the Acropolis, he could not at that time securely link royal figures with the architecture that he was excavating. He could not know whether the images on the monuments depicted kings, priests, or deities. Yet, in order to facilitate comparison between Piedras Negras and other Maya sites where excavators had used the term, he accepted the interpretive leap in designating the long, galleried buildings of the Acropolis as palaces, implicitly identifying these masonry ruins as the home of a royal court.

The fourth Preliminary Paper is the only one not authored by Satterthwaite. Mary Butler's study of the ceramics collected at Piedras Negras proved pivotal to Satterthwaite's reconstructions of site history. Butler's reconstruction of ceramic chronology was bolstered by Satterthwaite's innovative integration of architectural construction sequences and dates recorded on the abundant stela and other carved monuments, which allowed for the assignment of absolute dates to both the architectural and ceramic sequences well before the days of radiocarbon dating. Butler also took the initiative to conduct her own test-pitting program in order to better understand the ceramic sequence and flesh out the site chronology.

Preliminary Paper 5 continues the trend to seek an understanding of the transformation of architecture and of social meaning. Satterthwaite uses analyses of portable objects and architectural sequences to develop a picture of Structure J-3, a pyramid dominating the southwestern side of the Acropolis, which may never have been completed. Or, if it was completed, the structure represents a fundamentally different architectural form from other temple-pyramids at Piedras Negras, with concomitant social distinction.

Taken as a group, these Preliminary Papers represent an important contribution to Mesoamerican archaeology. Together with the Piedras Negras Architecture series, they are the most coherent publication of primary excavation data available from the University Museum excavations. ${ }^{5}$ These papers provide basic, primary reference materials that should be used by modern scholars for interpreting the material remains recovered from Piedras Negras in the 1930s. Moreover, for those interested in understanding the field of Americanist
archaeology, the Preliminary Papers constitute an important piece of history, offering invaluable insight into the development of archaeology in the Maya area during the 20th century.

## Piedras Negras Archaeology: Architecture

Although they follow a similar serial format to that of the Preliminary Papers, with publications grouped around building function, the Architecture series was a more robust series of publications, issued following the close of fieldwork in 1939. Despite the lack of funds available to support publication of the Piedras Negras project results, Satterthwaite was determined to see as much data as possible made available as quickly as possible to scholars. Unfortunately, the process was drawn out from 1944 to 1952, and was never completed. Support for continued publication was apparently not forthcoming from the University Museum, and Satterthwaite's colleagues from Piedras Negras had turned to other pursuits. Satterthwaite himself was eventually pulled away to conduct research, first at Caracol in Belize, and later as part of the University's Museums Tikal Project. ${ }^{6}$

The first fascicle produced was a basic introduction to the site issued in 1943. This was followed in 1944 by a report on temples that built on Preliminary Paper 5 and several publications of Satterthwaite's concerning templepyramids at Piedras Negras and in the Maya area more generally. This volume, however, focused specifically on Structure R-9 in the South Group of Piedras Negras. Such a focused work followed Satterthwaite's intent, expressed in the first Piedras Negras Architecture volume, to use his limited publications resources to disseminate data concerning exemplary structures. This data was to be generalized to other structures of the same functional type to facilitate inter-site, and intra-site, comparisons.

Following the volume on Temples, the third fascicle should have been Piedras Negras Architecture 3: Palaces. It is unclear why this was never published when later portions of the series were completed. There is no incomplete manuscript to indicate that it was being worked on, and nothing to indicate if there was an intended publication date. Satterthwaite may have been leaving this volume for last, on the premise that excavations in the Acropolis would have required the most effort to bring together in publishable form. Or perhaps he was still struggling with the issue of defining a palace. In the first volume of the architecture series he promises that a functional definition of palaces based on appropriately local evidence is forthcoming, and perhaps he continued to work over this issue, never coming to a conclusion.

Whatever his reasons, Satterthwaite skipped over palaces to move on to other architecture. Once again building on the Preliminary Papers, Satterthwaite bolstered his earlier publications on the ballcourts of Piedras Negras with the third publication in the Architecture series. This piece made available far more detailed excavation results than had the Preliminary Papers for Structure R-11 in the South Group. More importantly, it completed the promise implied in the second Preliminary Paper, which had included a preliminary note on the West Group Ballcourt Structures K-6a and K-6b.

Rounding out the publications from 1944 is not Piedras Negras Architecture 5, but 6. Here Satterthwaite provides data for those buildings that he was unable to classify. He suggests possible functions for several structures, but recognizing the intrinsic problems with typologies, he refuses to pigeonhole these buildings. Instead he provides the reader with what information is available and leaves the structures open for later interpretation.

The final fascicle (Piedras Negras Architecture 5) issued in the series was the volume on sweatbaths. Although sweatbaths are to be found at many sites, particularly in the Usumacinta drainage, Piedras Negras is unusual for its abundance of masonry sweatbaths. In this publication, Satterthwaite presents data from the excavations in all eight sweatbaths.

Following the publication of the last Piedras Negras Architecture fascicle in 1952, Satterthwaite moved on to other projects. Other researchers took up the challenge of publishing the results of the project (e.g., Coe 1959, Holley 1983), but the series was not continued.

## The University Museum and the Maya Area

The publication of these works represents an important contribution to Maya studies in and of itself. As historical documents, the Preliminary Papers and Architecture series must also be understood within the context of the people and institutions that produced them. The University of Pennsylvania Museum's investigation of Piedras Negras was the institution's first major archaeological initiative in the Maya area, but it was certainly not the earliest work in the Maya area for museum researchers; nor would it be the last.

The Museum's forays into Mesoamerica began with Daniel Garrison Brinton's collection and study of Maya texts in the 1880s and the acquisition of the Karl Hermann Berendt Linguistic Collection. At the end of the 19th and during the early decades of the 20th century explorations sponsored by the Museum were made in Yucatan by Henry Mercer (1895) and Robert Burkitt in Guatemala (1913).

The beginning of the 20th century witnessed an increase in the number of the Museum's activities in Central America. Robert Burkitt lived in the highlands of Guatemala for most of the period between 1913 and the mid-1940s. While there, he engaged in archaeological research at Chamá, Nebaj, Kixpek, and other sites in the central and western highlands of Guatemala. In addition to his work with the ancient Maya, he also engaged in ethnographic and linguistic research, particularly with the Kekchí Maya. Other Mayanist investigations conducted by the University Museum before 1920 include the archaeological reconnaissance of G. Byron Gordon in Mexico and Yucatan in 1910, from which he published details of his visit to Chichén Itzá in a 1911 Museum Journal. Gordon's 1913 publication of the Book of Chilam Balam of Chumayel from Karl Berendt's manuscript collection also marked an important ethnohistorical contribution.

During the 1920s the Museum's field research in Central America waned, with the exception of Burkitt's continuing explorations in the Guatemalan highlands. The most important outcome of those years was the remarkable three-volume publication, Examples of Maya Pottery in the Museum and Other Collections, published in 1925, 1928, and 1943. These books were beautifully illustrated by Mary Louise Baker and other artists, and the original plates are still kept in the Museum Archives.

Fieldwork in the Maya area resumed in the 1930s with the first of several large-scale projects undertaken by the Museum. Late in 1930, Percy C. Madeira, Jr., and J. Alden Mason participated in the University Museum-Fairchild Aerial Survey, the first of its kind in southern Mesoamerica. They surveyed some 2,500 miles of Guatemala in a Sikorsky Amphibian biplane, and took over 200 aerial photographs, revealing numerous unreported archaeological sites, including the massive Preclassic period site of El Mirador.

As detailed above, it was during this same period that Piedras Negras was investigated.

At the end of the 1930s Mary Butler, who had directed the ceramic analysis of materials from Piedras Negras, began archaeological research in the Guatemalan highlands, continuing Burkitt's work in some areas. She excavated near San Pedro Carchá, as well as Chamá and Nebaj, focusing on the ceramics, and developing a ceramic sequence for the region.

During and after World War II the University Museum halted most Mesoamerican research as personnel were drawn to other positions. Researchers continued to publish, and in addition to articles and reports on the archaeology of Piedras Negras, Linton Satterthwaite published his Concepts and Structures of Maya Calendrical Arithmetic, one of many contributions
to the growing field of epigraphy. Satterthwaite continued to put forward plans for archaeological expeditions, such as the one he proposed with Giles Healey for an archaeological survey of sites in Chiapas in the area around Bonampak, but he was unable to find institutional support for such an endeavor.

The 1950s was a period of resurgence in fieldwork for the Museum. In 1950 Satterthwaite began working at various archaeological sites in western Belize, including Caracol, Xunantunich, and Cahal Pech. He spent most time surveying sites and recording monuments, although he also conducted limited excavations at several sites, particularly Caracol. In 1954 a project was initiated at the site of Chalchuapa in El Salvador. Research was expanded, and eventually published, by Robert J. Sharer.

But it was in 1956 that the Museum began its most extensive archaeological research project. Initially directed by Edwin M. Shook, an extensive program of survey, mapping, and excavation was begun at the site of Tikal. Work continued under Satterthwaite's former student William R. Coe until the end of 1969. Satterthwaite acted as project epigrapher on the Tikal Project, and also undertook investigations at nearby sites, including Xutilha. The work at Tikal was Satterthwaite's last field project. But the University Museum continued to sponsor work in the Maya area, directed first by Coe at Tayasal on the shores of Peten Itza, and later by his former student and successor as American Section curator, Robert Sharer, in the Salama Valley, and Quirigua in Guatemala, and most recently at Copan in Honduras.

## Preparation for Publication

Consultation of holdings records in national bibliographic databases indicates that fewer than 10 copies of the Piedras Negras Preliminary Papers presently exist. The fascicles of Piedras Negras Archaeology: Architecture, although never completed, are available in a greater number of libraries (approximately 75), a function of the original print run. Copies of the Piedras Negras Preliminary Papers and the Piedras Negras Archaeology: Architecture in the University of Pennsylvania Museum Library have been well read over the years and are today in extremely fragile condition. It is not clear in what condition these original copies are to be found outside the Museum Library. That this material should be put expeditiously into print and disseminated with minimal additions and limited effort was our goal.

In addition to the Preliminary Papers and Architecture fascicles, the original fieldnotes, photographs, and other documentation from the Piedras Negras Project are available in the University of Pennsylvania Museum

Archives. ${ }^{7}$ Documentation, comprising approximately 3.2 linear shelf feet, includes early correspondence and preliminary reports to excavation and survey field notes (most notably Mason's and Satterthwaite's maps, ${ }^{8}$ drawings of stelae, ${ }^{9}$ reconstructed building plans, ${ }^{10}$ collection lists, pottery analyses, and photographs). Other documents, including unpublished academic papers by Francis Cresson, are held in the Tikal Room archives among Linton Satterthwaite's personal library, curated by Dr. Christopher Jones. We have included here, as appendices, those previously unpublished documents we feel to be useful as important field data or in some cases as historical documents of the fieldwork. We have only included documents we believe represent finished works, leaving field notes and other such materials for the archives.

Complete editions of the Piedras Negras Preliminary Papers and Piedras Negras Archaeology: Architecture, as well as select unpublished documents, were scanned electronically and converted to Word format files. Unfortunately, many of the available documents were typescripts, in extremely poor condition, and with some handwritten marginal notes or staining. The resulting images usually required extensive editing or retyping of text. Although we have chosen to maintain the spirit and style of the original authors, the presentation of data in scholarly archaeological publications has changed since these contributions were originally written. In those cases where it was deemed appropriate, we have made changes to follow current conventions. The most obvious changes are explained here for the reader who may consult the originals.

## Fascicle Numbering

The original numbering of the Preliminary Papers and Archaeology: Architecture fascicles have been modified to provide a sequence of chapters, as follows:

| Preliminary <br> Papers <br> $(1933-1936)$ | Archaeology: <br> Architecture <br> $(1943-1954)$ | Current <br> Volume |
| :---: | :---: | :---: |
| 1 | - | 1 |
| 2 | - | 2 |
| 3 | - | 3 |
| 4 | - | 4 |
| 5 | - | 5 |
| - | 2 | 6 |
| - | 3 | 7 |
| - | 5 | 8 |
| - | 6 | 9 |
| - |  | 11 |

## Bibliographic Citations

Bibliographic citations were originally given in footnotes. Citations have been placed within the text rather than in footnotes in accordance with current stylistic conventions and to reduce the number of notes. The format of citations has been changed as well.

## References

All bibliographic references included at the end of each fascicle are consolidated into a single, comprehensive list of references. The bibliography lists the cited version as well as any more recent or complete edition that can be more easily consulted by the reader.

## Footnotes

Other than citations, the author's footnotes are retained as endnotes after each chapter. Editors' comments are used in a few instances where the scholar made an error or omission. The correct term is used in the text; an endnote gives the author's original term.

## Figures

The illustrations (line drawings and photographs) are reproduced from the original fascicles and are now numbered in a single sequence.

The line drawings, many by Tatiana Proskouriakoff, are borrowed in their entirety. The original photographs have not fared as well. The inclusion of numerous photographic illustrations was a concession to Satterthwaite's enthusiasm for the camera. Many of the photographs are small, often losing much of the detail the photographs were able to show. The passage of more than half a century has darkened the paper and faded the ink, reducing the contrast considerably.

The conversion of the original photographs to digital files has, in most cases, retained their usefulness. These are reprinted as faithfully as possible.

## Tables

None of the tables in the original texts were assigned numbers and few had titles. Table numbering and titles have been imposed by the editors.

## Orthography

To make these writings most useful to the current research community we have used only currently accepted orthography. In a few instances the spelling or presentation of place-names has changed from the original publications.

## Ridgway Color Codes

All Ridgway Color Codes used by Butler in her pottery analyses have been augmented with their Munsell equivalents.

## Acknowledgments

Many people provided expert information to help us ensure the overall accuracy of this publication. We thank them all for their assistance: Alessandro Pezzati, Sharon Aponte Misdea, Robert J. Sharer, Jeremy A. Sabloff and Christopher Jones and Stephen Houston, and Kevin Johnston recognized and supported the merit of reissuing the Piedras Negras material. Also, well-deserved thanks to the Museum's Publications staff, especially Matthew Manieri, coordinated and directed by Walda Metcalf, who produced the volume.

## Notes

1. David Stuart first brought this little-read book to the attention of the editors.
2. Chambon accurately describes the legs of Altar 3, the "Sacrificial Stone" at the river's edge, and the largely buried façade of the P-7 sweatbath, which he supposed to be a tomb.
3. Interestingly, Chambon had visited Alfred Maudslay at Palenque in 1891 and had presumably mentioned the existence of Piedras Negras to the British scholar.
4. An unpublished letter in the Shook Archives of the Universidad del Valle de Guatemala reveals that during the 1940s Linton Satterthwaite did, in fact, propose a new Piedras Negras project to the director of the University Museum. This project, never realized, was intended to focus on the regional settlement of small houses away from the site core.
5. The University Museum Archives houses the abundant field notes from the Piedras Negras project, but as they are raw field notes these represent a far more disjointed and difficult set of data to use.
6. An unpublished cartoon in Satterthwaite's file drawers, drawn by a colleague at the University Museum, depicts Satterthwaite chained to a desk writing the Piedras Negras reports, only to be dragged away to Caracol.
7. The textual records from the 1931-39 excavations at Piedras Negras, retained by the Museum Archives, University of Pennsylvania Museum of Archaeology and Anthropology, comprise 11 linear feet of correspondence, financial records, field notes and diaries, catalogs, and reports and publication materials. Contents notes for the expedition records were prepared by Alessandro Pezzati, Museum Archivist, in 1996, and Oversize Plans, Sections, and Drawings were analyzed by Elizabeth Norris in 1999. These documents are available for consultation at the Museum Archives. The material has been divided into the following eight series: Correspondence (1930-48; 1.25 feet), Financial Records (1930-39; 0.25 feet), Field Notes (1930-39; 4 feet), Object Catalogs (1930-73; 1 foot), Miscellaneous Notes, By Structure (1931-39; 0.5 feet), Miscellaneous Notes, Alphabetical (1931-73; 1 foot), Reports and Publications (1931-73; 1 foot), and Photograph Catalogs and Photographs (1931-39; 0.5 feet).

Correspondence consists mainly of letters from J. Alden Mason and Linton Satterthwaite, as field directors, reporting to Museum Director Horace H. F. Jayne on the progress of excavations, and letters to representatives of the Guatemalan and Mexican Governments regarding the contract, export permits, and other logistics. A copy of the contract is included. Correspondents include Frans Blom, Erwin P. Dieseldorff, Manuel Gamio, Eldridge R. Johnson, Oliver LaFarge, Percy Madeira, Leslie Moore, Sylvanus G. Morley, Emiliano Palma, Alvaro F. Perez, Oliver G. Ricketson, John Ross, C. A. Sanborn, M. C. Todd, and Francisco Villanueva. Financial records include accounts and receipts for the expedition, arranged chronologically. Field notes of J. Alden Mason are arranged chronologically by season. Notes of Linton Satterthwaite are arranged by architectural structures and other subjects. Notebooks by Mason, Satterthwaite, and Butler cover architectural structures, notes by excavator, catalogs and lists, and other notes. Surveyors' notebooks by Fred P. Parris and T. Egan-Wyer contain mapping information and measurements. Object Catalogs include catalogs of artifacts in English and Spanish, packing lists, and notes on the division of collections between Guatemala and the Museum. Also included are storage location lists for artifacts in the Museum and checklists by Museum and field number. The two series of Miscellaneous Notes (By Structure and Alphabetical) consist of notes taken in the field or written up as part of the post-season analyses, and cover a variety of topics and subjects, including material used in preparation of publications. Published material on the site, including reports to the Director, press releases, drafts of excavation monographs, and lecture material, are located in the series Reports and Publications. Photograph Catalogs and Photographs include a complete set of field photographs pasted in albums, arranged by field season. Oversize Plans and Drawings includes excavation maps, plans, and sections, as well as architectural reconstructions and drawings of artifacts. Documentation available for individual structures includes:

Structure F-3 (Notes); F-4 (Notes; drawings: isometric view; vault section; plan).

Structure J-1 (Notes; drawings, section, 3 plans); J-2 (Notes; drawings: 6 elevations; 4 sections; 4 plans; 2 sections; 3 plans; vault); J-3 (Notes; drawings: 2 sections; 1 plan); J-4 (Notes; drawings: elevation; 4 isometric views; 3 sections; 2 plans); J-5 (Notes; drawings : plan); J-6 (Notes; drawings, 3 isometric views; 3 elevations; 6 plans; 7 sections; vault); J-7 (Notes; drawings, elevation; plan; section); J-8 (Notes; drawings, elevation; plan; section; vault); J-9 (Notes; drawings, isometric view; 6 elevations; 5 plans; 3 sections; 3 vaults; text and tracings); J-10 (Notes; drawings, elevation; plan; 2 sections; vault); J-11 (Notes; drawings, isometric view; 8 elevations; plan; vault; 6 sections); J-12 (Notes; drawings, isometric view; 3 plans; section); J-13 (Notes; drawings, 3 elevations; plan; vault; 3 sections); J-17 (Notes; drawings, plan); J-18 (Notes; drawings, elevation; plan; section; vault); J-19 (Notes; drawings, section); J-20 (Notes; drawings, 3 plans); J-21 (Notes; drawings, elevation; 2 plans; 3 sections; vault); J-22 (Notes; drawings, elevation; 2 plans; section;
vault); J-23 (Notes; drawings, 2 elevations; 3 plans; 4 sections; vault); J-24 (Notes); J-29 (Notes; drawings, 7 isometric views; 8 plans; 7 sections).

Structure K-5 (Notes; drawings, mask drawing; 4 isometric views; 31 sections; 17 plans; also preliminary sketch of K-5 and K6 by Proskouriakoff; L.S. Original notes, J.A.M. Notes (Extracts), worksheets, reconstructions; Mary Butler report; stone tool tracing); K-6 (Notes; drawings, 2 isometric views; 4 plans; also preliminary sketch of K-5 and K-6 by Proskouriakoff); Drawings of Misc. Stone Sculpture 10, Ballcourt rubbings.

Structure N-1 (Notes; drawings, 4 isometric views; 2 sections; 1 plan).

Structure O-2 (Notes; drawings, section); O-3 (Notes); O-4 (Notes; drawings, isometric view; plan; O-7 (Notes); O-12 (Notes; drawings, plan); O-13 (Notes; drawings, 12 isometric views; 3 elevations; 14 sections); 17 plans; J.A.M. Extracts from Notes; Probably Wyer Notes for J.A.M. (1931; Notes and Tracings; Proskouriakoff Notes on drawings; L.S. Notes); Drawing of Misc. Stone Sculpture 16, 1936; O-15 (Notes; drawings, section; plan); O-16 (Notes; drawings, plan); O-18 (Notes; drawings, plan).

Structure P-6 (Notes; drawings, isometric view; section); P7 (Notes; drawings, 4 isometric views; 1 elevation; 9 sections; 6 plans; Notes and partial manuscript by J.A.M. (1936).

Structure R-1 (Notes; drawings, 7 isometric views; 3 elevations; section; 2 plans); R-2 (Notes; drawings, isometric view; plan); R-3 (Notes; drawings, 4 isometric views; 2 elevations; 3 sections; 8 plans; also 3 preliminary sketches by Proskouriakoff); R-4 (Notes; drawings, 2 isometric views; 2 elevations ; 6 sections; 3 plans; notes); R-5 (Notes; drawings, 2 elevations, section, 2 plans); R-7 (Notes; drawings, isometric view, 3 sections, 3 plans; Draft of text); R-9 (Notes; drawings, 2 elevations; 11 isometric views; 5 sections; 6 plans); R-10 (Notes; drawings, 2 elevations, isometric view, 1 plan; Notes); R-11a-b (Notes; drawings, 2 elevations, 4 sections, 3 plans); South Group Ball Court Sculptured Stone; R13 (Notes; drawings, isometric view); R-16 (Notes; drawings, isometric view, section, 4 plans; notes).

Structure S-2 (Notes; drawings, isometric view); S-4 (Notes; drawings, isometric view); S-5 (Notes; drawings, isometric view, section); S-17 (Notes; drawings, 2 isometric views, 4 sections, 2 plans); S-18 (Notes; drawings, 5 sections; 2 plans; 3 isometric views); S-19 (Notes; drawings, 5 sections; 3 isometric views; 2 plans).

Structure U-3 (Notes; drawings, isometric views; plan).
Structure V-1 (Notes; drawings, 2 isometric views); V-2 (Notes; drawings, isometric view);V-3 (Notes; drawings, isometric view).

Site map (Notes; drawings, 8 overall maps, including a Cresson tracing of Parris' map without Proskouriakoff changes.);

Site sections (Notes; drawings, 2 sections pencil on tracing paper (section A-B, C-D); West Group plans (Notes; drawings, 2 plans); Album drawings by Tatiana Proskouriakoff include: watercolors of Acropolis, Court 1-2, Acropolis West Group Plaza, Structure P7 (East Group); pencil drawings of Structure K-5-1st, Structure K-5-3rd, Structure K-5, Structure K-6, and Structure R-3; Cave 5 (plan, section, rendering); Column Altar sections by Linton Satterthwaite: Strs. K-5, J-29, O-16, R-1, R-2, R-3, R-5, R-9, R10, R-15; Lintel 3: 1 Watercolor reconstruction drawing by Mary Louise Baker, 1936; Drawings by T. A. Proskouriakoff of Stela 1, 1937; 19 Hieroglyph squeezes; 3 Lintel 57 squeezes.
8. The two most reliable site plans made for Piedras Negras include a map made by Oliver G. Ricketson for the Carnegie Institution of Washington and the version prepared for the Piedras Negras Project by Fred Parris. The correspondence of structure numbers assigned by Ricketson (Roman numerals) and Parris (alpha-numeric) follows: I/U-3; II/U-4; III/R-1; IV/R-3; V/R-4; VI/R-5; VII/R-7; VII/R-9; VIII/R-9; IX/R-10; X/R-11a; XI/R11b; XII/R-13. A more recent digital map based on the Parris map, including structures to the south and east of the site core, is being prepared by Zachary Nelson.
9. Photographs of individual stelae and other monumental sculpture from Piedras Negras are published by Maler (1901), Morley (1937-38), and Proskouriakoff (1950): Altar 1 (Maler 1901, Plate 8); Altar 2, support (Maler 1901, Plate 10); Altar 3 (Maler 1901, Plate 7.2); Altar 4 (Maler 1901, Plate 9); Stela 1 (Maler 1901, Plate 12); Stela 2 (Maler 1901, Plate 15.1); Stela 3 (Maler 1901, Plate 13); Stela 4 (Maler 1901, Plate 14); Stela 5 (Maler 1901, Plate 15.2); Stela 6 (Maler 1901, Plate 15.3); Stela 7 (9.14.10.0.0) Maler 1901, Plate 16); Stela 8 (Maler 1901, Plate 17); Stela 9 (9.15.5.0.0) Maler 1901, Plate 18.1); Stela 10 (Maler 1901, Plate 19); Stela 11 (Maler 1901, Plate 20.1); Stela 12 (Maler 1901, Plate 21); Stela 13 (Maler 1901, Plate 18/2); Stela 14 (Maler 1901, Plate 20.2); Stela 15 (Morley 1937-38:5, Plate 139); Stela 25 (Maler 1901, Plate 22); Stela 26 (Maler 1901, Plate 23); Stela 29 Maler 1901, Plate 24); Stela 31 (Maler 1901, Plate 25); Stela 32 (Maler 1901, Plate 26/1); Stela 33 (Maler 1901, Plate 26/2); Stela 34 (Maler 1901, Plate 27); Stela 35 (Maler 1901, Plate 28); Stela 36 Maler 1901, Plate 29); Stela 40 (Morley 1937-1938:5, Plate 135); Lintel 1 (Maler 1901, Plate 30 (fragment); Lintel 2(Maler 1901, Plate 31); Lintel 3 (Morley 1937-38:5, Plate 146); Lintel 4 (Maler 1901, Plate 32); Lintel 5 (Morley 1937-38:5, Plate 126); Lintel 7 (Morley 1937-38:5, Plate 126); Lintel 12 (Proskouriakoff 1950:110, Fig. 39D); Throne 1 (Morley 1937-38:5, Plate 40).
10. Correlation of Maler, Morley, and Parris (University Museum) Structure Designations.

Part I
Piedras Negras Preliminary Papers

# Description of the Site, with Short Notes on the Excavations of 1931-32 

## Introduction

J. Alden Mason

The ruins at Piedras Negras, in the far northwestern corner of the Department of Petén, Guatemala, just over the Mexican border and on the Usumacinta River which separates at this point Mexico from Guatemala, were not discovered until about 1894 when a lumberman of Tenosique, Mexico, still alive and visited by the writer this year, built a lumber camp at the site, gave the name the place, and discovered the fallen monuments. The reason for the recent date of its discovery was that practically all the buildings were completely ruined and all the monuments fallen and covered with vegetation and the pyramids converted to large mounds, so that an ordinary visitor might traverse the site without his attention being attracted to anything unusual. In contradistinction, the other known large cities of the Usumacinta Valley are much better preserved, with edifices largely intact. Palenque, further down-stream and closer to cultivated fields, had long been known and considered as one of the major sites of Mexico, and Yaxchilán, although further upstream and deeper in the forest, had been reported and described several decades earlier, notably by Charnay, in his Ancient Cities of the NewWorld.

The year after the discovery of Piedras Negras by the lumberman, Emiliano Palma, the latter brought the site to the attention of the great archaeological explorer, Teobert Maler, who was at that time exploring the region and making notes and photographs upon archaeological sites, old and new. Maler spent several months there during the summer of 1895 and returned again for several months more in the summer of 1899 under the auspices of the Peabody Museum of Harvard University. Time and funds being short, Maler attempted no excavations, devoting his attentions almost exclusively to disinterring and photographing the stela and other monuments. In this work he was interested mainly in the artistic phase, paying slight attention to the hieroglyphic inscriptions. Considering the difficulties of his work, living in a jungle in the rainy season, much of the time in a cave, with wetplate photography, he did a magnificent job. His report on
the site, published in 1901 as vol. 2, no. 1 of the Memoirs of the Peabody Museum of American Archaeology and Ethnology, and entitled Researches in the Central Portion of the Usumacinta Valley, containing some notes on other sites but consisting principally of his report on Piedras Negras, at once created great interest, as his plates of the monuments demonstrated that at this site Maya sculpture had reached its apogee and many of them have been reported frequently as examples of the finest Maya sculpture. Thus one of the very few Mayan monuments figured by Dr. H. J. Spinden in his American Museum handbook Ancient Civilizations of Mexico is Stela 13, which he states in the caption to be one of the finest examples of Mayan sculpture, and one of the five illustrations of Mayan sculpture chosen by T. A. Joyce for his work Mexican Archaeology is Stela 14.

As regards glyphic inscriptions the monuments at Piedras Negras are of great importance; two of the stela, 1 and 3, are reproduced in Dr. S. G. Morley's (1915) handbook, An Introduction to the Study of Maya Hieroglyphs. Regarding Stela 3, Morley (1915:235) says "All things considered, the inscription on Stela 3 at Piedras Negras is one of the most satisfactory texts that has been found in the whole Maya territory."

Apart from his admirable plates of the artistic phases of the monuments and his descriptions thereof, Maler's notes are of slight value except as pioneer work, and many of his statements and conclusions have been proved incorrect by the work of the University Museum Expedition.

Since Maler's day, few archaeologists have visited Piedras Negras, and virtually all that has been published about it has been based upon his work. Dr. Morley visited it several times for the purpose of recording the glyphic inscriptions, a phase of the work neglected by Maler. This Morley did, with his usual thoroughness, for the purpose of recording the data in his still unpublished work, The Inscriptions of Copán, for which the University Museum Expedition has been asked to prepare a description of Piedras Negras. Dr. Morley made many photographs, drawings and notes of the glyphs. Dr. Morley's assistant, Dr. Ricketson, made a plan of the site which was initially
of much use to the Expedition, but is now superseded by the map and plan drawn by Mr. Fred Parris, engineer and architect of the University Museum Expedition, upon which this first Piedras Negras Preliminary Paper is based. Dr. Morley will also utilize Mr. Parris' map in his publication. Dr. Morley's party discovered several new stela, some of them plain and eroded, but among them were two admirable ones, Stela 15 and 40.

## Choice of Piedras Negras for the Johnson Expedition

When the University Museum planned to conduct archaeological work in the Maya region, Piedras Negras was selected since it was felt that a site in the so-called Old Maya Empire area was particularly desirable because of its greater age and the probability that excavations would throw more light upon the question of the origins Maya culture. Moreover little work had been done in this region, and all authorities were agreed that further researches there were greatly to be desired. With the exceptions of the work done by the Peabody Museum of Harvard University at Copán, Honduras, about 1900, the present work of the Carnegie Institution of Washington at Uaxactún in Guatemala, some recent excavations by the British Museum and Field Museum of Chicago in British Honduras, and earlier investigations by the Archaeological Institute of America at Quiriguá in Guatemala, no excavations of any importance had been pursued.

Piedras Negras was particularly chosen from among the possible sites of the Old Maya Empire, largely on the advice of Dr. Morley. Its preference was due to the following causes: Piedras Negras stands preeminent among Maya cities in artistic sculpture; its series of carved and dated stela, one of which was apparently erected every five years, is the most complete and unbroken in the Maya region; it is more accessible than most of the ancient cities and therefore the problem of exporting characteristic examples of its monumental statuary was easier of solution; further, the situation of the site on a large river with ample water-supply promised unusual facilities for the camp.

Having decided upon Piedras Negras as the site to be worked, Dr. Mason made a trip to Guatemala City in 1930 for the purpose of making the necessary arrangements with the Guatemalan government and succeeded in arranging a very satisfactory contract with them, in pursuance of the terms of which the Eldridge R. Johnson Expedition of the University Museum has just completed its second year of research and excavation at Piedras Negras.

The expeditions of 1931 and 1932 were made possible by the scientific interest and the generosity of Eldridge R. Johnson of Moorestown, New Jersey, who
gave the necessary funds. In 1931 work was carried on at Piedras Negras from February $22^{\text {nd }}$ until June $10^{\text {th }}$ and in 1932 from March $19^{\text {th }}$ until June $10^{\text {th }}$. J. Alden Mason as Field Director, Linton Satterthwaite Jr., as Assistant Director, and Mrs. Satterthwaite accompanied both expeditions. The engineer of the 1931 expedition was T. Egan-Wyer, the engineer and architect in 1932 was Fred P. Parris, Jr. Miss Mary Butler and David Amram, Jr., completed the personnel of the party in 1932.

## Description of the Site, With Short Notes on the Excavations of 1931-1932

Linton Satterthwaite

## The Map

The earliest map of Piedras Negras is of course Maler's (1901, Pl. 33), which roughly located the monuments then known, some of the buildings, and the major topographical features of the central part of the city. In 1920 Dr. Morley published a sketch map to show location of the monuments, in which he numbered a few of the structures (1920:569). Neither of these maps made any pretence to completeness, except as to monuments. The impression given by them as to assemblage is incorrect in many particulars and it would be best for students of the older literature to acquire a new mental picture of the city plan.

The 1931 Eldridge R. Johnson Expedition of the University Museum, University of Pennsylvania, had the tremendous advantage of a copy of a third map of the city, made by Oliver G. Ricketson, Jr. for the Carnegie Institution of Washington. This was supplied to us, together with much helpful information and advice, by Dr. Morley, and enabled us to finds all the major features in the South, East and West Groups, with the greatest of ease. This map was the only one used during the 1931 season. That season, during which we were constantly crossing and recrossing the area covered, and clearing large areas, demonstrated the desirability of a completely new survey with a transit. This was to show the shapes, heights, orientation and assemblage of all terraces, platforms, mounds, and standing structures, small as well as large, and was to include peripheral areas not thus far recorded. This was about half completed in 1932 by Mr. Fred Parris, the Expedition's architect, and his work thus far is reproduced in Figs. 1.1 and 1.2.

We have disregarded Maler's nomenclature as to structures, and the ten numbers shown on the 1910 Morley sketch map, in favor of a block system explained below. Mr. Ricketson numbered the structures on his plan consecutively from I to XLIX, but that method is unsuited to a site where several years of work are
Figure 1.1 Ruins of Piedras Negras, Department of Petén, Guatemala
(see also Appendix 6 for enlarged map sections).



contemplated and new units are almost certain to be found in areas only partially surveyed. Had that map been published we should, of course, have followed its numeration. Maler's numeration of stela, altars and lintels (except Stela 29') has been retained with subsequent discoveries by the Carnegie Institution and the University Museum, numbered in sequence, so that nearly all structures on the earlier maps can be identified on the latest by association of the monuments. A table showing the equivalent structure numbers for all three published maps is also placed on the map.

Stela are omitted on the plan for three reasons. We have located the exact original positions of only a few. The reduction necessary here makes it impossible to show properly such small features without color. Dr. Morley will shortly publish the same map with stela shown in color.

We have numbered all mounds and partially standing buildings thus far surveyed. Nearly all buildings except the Acropolis palaces and Structure P-7 appeared as mere mounds before excavation. While many more are yet to be surveyed in the peripheral areas, we believe few, if any, have escaped us on the Acropolis, in the West and East Group plazas, the South Group Court, the elevated area between the latter and the East Group, and the Plaza of Structure R-1. The term "structure" is used in a broad sense and we have not hesitated to apply separate numbers top stairways, etc., where their separate identification appears useful.

The system of numeration used is a modification of that adopted by the Carnegie Institution at Chichén Itzá, where squares are identified by coordinate letters and numbers, as A-1, and all structures within the square are numbered in series, so that the first mound indicated in that square would be A-1-1. We felt that the presence of two distinct numbers in a designation tends to error and confusion, particularly in making notes; and since we can cover the main area with no more than 26 squares of reasonable size ( 20 m ) we have designated them by letters only. For example, K-5 is the fifth structure described in Square K, the letter of the square appearing within a circle at the southwest corner of the square. Where, as in this case, excavation has shown more than one period of construction, the periods will be further distinguished by numbering of the structures from the top downward, or, in cases of horizontal stratification, from outside inward. K-5 indicates the latest distinguishable structure from our chosen example; K-5-2 ${ }^{\text {nd }}$ the one immediately under it, and K-5-3 rd the next earlier, and so on. We cannot number from the bottom up, since we must publish references before all periods are known. To minimize the danger of confusion in using two numbers in a given designation, we use ordinal numbers for periods of building.

In making the survey Mr. Parris adopted a policy of methodically clearing and surveying the most important parts of the central groups first, without hurry and without skimping the number of points located. While we could not make small-interval contour maps of each mound, every point which seemed to have significance was accurately located horizontally and vertically with the transit from a station or stations on one of several traverses. The schematic representation of Structure R4, for example, is based on thirteen accurately located points, and indicates with virtual certainty the presence of a squarish pyramid with front stairway only. By refusing to be satisfied with what easily met the eye, Mr. Parris has made out a fair case that Structure R-16 is further elaborated by the use of in-set corners. Whether this proves true or not, we could not have been sure of even the general orientation of this structure, without locating more than four points at its base.

Contour lines are of course more approximately drawn, and show general slopes but not minor irregularities, of which there are many. Contour lines may be relied on, however, to indicate truthfully the relative base heights of all artificial constructions shown, to within the contour interval. In the original notes, the interval is 1 m , but a 2 m contour interval is the smallest that can be shown at the scale here used. Contour lines run under structures, i.e., when a contour line strikes a mound it stops, the mound being represented schematically. The contours are used primarily to indicate slopes which we do not yet know are artificial. Particularly along the river, large contoured areas may contain terraces or mounds, especially on the river side of the Acropolis. Datum, to which all elevations may be referred, is 9.8 m below the lowest point of the circular band of the Sacrificial Rock. It is approximate low water at that point.

Building plans are based on the taped measurements from at least two points (usually corners) located with the transit, assuming for the most part that what appears to be a right-angle corner is one. One exception is the South Group ball court (Structure R-11) where all-important points were located with the transit and checked with taped measurements. It is felt that, in future, right angles in buildings should not be assumed. However, minor corrections in ground plans which may be necessary on this score would be scarcely perceptible with the scale here used.

Broken lines and hatched portions of ground plans indicate probable features now destroyed, or, more usually, those still buried. We have not made these restorations except where almost certainly correct, as indicated by the known part of the plan or by the contours of the debris covering them. A case in point is Structure $\mathrm{J}-12$, the solid black representing excavation features and two or three piers projecting above the debris, the rest
of the plan being very clearly indicated by ridges, humps, and associated depressions of the debris as found.

The reader should be cautioned against supposing that all or many of the mounds shown on the map as flat are mere platforms. Probably most of them show some evidence of fallen constructions on the surface. A close study of these surfaces would amply repay the labor, but we have not had time as yet to make it. The concentration of the ground-plans in the West and East Groups is due to our concentration of work there, plus the much better state of preservation of the Acropolis palaces.

Solid lines and solid black poche on actual ground plans indicate definitely known features, though many walls have not been followed to floor-level.

Finally, Mr. Parris is responsible for the entire map with the following exceptions. The details of Structures O-12, P-7, O-13, K-5, and the lowest stairway of J-3 are from the notes and drawings of Dr. Mason, supplemented in the case of Structures P-7 and O-13 by sketch plans and sections made by Mr. T. Egan-Wyer, our engineer during the 1931 season. Details of Structures J-2, J-3, $\mathrm{J}-17, \mathrm{~J}-20$, and $\mathrm{J}-23$ are largely from plans and sections by the writer of this description, as are occasional other minor details in other parts of the Acropolis.

## General Description

In coming to the city from Tenosique the traveler will have noted that he has ascended a limestone plateau area rising to no great height above the coastal plain. He has been picking his way through the bottoms (often flat and boggy) of narrow irregular valleys entirely surrounded by limestone hills. The sides are more or less steep and it is frequently necessary to climb over rocky saddles from one valley to the next. The effect is mountainous, though the highest hills probably rise little more than 15 $m$ above the lowest adjacent valleys. At Piedras Negras the perpetually swift current of the Usumacinta has cut a bed many meters below the ends of tributary valleys, which lead to its banks on both sides. At low water the river rushes between eroded masses of bedrock and huge boulders. At high water it rises about 2 m to the wellmarked vegetation line.

Due to the incompleteness of the map this broken terrain does not there appear clearly. It would be well to bear in mind that the area northwest of the Acropolis is a valley with a bifurcated hill on its other (northwest) side, as high as, or higher than, the Acropolis; that a long, flat-topped hill perhaps twice as high curves around behind Structures K- 5 and O-13, though it is indicated on the map by only the lower contours. The South Group as shown is bounded at the south on the map only by a sharply descending bank, artificially reformed, but this is only the northerly side of Maler's "Transverse Valley," the southerly side being formed by a steep though not especially high hill.

The high hill behind Structures K-5 and O-13, and another (off the map) which bounds the valley of the Southeast Group, are narrow, perfectly flat-topped mesas presumably representing an original limestone plain at this level. The lower hills examined have been eroded to irregular forms. The sides of all abound in vertical or overhanging cliffs, many of considerable size, and extremely large fallen blocks of stone are common on the talus slopes. Numbers of true caves must exist, and if methodologically searched for could be found.

It should be noted that while on a map of the region access to the outside world, the coast plain to the north, appears easy by water, modern, and almost certainly ancient, river traffic is absolutely cut off by impassable rapids below the city. Upstream, however, the rapids are passable for dugouts, at least in the dry season, and direct river connection with extensive drainage areas to the south, southeast, and southwest may have been maintained in ancient times. Overland communication when the region was densely populated was probably much easier than at present. The present great obstacles are vegetation and, in the rainy season, mud, rather than the hills.

Nearly all of the area under consideration has been built upon, terraced, or leveled off. We know that filling was largely resorted to for leveling and terracing, but there may have been some removal of rock as well. There is plenty of evidence that the main groups were originally masses of bedrock and talus, with little or no subsoil.

As used here a "court" is a nearly level area, more or less rectangular, and more or less surrounded by mounds or buildings. A plaza is also approximately level, but it may depart much more from the rectangular form; it tends to be larger, and more often contains structures built within it as well as around its sides. Both are, in almost every case, artificially leveled.

The heights of unexcavated structures mentioned in the text are usually to the last whole meter; i.e., a recorded height of 13.19 or 13.91 m is called 13 m . This avoids a false impression of great exactitude, really meaningless in many cases, such as the top of a mound of debris. Plaza and court dimensions are also approximate. They vary with the points selected for measurement.

In using the terms left and right, unless the context plainly indicates otherwise, we mean the left or right of a structural unit, not of the observer. That is, if the observer stands facing the front of a structure, the left side of the structure (left in the text) is on his right. Use of left or right of the observer, natural at any one position, is felt to lead to confusion, as he sometimes looks toward and sometimes away from the structure being examined.

The site selected for the principal groups (except the Acropolis) is in a large pocket in the hills, open toward the river, its elevated surface devoid of major heights but
by no means level, being higher toward the east than near the river, and higher at the north than at the south. It is bifurcated by the ravine between the South and West Groups, which, with other valleys, makes the site of the South Group a tongue of land ending at the south.

To expand beyond this pocket it was necessary to terrace and surmount the enclosing hills, follow the valleys, or cross the river. We know that the first two expedients were adopted, and have an as yet unverified report from workmen sent to explore that there are mounds across the river.

The important thing to remember is that the general layout of the city was largely controlled by the broken terrain and could not expand according to any abstract plan; but that within the pocket there is no topographical feature now visible which would have prevented orientation of structures to the cardinal points. It would have been more difficult but apparently quite possible to so orientate whole courts if their dimensions were changed, and the present dimensions are obviously dictated in general by the topography.

The general principles followed seem to have been to place structures at the edges of ravines and valleys, gaining a false appearance of height when seen from the rear; to build them against hillsides, gaining actual height with a minimum of labor; and orientating the remaining free-standing structures around more or less rectangular courts and plazas, the general orientations of which were already determined by locations on the edges of depressions and against hillsides. It should be noted, however, that most courts and plazas are as large as natural terrain at present visible will permit, and their actual shape may have been determined to a greater extent than is now known, by contours now hidden.

The city as known falls into five general groups, in the main determined by the terrain. The influence of the terrain appears rather clearly on the plan and sections. North of the Acropolis is what we provisionally call the Northwest Group. We do not label it on the map because only part of it has been investigated, and less has been mapped. Further investigation in connecting valleys may require a modified nomenclature. Structure J-29 fronts on the plaza of this Group.

The West Group lies for the most part in Squares J and K, and includes the Acropolis and its three courts of long palaces. It is very much cut off from the Northwest Group by the terrain, its main plaza being much higher.

From the West Group terraces and stairways lead down to the East Group, which lies for the most part in Squares $O$ and $P$.

A gentle rise and fall separate the South and the East Groups. These are connected by a broad space on this slight elevation, open at either end, and beginning in the southerly part of the Square O. We refer to this as
a corridor, the term being merely one of convenience. Most of the South Group may be seen on the map in Squares R and U . It is still above surrounding valley levels, the Plazas of the East and of the South Group being at approximately equal elevations.

To the east of both the South and the East Group is a valley entirely filled with relatively low mounds and terraces, almost entirely unsurveyed. This, like the Northwest Group, has not been labeled on the map, pending further investigation. It lies in Squares P, S, and V and is provisionally named the Southeast Group, but may later require subdivision. It is connected with East and South Groups by terraces and stairways, and the rear slopes of three pyramids.

For the benefit of actual visitors, we may add that the trail from Tenosique to El Cayo in Maler's day passed through low mounds of the Northwest Group in the northeasterly part of Square F and thence up a rising valley behind the hill to the rear of Structures K-5 and O-13; after climbing a saddle (apparently marked by a platform) it descended into and through the valley of the Southeast Group, passing through a welter of low mounds in that valley, and finally reaching the great ceiba tree, which still stands.

Since 1931, this trail bears right instead of left from the above-mentioned point and ascends to the West Group Plaza; thence passes between Structures K-5 and K-6, descends northeast of Structure K-2 to the East Group Plaza, and leaves the latter by passing between Structures O-12 and P-6; from here it descends a short distance in a southerly direction and rejoins the original trail. This new route is likely to be permanent, and every traveler will pass through four or five main groups of the city. But unless he leaves the trail and cuts some bush he very likely will be unaware of it.

## Detailed Description

## South Group

This description is framed on a hypothetical walk, map in hand, through the known portions of the city, beginning at the Sacrificial Rock in the river bed southwest of the South Group. Here in the South Group are the oldest monuments; here is the best place for a small party to camp, and here is the only monument (The Sacrificial Rock) which in [the] future will not be hidden by vegetation. If the latter is below water (as it is during much of the rainy season) the prominent high sandbank behind it will make its approximate location easy.

As we proceed through the East Group we will encounter most of the latest monuments. In the West Group nearly all the monuments bear contemporaneous dates between those of the South and East Group. As these
have been studied and will be published by Dr. Morley, we shall not discuss them further here.

About 425 m down stream from the Sacrificial Rock are some interesting geometrical patterns cut in broad shallow lines on the tilted flat surface of a rock-ledge in the stream bed. The designs are badly weathered and identifiable with difficulty. They cover several square meters of rock. The designs seem to be limited to spirals.

Returning to the Sacrificial Rock and ascending the high sand bank at a point about 31 degrees east of magnetic north (with the rock as the starting point) and climbing beyond we come out onto a more or less flat-topped tongue of land in the northwest corner of Square U (Fig. 1.1). Traversing this in the same direction, we strike at an angle the ruins of a terrace, $2-3 \mathrm{~m}$ high, which marks the southwesterly limit of the irregular plaza of Structure R-1. We ascend the terrace and almost immediately run into Structure U-1, a small squarish mound set on the edge of the terrace. Its top is about 1 m above the plaza of Structure R-1 to which we have just climbed.

We should here pause to remark that the lower area which we have just traversed and left behind contains many interesting low mounds not as yet surveyed, and on it the wood-cutters who discovered the city made their camp, left tin cans and bottles, and also "Lintel" 6, which they carried there for a table. We have left it there leaning against a tree. The level of this area is from 20 m to 22 m above the Sacrificial Rock, and the plaza is 3 m to 4 m higher.

This plaza may be pictured as having been in general rectangular, about 80 m by 5 m , with its long axis running from southwest to northeast, with its northwesterly quarter later entirely blotted out by the great high platform of Structures R-2, R-3, and R-4. Whether the plaza was in fact originally rectangular, and was later encroached upon, is of course another matter. Structure R-1 is the only major pyramid with such an unsatisfactory front yard. The encroaching platform, opposite, about 45 m by 6 m , rises 5 m above this lower plaza, maintaining an equal or greater height along the entire rear and both ends; it is only 1.5 m above the South Group Court, where bed rock occurs within 1 m below the surface. Much of the platform must be artificial, but quite possibly much is a projecting tongue of natural rock corresponding to the lower contours to the west and south.

The plaza is defined by terraces rising from it (at the northeast); by terraces falling away from it; and by the long low platform of the low mound U-2.

The higher portion of Structure U-2 is possibly a separate unit. Structure U-4 on the opposite side is also a low mound. Structure U-3 next to it, but facing northeast, is a ruined stone building (wall showing) on a higher platform, with a central projection, apparently
not a ruined stone stairway. The debris gives a faint suggestion that small stairways were placed against the sides of this platform. Structure U-9 is a tiny projection of the plaza platform.

Structure R-1 at the northwest corner of the plaza is the first true pyramid encountered. There is uncertain evidence of a ruined temple at the top, 12 m above the plaza and 26 m above the valley floor to the rear, from which it is quite imposing. The debris indicates that the rear terraces reached well down into the valley.

As we proceed we shall see that every large pyramid of the city has a broad, usually low, terrace along its base at the front, and that, except in the case of Structure O13, possibly the latest of all the structures, the central front stairway descends to this terrace rather than to the plaza or court level.

Structure R-1 is no exception, but instead of a short additional central stairway from terrace to plaza, there appears to be a projection of the terrace itself, like that of Structure U-3. Stela 28 lies on the ground in front of the terrace.

Southeast and northwest of the southwesterly part of the plaza are two systems of broad low terraces, descending in the one case toward the valley of the Southeast Group and Maler's Transverse Valley, and in the other case toward the river. Only parts of these areas have been explored, but they contain extremely interesting small mounds. Structures U-5 and U-7 appear to be low platform mounds. Structures U-6 and U-8 are puzzling tiny mounds about 1 m high. The ceiba tree southeast of U-7 is the one mentioned by Maler.

Walking straight out from the center of R-1 to avoid getting lost in the bush, we soon are stopped by the high platform already described, then turn right and follow it a few meters to its northeasterly corner, climbing 2.8 m to the South Group Court as we do so. This court is nearly square (about 6 m on a side) and serves five true pyramids, facing it from three sides. Turning left, we follow the platform to the megalithic stairway in front of Structure R-3.

This is one of five stairways of a special type thus far identified. Four steps, formed of very large cut stones, one course to a riser, lead to a shallow platform projecting from the main platform. The projection is wider than the steps, giving the effect of shoulders on either side. Such stairways are in each case low, and much wider than deep. In this case, and probably in all, the great stones for the steps are so cut that the riser is battered (slopes back) and the tread is sloping, rising markedly from front to rear. In every known case but this one, the structure to be reached is higher than the megalithic part of the stairway. On the other excavated examples, fabricated stairways lead to the higher levels from the rear of the platform forming the shoulders.

In line with the stairway is Structure R-3, and on its right, Structure R-2. The latter was partially cleared. It is stone-walled platform 1.5 m high, with central front stairway rising between heavy balustrades or, more probably, rectangular masses with level tops flush with the platform. The walls were nicely designed with a series of moldings; the bottom one curved in section, with a specialized cut stone to carry it around the corner. Very low ruined walls on the top appear to be traces of a small chamber constructed, for the most part, of perishable materials. In the plaster floor (not under it) abutting the northwesterly side at the base of the platform, and near the front corner, was a burial, without ornaments and without grave structure except for a slab set across stones and covering the head. The body was prone, close to the wall, head to the southwest.

Immediately to the northwest is Structure R-3, a pyramid probably better preserved than any other at the city. The top was investigated and most of the front and sides were cleared. There are apparently four terraces, the lower three being perfectly clear. Their battered retaining walls are paneled and further elaborated by broad primary and secondary central projections or offsets, as suggested on the plan. Corners are rounded, with a curve of long radius, formed on non-specialized blocks. If the offsets were deeper, the corners would be inset in the usual sense.

Remains of an almost completely disrupted stone sculpture on top indicate but do not satisfactorily prove that it supported a small rectangular temple with two central doorways, spanned by massive stone lintels, carved with glyphs on the under side, in early style. One, "Lintel" 11, badly shattered and scaled off, was found in the right (east) doorway and now lies in the supposed chamber. We believe that "Lintel" 14, called Stela 29 by Maler and removed by him from the top of this pyramid, was the other lintel.

We seem to have here a combination of sculptured stone lintels and roof of perishable materials, for there was insufficient debris for a fallen vault, and the flat slabs forming all known vaults at this city were almost entirely absent. The floor of the supposed temple was 9.4 m above the court. A roughly cylindrical stone, diameter about 20 cm , length about 30 cm was found in the debris upon it. Stela 42 (plain) lies on the southeasterly slope, approximately on the central line. Stela 44 (plain) stands in an excavation at the northwesterly corner, leaning against Structure R-4. It was found higher up on the northwesterly slope of R-3, near this corner. A floor burial, similar to that just described, was found in the angle between the lowest terrace and the southeasterly stairway retaining wall.

Jammed close against its left flank is Structure R-4, a larger pyramid with its top 14 m above the court. The
debris indicates a single front central stairway. On the platform in front of the stairway now lie Stela 30, and a few meters to the southeast, Stela 31 and "Lintel" 14. Huge trees on the top of the pyramid make it impossible to say as yet whether there was a stone temple or not, despite cursory excavations.

On the northwesterly side of the South Group Court is Structure R-5, its top 13 m above the court. The debris indicates a single central stairway descending to the typical broad terrace at the base. This lowest terrace is peculiar for it has an inset portion at the center instead of the projection noticed on R-1. Also, it seems to run back on both sides and possibly around the rear. Maler found Lintel 4 on this pyramid. It is now en route to Guatemala City. The debris at the top is more satisfactory than usual and gives some reason for postulating a one-room temple with three front doorways, rather than a single doorway as restored by Maler.

On and in front of the terrace lie Stela 32, 34, 29 (Maler's "Sacrificial Column"), 35 and 37. Stela 29 is part of a carved somewhat cylindrical stone similar to Stela 2. Another large fragment of the same form, and probably belonging to it, lies near the left end of the platform, but an attempt to combine them has not yet been made. Stela 33, which lay between Stela 34 and 35, and Stela 36, between Stela 35 and 37, are now en route to Guatemala City. The left upper corner of Stela 30 was excavated by Dr. Morley's party in the area between Structure R-5 and Structure R-6, the latter a low mound immediately to the northeast.

On the opposite side of the South Group Court are Pyramids R-9 and R-10. The latter conforms to the type already described, but the low front terrace extends several meters to its left, as a platform. On the platform is a large plain fragment of a stone having a round or oval cross-section. It seems to be part of a stone not unlike Stela 29 across the court. The top of the pyramid appears to have supported a ruined temple, the small mound of which is 8 m above the court.

Structure R-9 is puzzling for the debris gives very little indication of a main stairway at the front or indeed anywhere else. It has a small mound on top ( 9 m above the court) and the usual broad terrace at the base, with what looks like a ruined stairway connecting the latter with the court. At its left the terrace merges into a slightly higher platform-like construction, extending beyond the pyramid to the left. It is now apparent that while a broad flat front terrace is almost universal with large pyramids at Piedras Negras, its forms are various.

Stela 24, 25 and 26 lie in the court close to the terrace of R-9, and Stela 27 is in a similar position before R-10. Maler did not realize that Structures R-9 and R10 were separate units, and assigned all four stela to the same structure.

A long L-shaped platform 5 m high when viewed from the court, bounds it on the northeast. This apparently consists of two units, the relation of which can best be studied on the plan. Structure R-7 may not have been a building, but it is approached by a megalithic stairway of the type already described and the surface is covered with stone debris. Here, as everywhere in the South Group, one gains the uncertain impression that the ruins are of stonewalled but not of stone-vaulted buildings. In this case, as in all except the stairway in front of Structure R-3, across the court, the megalithic stairway leads only to a terrace or landing, from the rear of which, in the two excavated examples, at least, fabricated steps lead to higher levels.

The megalithic stairway seems to call for the postulation that Structure R-7 faced southwest, while R8, at a slightly higher elevation, may have been entered from the same direction, from the southeast, or from both, according to one's interpretation of suggestive but uncertain debris contours. The two together outline two sides of the southern field of the South Group Ball Court, which we may now enter from the top of R-7. The field is 3.6 m above the South Group Court, but about 2 m below the corridor to the northwest, giving it a partial sunken court effect.

The floor of the whole of this field, southwest of the twin Ball Court Structures R-11a and R-11b, except under a few trees, was skinned off. The structures also have been rather thoroughly cleared, their ends and inner sides entirely so. The debris from these excavations is now collected within quadrangular stone or wooden walls lying on the field, which must not later be mistaken for aboriginal constructions. A number of these walled mounds lie in other parts of the city, and we hope they will not be too confusing to future investigators. There is another in the northern field, as well as less well-defined piles of debris, resulting from, completely clearing the alley between the structures and a broad strip adjoining them in the northerly field.

This court agrees with the Old Empire type originally identified by Blom (1930) in every essential respect. We have the broad low platforms facing the alley, with their sloping sides; the sloping main walls, without stone rings; and the three drum-shaped stones set in the middle of the alley. The other two stones on the platforms, found by the Carnegie Expedition at Yaxchilan, whose example set us to work here, are absent. The main sloping walls are faced with stone slabs. The surface of the platforms, however, is of concrete. The tops of both structures were covered with debris of slight depth, entirely disrupted. The parallelogram plan of both structures was carefully determined by measurements and location of many points with the transit.

Yet into the sloping main surface of R-11-a, very close to the center, was a heavy stone which probably is
an ancient stela, here reused. It is 1.9 m long, 0.5 m wide and 0.2 m thick, and very slightly rounded at the top. Sides, top and, back are nicely tooled, the front (upper) surface showing vestiges of glyphs near the bottom in very low flat relief, with irregular outlines. It has been designated Stela 45 and remains in position. Similarly let into the sloping wall of the opposite structure, also slightly off center, is a worked stone 0.7 m by 1 m and 0.1 m thick, with boldly rounded top. It may have been carved-on the upper surface, but this is uncertain. Both the southern and northern drums or markers in the alley show faint but certain traces of carving on the tops, including glyphs in circular bands at the periphery. They have been designated Miscellaneous Inscribed Stones 4 and 5 , respectively, and remain in approximate position. The stone in the center is entirely weathered, if it ever was carved.

A stairway led to the top of Structure R-11-a from the rear or northwest side. We are fairly sure that R-11-b had no corresponding stairway, in its final form.

The southern playing field is enclosed by Structures R-7 and R-8, and, on the northwest, by a low terrace retaining the higher ground in that direction. The nor thern field is bounded by a continuation of this terrace, and by the unprotected edges of the high platform built in part to form it. A bench 50 cm high is a constant feature of Structures R-7 and R-8 and of the northwesterly terraces, where they rise from the ball-court fields, except that in the northerly field the bench becomes more like a true terrace, and is about 1 m high.

The puzzling Structure R-12 leads away from the corner of R-11-b at an angle. Both sides, though badly ruined, appear to consist of double vertically walled terraces. This runs into a rear corner of Structure R-13, a tiny one-roomed chamber, as indicated by the debris, set on a squarish platform. The central part of the front of this platform is inset, somewhat like that of R-5. The platform is only about 1 m high, at its highest point. A massive plain stone lintel lies in the doorway of R-13.

Passing beyond the front of this we come to Structure R-14, supported on a large platform built out into the valley to the southeast. The structure is now a rectangular mound, about 2 m long. Apparently it faced to the southeast, as a projecting mass of debris suggests a stairway leading 7 m down from it into what we are for the present calling the Southeast Group.

Retracing our steps across the northern field of the ballcourt, and climbing its boundary terrace a few meters beyond the point where it begins to bend to the north, we will hardly fail to find the two low platforms R-15 and O-1, although they are only about 0.5 m high. These bound on one side a sort of corridor connecting the South Group Court and the East Group Plaza. However, we are not done with what we are still calling the South

Group. To avoid getting lost (unless this area is cleared) it would be well to go to the southerly end of R-15, and then, compass in hand, make a bee-line due west over the flat surface for Structure R-16, the largest free standing pyramid of the city. The corner of this should be encountered after about 4 m .

Structure R-16 conforms to type, apparently having a great central staircase leading down the front to a broad low front platform. As might perhaps by now be expected, the platform differs from all the others thus far encountered, its chief distinction in this case being that its retaining walls have little relation to the pyramid. The northern portion lines up with Structure O-2 to its left and is parallel to Structures R-15 and O-1 on the opposite side of the corridor. The southern portion is roughly parallel to the ball-court and the northwestern end of Structure R-7 opposite. Possibly the terrace continues around the pyramid's right side. This is the only pyramid of which the lower front terrace does not run at least approximately parallel with the front of the pyramid.

The orientation of the pyramid itself is peculiar. It faces southeast, and this orientation corresponds only in a very general way with any other structures in the vicinity, though there is no apparent feature of the terrain which could have determined its orientation. Possibly it is significant that its medial axis, front to rear, if prolonged sufficiently, would probably come close to striking Structure J-23, at the very top of the Acropolis.

The configuration of the debris suggests, but does not establish, deeply inset corners. Apparently there was a stone temple on the top. The present height is 18 m above the front terrace, which in turn is from 0.7 m to 4.5 m above the ground in front, which slopes toward the southwest. Stela 41 lies on the front terrace, to the south.

Passing north along the terrace we immediately encounter the stairway and platform of Structure O2 , the platform being about 2 m high. The plan of this stairway, particularly the fact that its first flight only partly ascends the height to be reached and to a subsidiary terrace extending to form shoulders on either side, raises the suspicion that it is megalithic, like the five others of this plan thus far observed. It has not, however, been cleared. The ruin of Structure O-2 itself is shown as a mere mound, about 1 m high. As a matter of fact the terrain shows clearly by a series of depressions that the structure originally contained stone-walled chambers.

Descending the stairway, we pass northward about 22 m along a low mound projecting from it (Structure $\mathrm{O}-2-\mathrm{a}$ ), and turn left around it into a small court. This court departs considerably from a rectangular form. This is apparently caused by a desire to line up Structure O-2a with the mounds on the opposite side of the corridor, which were so placed because of the configuration of the terrain. The court is small, about 25 by 30 m .

Structure O-3, on the southerly side, appears from the debris to have consisted of a small single chamber with one doorway. It is placed on an irregular platform which itself lies on another, extending out from the rear of $\mathrm{O}-2$. The total height above the court is about 2 m on the westerly side is Structure O-4, on a lower platform built out from the court proper to hold it. We cleared the space in front of its single front doorway to fully expose a massive plain stone lintel, broken in two but still hanging in the doorway. This was a stone-walled building, but whether stone-vaulted, excavations were insufficient to determine. It is fairly certain that the jambs had not been displaced. At the remaining tops they were 25 cm farther apart than at a point near the bottom, 1 m below. That is, a doorway wider at the top than at the bottom is plainly indicated. Structure O-5 is a low mound bounding the northerly side, about which we can say little at present.

On the upper slopes of the ravine northwest of this court we have identified two or three broad platforms, and one low mound or platform, Structure O-6. We should state here that there are very probably a number of such terraces and mounds all along this slope, behind this court, behind Structures R-16 and R-5, and very possibly connecting with similar constructions south and west of Structure R-4.

We have now made the circuit of what we have called the South Group. It has a certain natural unity in that it lies on an elevated tongue of land surrounded by the river, a ravine, Maler's Transverse Valley and the Valley of the Southeast Group (with which Group, however, it is closely connected). Architecturally it is characterized by free-standing pyramids, with variously formed lower front terraces which are relatively low; by the nearly complete absence of any standing walls visible without excavation; by the absence of any visible vestiges of stone vaults (which may yet be found, however); and by masonry, where uncovered, which makes use of larger blocks than are common in the other groups.

Leaving Structure O-5, and passing east along the edge of a gentle slope on our left, we come to Structure O-7, about 27 m distant. These two mark the northerly entrance of the corridor between the East and the South Groups. The former, Structure O-5, probably faces southwest on the small court; Structure O-7 seems to face northeast on the East Group Plaza and has therefore been assigned to that group, though possibly incorrectly.

## East Group

Structure O-7, which was cleared, is a low platform mound, apparently actually ascended by a small stairway on the right of what we are calling its rear. To the left of this rather uncertain stairway, seven drum-shaped altars are ranged against the base of the vertical wall of
the platform. They are about 50 cm in diameter, but vary from 24 cm to 30 cm in height. The top of the rectangular platform itself is divided into two levels, connected by a single step, the lower level facing the great pyramid O-13 across the plaza. There was certainly no stairway on this side. Along the rear of the top, badly disrupted by trees, was a low broad sill, and a centrally placed stone cist or altar projected from it. Scattered in two groups on the platform were the remains of 14 additional drum-shaped altars, and parts of four more were found scattered on the slopes in front of and to the right of the platform, making a known total of 18 found on or probably fallen from the platform itself. Diameters of these are identical with those of the group of seven at the rear, but the heights vary from 20 cm to 40 cm . Only one of the 25 altars showed some uncertain evidence of having been carved. Those not too badly weathered showed that they had been very nicely tooled. Needless to say these altars make this platform extremely interesting. An original suspicion that they were drums from fallen columns was entirely dispelled by the excavations.

Within the rear and higher part of the top, but more or less on the surface, a system of small connecting slabcists had been built, within one of which was carefully erected a small well worked stone shaft, measuring 11 cm by 13 cm by 24 cm . The back of this cist was one of the altars set on edge, apparently dating the cists as built after the altars were scattered in confusion.

The height of this platform renders it rather imposing from the front and right side, where the ground is lower. At the rear it is but 1 m above the surface.

Passing a little south of east from here we enter a small plaza-like cul-de-sac in and around which are grouped four low mounds or platforms, Structures O-8, O-9, O-10 and O-11, with the left side of Pyramid O-12 to the northeast. Beyond Structures O-10 and O-11 are Structures P-1 and P-2, the first a tiny squarish mound, the other a relatively long rectangular one. Both appear to be ruins of stone buildings of some kind. They are set near the ends of a very large platform projecting into the valley (Structure P-5), the great eastern slope of which may have been a stairway. Compare this arrangement with Structures K-1, K-2 and K-3 in Square K, where we know K-2 was a great broad stairway.

From P-1 we may conveniently go around to the front of Pyramid O-12. This conforms to the general type, having had a single front stairway leading to a broad terrace at the base. In this case there are two terraces, one lower and in front of the other, obviously an adaptation to the terrain, which slopes from the pyramid's left to its right. Both terraces run parallel to the front of the pyramid. The front slope was cleared considerably in a search for lintels, which were not found. The lowest steps were intact in some places, with hard plaster on
the adjacent portions of the upper of the two terraces. The inside of the temple was cleared, revealing a singleroom temple with three front doorways. A narrow sill, hardly a bench, ran along the rear wall on the inside. The width of the room, including this sill, was 1.8 m . Walls varied from 1.1 m (front) to 1.5 m (rear) in thickness. The roof was probably a stone vault, though the evidence for this fact was not recorded.

The temple floor is 17 m above the level portion of the plaza in front of Structure O-13. At this height it commanded an excellent view over the East and West Group Plazas to the Acropolis, which it in general faces. Its rear shares with three pyramids of the South Group an imposing position with reference to the largely unmapped Southeast Group. Like those pyramids it backs against a natural depression, thus gaining added height. Its orientation seems to be independent of the terrain.

Stela 22 lies on the upper front terrace near the northeasterly end. Stela 23 lies much farther to the front, on the gently sloping plaza surface, and about opposite the center of the pyramid.

Passing around this major pyramid on the slightly falling plaza floor we core to Structure P-6, which completes the southeastern boundary of the plaza. This is a long rectangular ruin, possibly of a stone building, without visible evidence of stone vaults. It is set on a large terraced platform projecting from the natural hillside at its right and rear. It is approached by two flights of stairs, a little to the left of its center. The lower flight, rising to the lower terrace, is a typical megalithic stairway, with flanking shoulders.

The lower terrace turns an inside corner at the north and thence probably ran in front of Structure P7. This is Maler's carefully drawn Temple of the Eight Chambers. It was about two-thirds excavated, and it is necessary to out his number of surrounding chambers to three. The sanctuary is approached by a depressed passage. There is a rectangular masonry altar in each of the rear room. Great quantities of potsherds, including one of Ulúa Valley polychrome type, were found within the sanctuary altar. There is some evidence that the surrounding chambers are of later construction, the central shrine showing cornices and niches on the outside walls, and the base of a possible four-sided vault, possibly the base of a roof-comb, on top. The vaults of the outside rooms spring at 3.2 m above the floor. A comparison of the great size of complete vaults required to span such wide rooms ( 3.75 m ) with the relatively small amount of debris in the rooms, raises the question whether they may not have been capped with long beams instead of the usual capstones. The walls average only 85 cm in thickness. The shrine is beautifully vaulted, the vaults, made of thin slabs,
sloping in from four sides. The spring of these vaults is only 75 cm above the latest floor.

This structure backs against a high hill. Because of its central shrine room and rear altars it would seem to have been a temple, though its outer rooms, from their size, are more suitable than any other vaulted structure in the city for residence, and the temple is only 3.5 m above the plaza in front of it.

Passing northwest along the edge of the plaza, defined by the hill, the lower slope of which is probably terraced, we come to Structure O-13. This might perhaps be termed a "False Pyramid" since it is built against the steeply sloping hill, standing free from it only at the top. It attains full height only at the front.

From the point of view of sculptural embellishment it is one of the great temples of the whole Maya area. "Lintel" 1, and the fragment of "Lintel" 2, both now in the Peabody Museum at Cambridge, and "Lintel" 3, now in the University Museum in Philadelphia (Cat. no. L-16381) probably adorned three of its five front doorways. Stela 12 and 15, and possibly Stela 13 and 14, all in the very front rank of Maya sculptural art, stood before it on a terrace reached by its very broad and imposing main stairway. Stela 15 is on its way to Guatemala City, Stela 13 and 11 are en route to Philadelphia, while Stela 12 (Cat. no. L-27-199) is already (October, 1932) erected in the University Museum. Stela 16, 17, 18 and 19 lie in a row on the plaza just in front of the front terrace and stairway. Stela 20 and 21 lie a little farther to the front, and slightly to the southeast.

This temple is typical of all other pyramidal buildings known at the city in that the stairway crosses the low front platform and descends directly to the plaza level. The tripod circular table, Altar 5, stood close to the bottom step at the center, where its broken pieces remain.

The stairway, and the terraces for several meters on either side, were excavated from bottom to top, and most of the temple building was cleared. The lower terraces appear to have been plain, and are battered; the final wall from the high stela-bearing terrace to the temple level is also battered, but its design includes buttresses and panels. The corners here are each formed by single specialized stones well out to give a rounded corner of short radius. The effect is that of angular corners with the sharp line at the corner softened by the curve. Maler's conclusions that there was a short rear stairway and no front stairway were entirely erroneous.

The plan of the temple must speak for itself. Secondary buttresses were added and it is quite possible that the front open gallery as a whole is a later addition. Fragments of elaborate exterior stucco decoration were recovered. Great numbers of caches, including especially large quantities of eccentric flints and obsidians, were found under the floors, especially under the rear
chamber, which was fire-blackened. The small objects were usually placed in covered jars or in deep bowls with inverted bowls as covers. In or under this floor was found Miscellaneous Sculptured Fragment 1, now in Philadelphia (Cat. no. L-16-81). The two halves of "Lintel" 12 were used as building stones in the walls of the temple, and are now en route to Philadelphia.

The plaza at this point, 15.8 m below the floor of the front gallery of the temple consists of a rubble fill, doubtless formerly surfaced with plaster. Excavations revealed the former presence of a depressed area at least 29 m wide, extending out about 23 m from the front of the pyramid. Its floor was paved with stone slabs, 1 m below the later floor above. Vertical stone retaining walls surround it on the northwest and southwest sides.

Structure O-13-2 $2^{\text {nd }}$ was partially revealed by a deep trench through the upper temple and its substructure. It seems to have been a narrow platform built against the hill and incorporating a huge boulder or projection of bedrock. No evidence for a structure upon it was discovered. Its depth, front to rear, is 4.6 m , its width unknown. It is 4.4 m below the front gallery of C-13, 11.4 m above the latest plaza floor.

Two major monuments remain to be mentioned while we are in this part of the plaza. We cannot certainly associate them with any one of the buildings. The top of Altar 4, perhaps belonging to Structure O-12, lies near its original position, which is about at the intersection of a line joining Structures O-13 and O-7 and the 4 m contour line. Three of its almost identical grotesque head legs are en route to Guatemala City, the fourth to the University Museum. Altar 3, northwest of this, still stands on its four legs.

From Altar 3 we may conveniently strike due west until we come to the edge of a precipitous ravine, and then follow it around to the right, finally bearing left around its end. If we continue circling the head of the ravine, climbing a little as we go, we will come to a small cul-de-sac running northwest, with Structure O-14 to O16 roughly marking its southwestern side. Possibly these belong with the West Group, fronting southwest over the broad platform running out in that direction.

Structure O-14 is a small pyramid, now but a mass of ruins, 5 m above the little plaza, much higher when seen from the southeast. Structure O-15 offers quite certain evidence of ruined stone-walled chambers. Structure O16 is a low mound, possibly a mere platform. Turning back from this enclosure and turning left around the corner of the high platform on our left, we soon come to a protruding mass of debris, in all probability a very sizeable stairway serving Structure O-18 on the platform at its top. Arbitrarily, perhaps, we consider the latter as part of the West Group, and continue northeast to another, a very-large stairway indeed, Structure K-2.

A strip 2 m in width was cleared from top to bottom, proving it a stairway of 23 steps with risers about 35 cm high and steps about 85 cm wide. The whole stairway is not less than 35 m wide, more probably 4 m . It runs back horizontally about 17 m , rising 9.1 m in that distance, a relatively gentle slope for Mayan-stairways. This one appears to have been intended for constant travel between the East and West Group.

If this stairway is correlated with Structures O13, P-7 and P-6 on the map, disregarding the others, something like a quadrangular plaza assemblage will be noted, with a long court axis of about 20 m . However, Structure O-12 spoils the effect of this great length considerably. The width can be made almost anything, up to 10 m , depending on where it is measured. The width of the flat floor is actually much curtailed by the slope on the southeast side. Very possibly this slope, shown by us in contour lines, hides former low broad terraces. Just northwest of Structure O-13 the hill behind it turns northward, and forms one side of a finger-like projection of low ground, rising from plaza level until it finally reaches the level of the West Group Plaza, southeast of Structure K-5. This has been extensively covered with very broad terraces running into the slopes, but we have not as yet identified any surviving evidence of buildings on then. Far up the hill behind these terraces is a small dry cave in which was found Burial No. 6, extended, with two large carved bone tubes. Instead of following this easy ascent, we will climb the stairway X-2 as the Mayas probably did, to the West Group Plaza.

## West Group

We come out on a long platform 30 to 70 cm , above the West Group Plaza, noticing the small mounds, Structures K-1 and K-3 flanking the top of the stairway. The first is about 1.5 m and the second 0.75 m high. Both are ruins of stone structures and should repay excavation. Leaving the platforms we follow northeast along the edge of the high terrace delimiting this side of the plaza. The long axis of the plaza runs about 115 m , from southwest to northeast. The width varies from about 65 to about 85 m . The surface, largely artificial, appears level, but is about 2 m lower at the southerly end. We pass a low mound or platform, Structure K-4, and also a small area of projecting bed rock, apparently untouched by builders who must have cut off or buried dozens of such outcrops.

Almost due north of Structure K-4, and about 15 m away, is one corner of Structure X-5, the last freestanding pyramid to be described. Like Structure O-12 in the East Group, it is the only pyramid of that class in its group.

It conforms to the general type of the South Group, having a single central front stairway rising from a terrace at the base. The latter appears to run around the sides of the pyramid and into a gentle slope on which the
structure was erected. The floor of the temple is 13.8 m above the plaza.

Excavations on the upper front slope brought to light "Lintel" 7, now at the foot of the stairway, apparently from the middle doorway, but failed to disclose the two more which may have spanned the two side doorways. The interior of the temple at the top was completely cleared. Its single chamber was 2.2 m by 8.7 m , inside dimensions; thickness of the rear wall was 1.7 m , that of the front 1.4 m . The roof was apparently a stone vault. A low sill ran across the rear and there was a centrally placed rectangular niche in the rear wall. In the latter was a roughly cylindrical stone, set on end, similar to one found at the top of Structure R-3. In the fill under the floor was found most of a stucco head, realistically human, more than life-size, with traces of red paint. Stela 38 and 39 lie on the platform at the base, to the right (northwest).

Most of the easterly quarter of the substructure was cleared away, to a depth of 5.5 m below the floor. At about 2.5 m was found a plaster floor, apparently a platform without stone walls. In the center was a similar cylindrical stone, fire-blackened, and set on and in this floor (Structure K-5-2 ${ }^{\text {nd }}$ ). About 3 m below this was the floor of a remarkable temple, also with such a stone, fire-blackened, set on end in the supposed middle of the floor. This building (Structure K-5-3 ${ }^{\text {rd }}$ ), assuming the stone was at the center and the chamber half-cleared, consisted of a single-room temple 5 m in width and 19 m in length (inside dimensions). The left side wall was 1.4 m thick, the front 1.1 m thick, and their height not less than 2 m . There were three front doorways (on the above assumption); the one cleared being 3.7 m wide. A masonry bench 0.5 m high and 1.3 m deep ran along the rear wall.

Because of the great width of this chamber, coupled with the poor quality of the masonry, we must conclude that the roof was supported by timber. A structure drawn by Maudslay, at Rabinal, Baja Vera Paz, Guatemala, is the only southern Maya chamber known to the writer which is as wide as this (1897).

Directly in front of this pyramid is the West Group Ball Court, Structure K-6, a and b. The debris contour is typical, but a preliminary and interrupted excavation on Structure K-6-a showed that the platform on the alley, at least near the southerly end, has a vertical face, about 70 cm high. Apparently the main inner walls were not faced with slabs and, as a matter of fact, we cannot be sure that they were not vertical also, without further excavations. There are here no enclosing walls or structures around the fields at the ends, and no circular stone markers in the alley.

A few meters to the northwest is the low platform Mound K-7, which lies along the head of a ravine leading
down to the Northwest Group. Turning south we immediately come to the high long platform, Structure $\mathrm{J}-1$, reached by a megalithic stairway of usual pattern. The platform rises 5.4 m above the plaza, is 62 m long and attains a maximum width of about 15 m , exclusive of the narrow and lower terrace at it's front. In a sense it is the usual front platform of the pyramid, Structure J-4, behind it. A central stairway probably leads up the pyramid from it, but the megalithic stairway which serves the platform itself is well off center, to the southwest.

Or, its left or northeast end, some set on a slightly raised dais, formerly stood Stela 1 to 8 . The cists of nos. $4,6,7$ and 8 were identified, and indicate that all stood in general in a row, but that some were placed a halfmeter or so to the rear of others. All now lie on it or fallen down the front, except Stela 6, which is en route to Guatemala City. In the plaza a little to the stairway's left stood the great round tripod table, Altar 1, now removed from its legs and lying a few meters northeast of it's original position.

The megalithic stairway is rendered more monumental than any of the others by having its high sloping shoulders faced with great rectangular slabs of out stone, which are megalithic indeed. The most southerly slab, still in place, is Stela 43, supposedly here reused. It was first identified as a stela by Dr. Morley. The two recovered fragments of "Lintel" 13 were found close to the lowest step of this stairway, on the surface of the plaza. Probably they had been used as building material in the upper fabricated flight of steps.

The great false pyramid of Structure J-4 rises at the end of and against the Acropolis hill, behind the central and northeasterly portions of the platform or overgrown terrace, Structure J-1. The temple floor is 28 m above the plaza. The upper three terraces stand free of the hill, much of the walls showing. The terraces of the northeasterly side apparently extended down into the ravine on that side, giving a total apparent height of 36 m on that side. Maler thought the top was reached from the right side (the left of an observer facing the structure from in front) but this was certainly not the case. There was in all probability a central front stairway, though the bulge of debris is curiously off center at the base, inviting investigation here.

Maler's conclusions regarding the temple at the top were entirely unjustified by the debris. A trench through the middle shows a small stone-vaulted temple with front doorway 1.55 m wide and rear doorway 0.95 m wide, in all probability the central and only doorways. The room was 2 m wide (front to rear); thickness of the rear wall was 0.75 m , that of the front wall 1.1 m . A crude secondary transverse wall was followed a meter or so from the rear wall. Fragments of interior stucco decoration were plentiful.

Descending to the plaza again and passing south along the great stairway of Structure J-2, to which we will return, we come to Structure J-3, a pyramid whose great mass, built against the southwesterly end of the Acropolis hill, balances that of Structure J-4. It faces nearly east, the orientation obviously dictated by the terrain. On its right the lower terraces merge into the hill.

The top of the relatively broad second terrace, 6.4 m above the plaza, was completely cleared. It is on a level with Structure J-1, the plaza being about 1 m lower at this point. On this terrace the cists built near the front to receive Stela 9, 10 and 11 were located and cleared. Stela 9 lies close to its cist, the broken base still in the cist, in front of the stairway and near its right side. Stela 40 was found lying on the plaza a few meters southeast of the lower stairway and must have been placed to the right of Stela 9, though the location could not be accurately determined. It is now en route to Philadelphia. Stela 10 and 11 lie across the lower terrace, more or less below their cists, far out near the left (northeast) end of the terrace.

In the cist of Stela 9 were found buried a small drumshaped stone (diameter 20 cm , height 30 cm ) and an interesting incense burner with cover, unbroken. Similar drum-shaped stones were found in the cists of Stela 11 and of Stela 8. Complete or broken parts of sixteen chert knives were found scattered along the terrace near the bottom step of the main stairway leading from it to the top of the pyramid.

This stairway was cleared, together with the flanking terraces so far as they could be followed (about 2 m ) on either side. "Lintel" 5 was found on the slope. Most of the parts were found, assembled and photographed. They are now 1 m or so northwest of rectangular Altar 2, in the plaza.

The structure at the top was badly disrupted, but at the center left no doubt that it was a rubble-filled platform rising in broad low steps from front to rear. The rear and highest step is 28 m above the plaza. A deep trench through this confirmed the fact that no stone building had stood here. "Lintel" 5, if a lintel, must have been here reused probably to embellish one of the upper terraces.

Trenching on the stela-bearing second terrace revealed an earlier but ruined stairway under the latest, and a widening of the terrace itself prior to the erection of the stela. This earlier stairway and terrace belong together and are all yet known of Structure J-3-2 ${ }^{\text {nd }}$. A minimum age for the terrace in its latest form (9.15.0.0.0, the date of Stela 11) would seem to be established.

This terrace, and the corresponding Structure J-1, differ from all other basal terraces fronting pyramids in height and from all but one other in the presence of a subsidiary narrow and lower terrace along the front. The height is probably dictated by the contours of the hill,
and this in turn calls for a subsidiary ornamental terrace in front. A trench in the plaza carried through the lower terrace of Structure J-1 showed bedrock rising above plaza level just behind the terrace retaining wall.

Before investigating the Acropolis further, we shall complete our circuit of the plaza. Structure N-1 lies on the southwestern edge of the plaza, here defined by a drop to lower levels between it and the river. We can add little information to that conveyed by the plan, except to say that this mound is a mass of stone ruins, apparently involving a tiny building centered on a series of superimposed platforms. Its top is about 2 m above the plaza.

The puzzling mass of Structure O-17 defies present interpretation. Its top is about 3 m above the plaza in front, and about 13 m above the flat area to the southwest. There are a number of low mounds and terraces in that direction, as yet unsurveyed, and possibly a stairway to this lower level. The debris is not convincing.

Proceeding along the edge of the plaza, here a level mass of stone rubble, showing plainly its artificial construction, we round a corner and come upon Structure O-18. This is a long rectangular platform, about 50 cm high, with small hummocks of stone debris, about 50 cm high, disposed regularly along each of its long sides. Possibly these, disrupted as far as observed, represent stone bases for wooden posts. The known fragment of "Lintel" 8, probably about one-half of the whole, protruded at the southeasterly edge of this platform, near the southerly end. Trenching here disclosed the small known fragment of "Lintel" 9, buried in the fill below the floor. "Lintel" 8 now lies in the center of the structure, a few meters from the southerly end. The fragment of "Lintel" 9 was sent to Guatemala City in 1931.

Walking somewhat north of west from the southerly end of this structure, toward the center of the stairway of Structure J-2, we should be able to find Altar 2, the last of the great table altars to be mentioned. Dismantled, the top and four legs lie just southeast of their original position. We have to record our inexcusable failure to locate this position accurately, which will be done next season. We believe it stood about 15 m out from the stairway, and in a direct line with the three doorways piercing Structure J-2 (a palace) and, if so, also in line with the doorway in front of the throne in Structure J-6. However, this lining-up of altar, doorways and throne is as yet uncertain. Possibly the wish is father to the thought. The altar was certainly not directly associated with any stela, or with any building other than Structure $\mathrm{J}-2$, or possibly Structure $\mathrm{N}-1$.

The great stairway of Structure J-2, judging from the perfectly even slope it presented, was not less than 3 m wide. It is badly disrupted, but two cleared strips left no doubt it was a stairway at the points examined. It
may have been interrupted about half-way up by a step or terrace broader than the others. It rises 10.7 m , running back 13.5 m horizontally in the process, giving an angle of about 37 degrees.

Structure J-2 is the first long palace to be clearly identified. The term palace as used here is purely one of convenience, without functional significance, and at this city can hardly be said even to imply the presence of many chambers. For lack of space we must leave these buildings mostly to the ground plans, first summarizing the general features of the Acropolis and this type of building, and then making a hasty tour of this almost completely made-over hill.

In all probability in the beginning the hill was rugged and broken. Its right side rises abruptly from the river. Its rear and left sides rise almost as steeply from the valley of the Northwest Group and from a ravine running southeast from that valley. The front or easterly side, probably very uneven, descended on a much gentler slope, facing the area selected for the main groups of the city. The over-all dimensions of this hill were something like 175 m from side to side, and 245 m from what we call the front to the rear.

On the sides and rear many vertical escarpments have been left untouched, though much of these sides was covered with constructions built against or upon them. The front or southeastern side, together with the probably narrow original crest at the rear, the highest part of the hill, have been entirely buried by the various constructions.

A glance at the map shows that the Acropolis buildings are for the most part long palaces grouped around three principal small courts. Court 1 nestles between flanking pyramids on either side, its surface 10.5 m above the West Group Plaza. Court 2 is 10.4 m higher and Court 3 is elevated 8.25 m above Court 2. Finally, Structures $\mathrm{J}-20$ and J-22, built around a high terraced central peak, carry the eye to Structure J-23, built on the peak, bedrock appearing beside it. The floor of this building is 16.2 m above Court 2, which it overlooks; 37 m above the West Group Plaza; 67 m above the Northwest Group Plaza which it also directly overlooks; and about 90 m above the river at low water. From this building it was possible to see large portions of all known groups of the city.

Apparently it faced two ways. Retaining walls and possibly the ruins of a stairway lead down from it to the little plaza of Structures J-24, J-25 and J-26. Thence a continuous broad strip of fallen debris interrupted by a shelf supporting the low mound, Structure J-27, leads clear down to the Northwest Group Plaza. This debris is almost certainly the ruin of a gigantic series of stairways (J-28).

Access to Court 1 was through Structure J-2 and possibly also around its end; thence a circuitous route
through Structure J-8 and around one of the ends of Structure J-9 had to be taken to reach Court 2. We cannot say as yet how Court 3 was reached. Possibly from the latter there was some means of ascending the flat roof of Structure J-22, from the inner edge of which stairways lead to Structure J-23, the highest building of all. This building could also be easily reached from Structure J-20, which is elevated 5.7 m above its court.

It will be noted that each court is very much cut off from the city at large and in a sense together they form a separate group differing in this respect from any others, except one small court in the Southeast Group, not shown in the plan of the city.

All of the buildings on the Acropolis have been trenched for sections. Structure J-2 has been almost completely cleared, Structure J-23 and the throne-room of Structure J-6 entirely cleared. We have also cleared considerably in Structures J-12 and J-17. Many of the palaces stand to the height of the medial cornice, the fallen upper zones nearly filling the rooms to this height. Ground-plans must therefore be read with this caution; we are sure of everything shown in solid black, but we are not sure how much more, especially secondary walls and interior fittings such as benches and altars, may be omitted. Many walls have been measured where they protrude from the debris, 1-2 m above floor level.

In all the free-standing palaces there is a transversely placed end room, usually one at either end. With one exception they are connected with the main galleries by small doorways, as shown. All of them make a more or less liberal use of multiple doorways in the façades, resulting in nearly square piers where the walls are thick. There was originally but little division of the long galleries, whether open arcades or not, into chambers. Nearly all the transverse partition walls shown may have been secondary and several certainly were so. A number of doorways, especially those through the medial wall, have been walled up. Details of this kind cannot be shown on a plan of this scale. The plan of Structure J-18, without the partition walls in its southeasterly gallery, may be taken as the most typical of the free-standing palaces before alterations. Wooden lintels spanned outer doorways, stone vaults covering many interior doorways. Vaults slope in at the ends as well as at the sides.

Structures J-6, J-8, J-10 and J-22 are the only long structures which do not include two parallel galleries as the basis of the plan. All four are built against the hillside, their undoubtedly flat roofs serving as terraces or promenades before buildings higher up and behind.

All the long structures except Structure J-12 were roofed with stone vaults, springing from 2.0 to 2.2 m above the floor. The plan will suffice to indicate the wide range in relation of room width to wall thickness. The
galleries of Structure J-9 average 1.8 m in width, wall thickness being $1.2 \mathrm{~m}, 1.1 \mathrm{~m}$ and 1.3 m . The galleries of Structure J-11 were 2.9 and 2.6 m in width (front and rear respectively) while the wall thickness, front to rear, for these wide vaults, were but $0.65,0.95$ and 0.72 m at the points measured. The corresponding dimensions for other palaces vary between these extremes.

Remnants of upper zones indicate both steeply sloping and vertical entablatures, and two-member apron medial cornices. We were able to make many interesting observations on these buildings with a minimum of excavation.

Returning our attention to Structure J-2, we may pass through its three doorways opposite the throne of Structure J-6. We face a monumental stairway, the lower flight megalithic, rising from the opposite side of Court 1 to the latter building. Directly behind the central of the five doorways at the head of the stairway was a carved stone throne (Throne 1), set partly before and partly within a niche in the rear wall of the building. The throne (Cat. no. L-27-198) is now being restored at the University Museum. We are satisfied that it was intentionally broken-up in aboriginal times. The throneroom and stairway were completely cleared. The last date on the throne is very clearly 9.17.15.0.0. end of a hotun, apparently establishing the approximate age of the structure in its latest form. The niche appears to have been built to accommodate the throne, and if so this building may be dated as of about that time.

This building extends to our right (the building's left) behind the high platform terrace, Structure J-7. Trenching shows that this has been doubled in height, being now about 3 m above the court, and that in its first form it buried structures the ruins of which are still found at about court level. One of these was a building the large corner stones of which were more carefully out than any thus far observed elsewhere.

Turning across the court we see a corresponding platform terrace, Structure J-5, its top 4 m above the court. Both are ascended by broad stairways. Within this latter platform was discovered an elaborate vaulted tomb, richly furnished, with a red painted adult skeleton and partial remains of two children.

From the rear of this platform a stairway leads to Structure J-8, 4.5 m higher. Proceeding by the route above suggested we come to Court 2. Structure J-10 is almost entirely destroyed or buried. Structure J11 shows remaining portions of masonry vaults over small inner doorways, found also on Structures J-18 and J-23. Structure J-12 is of very great interest, as its general plan is typical of the others, but excavations at the northwesterly end proved beyond doubt that it was roofed with perishable materials. Its massive walls are of poorer construction than the others are.

Structure J-13 appears from debris configuration and trenching to be a full-width stone-vaulted palace, shortened by the exigencies of space.

Northeast of Structure J-12 a broad stairway, Structure J-15, leads down 6.1 m to a small plaza set against the precipitous slope. Structure J-16 is a low mound, apparently stone ruins. Structure J-17 is much longer, and had a decided hump in the middle. Incomplete excavations here show a small chamber with a huge plain lintel in the single doorway. The debris was less than 1 m in depth, and we are in considerable doubt as to whether the chamber was vaulted. In all probability it was not. This is a peculiar and interesting building, which cannot be discussed at length here.

Returning to Court 2 and climbing over debris to Court 3, we may observe that in the northwesterly end vault of Structure J-21 is a small triangular riche of Palenque style. Structure J-19 is a platform mound, about 50 cm high, covering at least one earlier construction of the same kind. Structure J-20, elevated about 5.5 m above the court, apparently consists of low foundation walls only. Certainly there were no stone vaults. Its position is very commanding, especially from up or down the river.

Structure J-22, behind and 8 m above Court 2, was undoubtedly vaulted and for the most part was probably an open arcade, turning a right angle at the northeast. Its roof formed one of the terraces of the pyramidal substructure of Structure J-23 above. The position and small size of the latter, plus fragments of interior stucco decoration suggest that it was a temple. Its plan on the other hand is the typical palace plan at this city.

## Northwest Group

The projecting tiny plaza below Structure J-23 to the northwest is at about the same level as Court 2. It faces northwest and is tied to the Northwest Group, though about 4 m above the main plaza, by the great series of stairways already mentioned. Structure J-24 was trenched, and is a narrow terraced platform, 1.9 m high, with about 30 cm of debris on its surface. Structures J-25 and J-26 are low mounds not investigated.

Descending the great stairway, which seems to have been broken by at least one terrace or landing, we find a broad shelf or terrace at the base, with the tiny mound F-1 to the right.

Farther to the east, beyond a small ravine in the hillside, is the ruin of a pyramid of major proportions, Structure J-29. It is built against the hill, with a large high front terrace at the base. A stairway probably rose from this terrace, as there is no other possible approach to the top. The debris there indicates two buildings, one set behind and above the other. Their present tops are about 27 m and 20 m above the plaza level.

At the river end of the valley, and of the plaza, are Structures E-1, a low mound, and E-2, a stone ruin,
associated with a broad terrace or platform. Here is the site of the Expedition's camp.

Nothing further in this group has been mapped. The plaza runs northeast from the river, with a few terraces and mounds on the northwest side, until it intersects the valley of the Tenosique trail. Here is a considerable group of mounds, more or less small and low, with at least one small pyramid, set against the hill. High on the hill opposite Structure J-29 is a group of two steep-sided long mounds, over 2 m high, apparently disassociated from anything else.

## Southeast Group

Logically, this should have been described with the East and South Groups, with which it is closely associated. It seemed better, however, to cover the well-known areas first. It is marked off from the East and South Groups by a decided drop in elevation and by the character of the mounds. These are mostly small and low. They almost fill the valley, with no large courts or plazas, and rise the same distance up the hill to the southeast, not shown on the map.

Going to the East Group and passing beyond it, between Structures O-12 and P-6, the ground at once begins to drop. On our right we pass a series of broad terraces, on which are the small mounds of Structures P4 and P-3. Further along is the low mound of Structure S-1, and about 35 m further, Structure S-2, on its own platform. A massive plain stone lintel on this structure was turned, but we did not excavate to determine the presence or absence of stone vaults. An additional 35 m separates this from Structure S-4, a small mound somewhat higher.

As we have proceeded, the level of the valley has been dropping steadily, and we have paid no attention to great numbers of low mounds on our left, which are not yet surveyed. We have been following the Tenosique trail in the direction of El Cayo. If we continued we would pass Maler's ceiba tree, cross the head of his Transverse Valley and continue on an indefinite distance, with mounds and terraces on either side. Instead, we will out across the mound area, leaving Structure S-4 and going in a direction 34.5 degrees east of south (magnetic), climbing up a terrace or two on the way. After about 165 m we reach Structure $\mathrm{V}-1$. The plan of this mound represents what we could make out of the building on northern of its two wings. The stone walls were originally not over 1 m in height, perhaps carried higher with wood or wattle-and-daub construction. Below the floor of this building, possibly a dwelling, were a vault and two slab-covered cist burials, one of the latter including an adult and child. From the rear retaining wall of the substructure came the known fragment of "Lintel" 10, sent to Guatemala City in 1931.

Buried below this structure was the ruin of an earlier one, with most, at least, of its walls only 35 cm thick.

Still lower, part of a buried terrace was uncovered, faced with large irregular stones, set on edge.

Trenching through Structures V-2 and V-3 proved the former presence of stone structures of no great height, without vaults. In the first case a thick deposit of disintegrated plaster on the well-preserved plaster floor suggests the former presence of a beam and mortar roof.

This little complex is set near the base, and at the end of a long high mesa curving southeast to this point from a saddle separating it from the hill behind Structure O-13 in the East Group. This end is terraced to a height of 10 $m$ or so behind (northeast) of the complex. At that height a projecting spur has been made over into a rectangular court with a commanding view on three sides. There are sizable mounds or platforms on all sides of the court, that on the south being about 3 m high. In location and size
this court compares with Court 1 of the Acropolis.
The slope behind it is gentler, and here are a number of interesting small and roughly circular mounds, about 2 m high.

From the court an excellent view of most of the Southeast Group, and probably the major buildings of the South and East Groups, would be afforded if the bush were cleared.

## Note

1. On the advice of Dr. Morley, Maler's Stela 29 has been renamed "Lintel" 14; while the Sacrificial Column mentioned by Maler as lying in front of his Structure IV (our Structure R-5) but not numbered by him, has been assigned the vacant number and is here called Stela 29.

# The South Group Ball Court (Structures R-11-a and R-11-b), with a Preliminary Note on the West Group Ball Court (Structures K-6-a and K-6-b) 

Linton Satterthwaite

## Field and Structures General Description

There are two known ball courts at Piedras Negras, in the South and West Groups respectively. Preliminary work on the first, in 1931, followed by more thorough excavation in 1932, enables us to describe the South Group Court in some detail.

Our attention was first especially directed to the ball courts by Dr. Morley, immediately after the Carnegie Institution of Washington Expedition in the person of Mr. Karl Ruppert found five round sculptured stone markers in one of the ball courts at Yaxchilan (Morley 1931).

Three of these were on the center line of the alley and one each on the side platforms, at the center. This court was long ago tentatively identified as such by Maler (1903:134) but the existence of Old Empire ball courts was not generally recognized until a considerable number were described by Blom in 1928 (Blom 1930). Dr. J. Alden Mason, Field Director of the 1931 and 1932 expeditions, located three stones in the alley of the South Group court and then assigned to the writer the task of ascertaining its remaining features.

Plan and sections in Figure 2.4 show the general features, which agree with those first set forth for Old Empire ball courts by Blom in 1928 and in more detail in 1932 (Blom 1932). This plate is drawn by the 1932 expedition's architect, Mr. Fred P. Parris, from a careful survey made after excavation. Figure 2.1d gives a good impression of the arrangement of the two structures. The plan, to avoid too great reduction, does not show the southeasterly boundary of the southern field, and only part of that of the northern field. The whole field is shown on the general plan of the city (Mason and Satterthwaite 1933).

In this court the fields at either end are in part bounded by the two platforms, Structures R-7 and R-8 and by retaining walls along the northwest sides, giving a partial sunken court effect. Structure R-8 is not shown on the plan in Figure 2.4. It joins Structure R-7 at the southeasterly corner of the court, the two forming an L .

There are no bounding structures along the northeasterly and southeasterly sides of the northern field, which are delimited by steep slopes leading down to a ravine. Probably these slopes were terraced. The entire field was paved with a concrete of lime and crushed stone, now for the most part disintegrated. The walls of the structures were certainly in part and probably almost entirely surfaced with lime plaster.

To avoid confusion the reader should note at once that the plan in general follows the lines of parallelograms, rather than those of rectangles. The long axis referred to below passes through the three stones in the alley between the twin structures. The short axis passes through the central stone, but is parallel with the end walls of the structures, and is therefore not at right angles to the long axis. In discussion of the structures, these axes are the center lines, except where otherwise stated. For the cross-sections, shown in Figures 2.4 and 2.5, to give a picture comparable with other buildings, we have used a special center line passing through the central stone also, but at right angles to the long axis. This would have been the transverse axis or center line of the structures, had they been rectangular.

In using the terms rear, behind, and back we consider that the front of each structure is the façade facing the alley between them. Inner and outer are synonymous with front and rear, respectively.

The two end fields are approximately, but by no means exactly, of equal size. The width of the alley joining them, giving the whole field the form of the letter I, is about 4.3 m , as measured at right angles to the long axis. Its length is 18 m . The total length of the long axis through fields and alley is about 56 m . The structures rare about 2 m . southwest of a central position between the ends of the field as a whole. They are also a little northeast of a central position between the sides of the field as a whole, which is about 3 m wide at the north and about 35 m wide at the south. If we assume a symmetrical arrangement of that part of the field used in the game, with the three alley stones on the center line, the width of the used portions of the end fields was only 27 m . The bounding retaining walls at the northwest of


A


B


C


D

Figure 2.1 a. Structure R-11-b from the northerly end of R-11-a. The large and supposedly sculptured slab may be seen just to the right of the vertical line cutting the stump in the left foreground; $b$. Structure R-11-a from the top of R-11-b at center; c. Stela 45, in situ, with trench on left; d. both structures, from southern end field.
each field, which are in line, are half this distance from the long axis.

Test sections indicate that a continuous bench or terrace, 45 cm high and of about the same width, ran along the inner bases of Structures R-7 and R-S and the retaining wall on the edges of the southern field. The retaining wall at the northwest of the northerly field has a similar terrace, but it is about 90 cm high and of about the same width. There is a broad stone platform, about 30 cm high and $2-3 \mathrm{~m}$ on a side, set in the southwesterly corner on the southern field. We show this in broken lines because we neglected to measure it.

If we join the opposite inner corners of the twin Structures R-11-a and R-11-b, we find that they fit almost perfectly into a single large parallelogram. All corners and many other points were located with the transit, and checked with taped measurements, so that the parallelogram form of the ground plan of each structure is quite certain. The angles in each case vary about six degrees from ninety. No side nor end fails to be parallel with any corresponding side or end of the same or of the other structure by more than one degree. Such accuracy in laying out two disconnected structures could hardly have been achieved without accurate taping.

That a rectangular plan was actually intended may nevertheless be thought probable. If the builders laid off two adjacent lines supposedly at right angles to each other, but actually with a six degree error, and then laid out the rest from these as base lines, but were careful with their linear measurements, the same error in the angle would be carried throughout the plan. A building at Chichén Itzá shows a similar more or less constant deviation from expected right angles (Ruppert 1931). However, any explanation of the parallelogram ground plan here must take into account the terrace walls buried in the end fields, described below. The northeasterly and southwesterly boundaries of the fields depart considerably from directions parallel with the ends of the structures.

The maximum length of the structures at pavement level is 18 m . The width of Structure R-11-a, measured at right angles to the long axis, is about 12.2 m , the rear stair-way projecting an additional 2.15 m . The height as measured from alley pavement to the concrete floor on the flat top is 3.29 m .

The width of Structure R-11-b, disregarding the rear altar or bench, is about $13.7 \mathrm{~m}, 1.5 \mathrm{~m}$ greater than that of Structure R-11-a. The height was measured as 3.27 m . The upper floor heights are therefore identical.

Each structure consists of a long relatively high platform, with vertically walled terraces on the outer or rear sides, and vertical walls at the ends. Probably these were terraced, after rising at least 1.8 m above the pavement of the fields. The inner sides, facing the alley, we believe descended about 75 cm from the top floor
level by one or two low terraces or steps to the tops of the main slopes. The latter then lead downward to the front platforms facing the alley. In the case of Structure R-11-a the angle of this slope is about 36 degrees from horizontal. That opposite, in much worse condition, was doubtless about the same. This inclined plane, where best preserved on Structure R-11-a, measured 3 m on the slope, and this is almost certainly close to the maximum.

Along the base of the main inner slope of the latter structure runs a low platform which, at the front, curves gently down to meet the alley pavement. At the south it apparently terminates at the vertical southerly main end wall of the structure, but at the north extends 50 cm beyond, and runs back 3.25 m along the end wall, forming a narrow wing. This latter design occurs on both ends of Structure R-11-b, that at the southerly end being best preserved. This end is shown in Figure 2.2d. Here it is quite certain that the rear extension of the wing rises in one step about 15 cm above the platform level. Perhaps these platform wings beyond the ends of the principal walls may be compared with the much greater but essentially similar extensions of the platforms of the great ball court at Chichén Itzá.

It is barely possible that this extension or wing was present at the southerly end of Structure R-11-a also. If so, it ran all the way, instead of only part of the way, to the rear. If we are correct in thinking otherwise, and that the portion of the end wall behind the platform rose above platform level, we must conclude that the main inner slope was about 50 cm longer than that of Structure R-11-b. Both slopes and end walls are too much fallen to be sure.

The inner or front platform of Structure R-11-a is 3.65 m wide and 74 cm high, except on the sloping front. Both platform and main slope of the other structure were found in much poorer condition, but with slight variations in dimensions, were identical with those of Structure R-11-a. Where well preserved and measured, the platform of Structure R-11-b was 7 cm lower and 50 cm narrower.

A badly ruined stairway leads to the top, or at least to the terrace, at the rear of Structure R-11-a. It is 5.75 m wide and placed about 1 m southwest of center. We could find no trace of a stairway to the top of Structure R-$11-b$, in its latest form. That there was none is practically proved by the presence of a masonry altar or bench, 50 cm high, 50 cm wide and 1.9 m long, placed against the base of the lower rear terrace wall almost exactly at the center. This may be seen in Figure 2.2b. It was apparently later extended a distance of 1.35 m to the northeast, or else there was another shorter bench, of equal height and depth, on this side. The northeasterly end was found intact at this point.


Possibly there was an approach to the top from the peculiar platform, Structure R-12, which runs into it at an angle. We did not excavate on the top of this latter structure. It is about 1 m high, the side walls terraced. (Fig. 2.2b).

On the surface of the flat top of Structure R-11-a was a covering of stone debris, including building blocks, about 50 cm in depth. There were no slabs and there could have been no stone vaults. Nothing whatever was in position except a short section of ruined wall along the inner edge near the center. This, as found, rose about 65 cm above the concrete floor, as indicated on the section, Figure 2.5b. We could not make out a northwesterly side of this wall.

A covering of entirely disrupted stone and humus, about 30 cm deep, lay on the floor of Structure R-11b. It consisted for the most part of broken stone, rather than of building blocks. We are driven to the conclusion that both structures in their final forms carried some sort of stone constructions on their tops. But we can deduce nothing as to their nature, other than to say that they were probably dissimilar. However, the tops were not completely cleared.

Inner slopes, platforms and alley were entirely cleared, and we can say with certainty that no stone rings were present. Stone tenons in their places were not found, but we were not searching for them and they might have been missed.

## Stone "Markers" and Two Carved Stones

Three stone drums varying around 50 cm in diameter were found in position on the center-line of the alley between the structures. One was at the center of the line, the centers of each of the other stones being 1.1 m in from imaginary lines joining the opposite corners of the platforms. Miscellaneous Sculptured Stone 4, at the south, and Miscellaneous Sculptured Stone 5, at the north (Fig. $2.6 \mathrm{c}-\mathrm{d}$, respectively, and Fig. 2.1a) were sculptured in low relief on the flat upper faces, the design in each case consisting of a peripheral band of glyphs (or part of such a band), with faint but certain traces of a design in the center. The sides of each were nicely tooled except toward the bottom, which was left rough. The sides bulge decidedly, as shown in the sections. In general form these two are similar to three, found by Merwin at Lubaantun in British Honduras, in line between two mounds, and now in the Peabody Museum, Cambridge (Merwin and Vaillant 1932: iv). According to notes of the writer, two of those have a projecting rim at the top, and only one a receding rim, as here. Merwin seems to have been the first to associate circular "stone markers" with ball courts.

The third and central stone at Piedras Negras was almost certainly not sculptured on top, the sides were only roughly dressed, lacked the bulge, and the depth nearly equals the diameter (Fig. 2.6e). Unlike the others, it was only roughly circular.

We assume that these stones were set flush with the pavement, or protruded slightly above it. The projecting rims of two of the Peabody Museum examples would tend to support the latter hypothesis. However, the northerly stone was found under several centimeters of crushed stone, which was found all over the field as the remains of the pavement. This was probably the case with the other two, though the fact was not recorded. The top of the central stone, which was not moved, was 6.5 cm below the pavement level, which could be made out clearly where it abutted Structure R-11-b at a point 2.5 m to the north. It is unlikely that this stone settled appreciably, as a hollow was apparently made in the bedrock to receive it (see Sections, Fig. 2.5). A carefully cut section through the preserved part of the pavement, from which only the finishing plaster, if there was such, had disappeared, showed no evidence of a later pavement superimposed on an earlier (see Fig. 2.3a). For these reasons we feel justified in suggesting the possibility that the stones were actually set with their tops somewhat below the pavement level at the sides of the alley, in which case the pavement probably sloped down around them, forming a sort of basin in each case, or was lower at the center than at the sides. The difference in levels, though accurately determined, is slight, but where a rolling ball is involved, might be intentional and significant. Careful taking of levels on all three stones and pavement levels at several points in some well-preserved ball court might repay the labor.

It seemed probable that the fields at the ends of the structures, which in other examples are so often outlined by other structures or by special walls, were as much used in the game as was the alley, and that if this was true additional "markers" might have been placed there. To find out, we skinned off all the pavement material from a strip about 2.5 m wide across the northerly ends of the structures and alley; from the entire alley, except for a small patch of well defined pavement, off-center; and from the whole southern playing field, between the northwesterly boundary wall and a line about 26 m southeast of it. This whole surface was cleared to a depth of about 30 cm , except immediately under three or four trees in the southern field. So far as markers were concerned our results were negative, and there seems little doubt that the three stones in the alley were the only ones used, and that the fields were devoid of any surface features, unless made of perishable materials.

The Carnegie Institution party at Yaxchilan found, besides the three stones in the alley, similar markers on


A


C

Figure 2.3 a. Section cut through alley floor, showing edge of inner platform and basal slabs; b. Structure R-11-b showing steeply sloping early rear wall, with early stairway side wall at left, rough chinked dry wall of medium-sized stones, from southeast; c. Structure R-11-a showing sample of concrete floor from inner platform, former surface to left.
the platforms, opposite the central alley stone. These are not present at Piedras Negras and a statement in the above cited report to this effect is in error.

A worked slab (Figs. 2.1a and 2.6b) was let into the main inner slope of Structure R-11-b, the center of the bottom edge being about 1.1 m above the platform as measured on the slope, and 20 cm northeast of the center of the structure at that point. Though badly broken into five pieces, the parts are in approximate position. The edges are tooled, and the top was boldly rounded. Its height is 98 cm , width 67 cm , and thickness 10 cm It is much thicker and larger than any other slab used on this slope, and its face is deeply eroded, while the others are not. Its form does not suggest any well-known function, and it seems not improbable that it was made for use there, and very probably was sculptured, though now entirely eroded.

Let into the slope of Structure R-11-a opposite was what we have designated Stela 45. Its base was 65 cm above the surface of the platform, measured on the slope, the center 21 cm northeast of the center of the structure at that point. This is shown in Figures 2.1b-d and 2.6a. The composite Section, Figure 2.5b, passes through it. Its present height is 1.92 m , width 40 cm , thickness 17 cm . Top, sides and back are nicely smoothed, the top being slightly rounded. Though very badly weathered, there are vestiges of four glyphs, in double column, at the base. These are in low relief, the raised surfaces perfectly flat, and outlines are irregular. Enough remains of borders, glyphs and horizontal channels on the upper parts of the stone to indicate with reasonable certainty the former presence of two columns of glyph-blocks, twelve blocks to a column, with space at the top for an upper border and an Introducing Glyph covering four blocks, though this portion incompletely weathered. At A-11 and A-13 are what may be exceedingly wide bars. If so, they are decorated, but their identification as numerals is not by any means certain. The stone is broken in half, but had not been appreciably disturbed.

The careful finishing of sides, top and especially the back, the archaic character of the glyphs, and the dissimilarity with the stone opposite make it probable that this is an early stela, reused in this position. Unfortunately we did not examine the lower end, except from the surface, but it appears to have been broken off, in which case the lower part of the stone is missing. This point is of some importance, as the lowest glyphs are only 10 cm or so from the present bottom, leaving no plain base for burial in the ground. The front surface was set flush with the surrounding slabs, which we know were covered with plaster, which was found in place at the base of slope. Perhaps this fact casts some doubt as to the supposed fact that the face of Stela 45 was exposed. However, the stone is very large and heavy in comparison
with other slabs used on the slope and if it was reused here the builders must have had some special reason, other than mere convenience.

The positions of this and the corresponding stone of the other structure confirm such a supposition. At the bottoms, the centers of each are but 20 cm northeast of center, according to our measurements. By plotting known dimensions, we find the center of the top of Stela 45 is only 5 cm from center, the difference being due to the parallelogram plan of the structure) while that of the other stone, being on the same side of center (the center line of a parallelogram) is farther from it than the bottom. But even this maximum distance from a central position, about 30 cm , might be ascribed to our own errors in taping and to irregularities in the end walls from which we measured.

It seems highly probable that both stones, dissimilar as they are, were intended to be in the centers of the respective main slopes. They may have been joined by a pain-bed line dividing the field, a possibility brought out by Blom in his latest paper. They are not of course opposite each other in the sense of being on a line at right angles to the fronts of the structures, and to the line of stone markers in the alley, but are nearly so. And we have seen that this right-angle line is not a true central line.

In this connection we may mention that Blom found an inscribed tablet, apparently near center, on the inner slope of one of the structures of a ball court at Toniná, Chiapas, figured in the last mentioned paper.

These slabs and the circular markers may together have served to mark out the longitudinal and transverse axes of the field, dividing it into quarters.

## Periods of Building

Distant almost exactly 11.3 m from the northerly and from the southerly end walls of the structures, we encountered the buried vertical retaining walls of two terraces, the tops at the surface of the fields, the bottoms on bed rock, between 0.8 and 1 m below floor level. The positions of these are shown by a special line on the plan, Figure 2.4, and noted in the key. That on the north peters out a little southeast of the longitudinal center, where bed rock at this level disappears and a superimposed solid earth and rock fill foundation for the pavement gives way to large pure rock fill. It faces northeast. That at the south faces southwest and southeast, turning an angle to run into (or possibly under) Structure R-11-b, It seems to lie on bed rock throughout.

It is interesting to note that the lines of these terraces, which were undisturbed and reasonably straight, when plotted from the surveyed points, are parallel with the
lines of the structures to within one and one-half degrees. This, coupled with the almost exact central position of the structures between them as measured on the long axis of the field, suggests that structures and terraces were laid out together, the fields being later extended by filling and the terraces being thus buried. On the other hand, the northerly terrace quite certainly did not extend more than 1-2 m southeast of the long axis at the time of excavation and we are fairly sure it does not now turn a corner. Possibly it originally was a counterpart of the terrace in the southerly field, resting in part on fill which slipped down the hill's side, thus destroying the missing part, and accounting for the absence of a definite end to the wall.

The possibility remains that the terraces preceded the ball court in time, and that the angle in the southerly one, which varies about five degrees from a right angle, took this form from hidden features of the terrain. In such a case, the structures may have been laid out purposely with about the same variation from a rectangular form, to conform to the terraces. In any case, it seems very probable that the original depth of each end field was only 11.25 m .

A trench dug through the inner platform and nearly to the rear of the main inner slope of Structure R-11a, at center, indicates that the platforms and inner walls are those of the original ball court (Fig. 2.5b). There is little doubt, however, that both structures were widened by later terraces placed on the rear or outside façades. On the top of each structure, a hard concrete floor was plainly traceable for a distance of about 3 m from the inner edge, when it gave way to fill.

On the rear of Structure R-11-b we located an earlier rear wall, shown in the section on Figure 2.5a. This was about 3 m high, not vertical, but steep, sloping back 35 cm in this distance. The later vertically walled terraces also protected the ruined inner part of a supposed stairway side wall, uncovered about 4 m northeast of center. The lowest course of a wall parallel to this was uncovered about 6.3 m to the southwest. These stones were below pavement level, on bedrock. If they represent the other side of an early stairway, the latter was in about the center of the rear wall, which confirms the connection between them. It is plain that in the course of remodeling, slightly battered walls, not terraced except perhaps at the very top, were replaced by vertical terraced walls. It is also practically certain that there was an original need for a central stairway on the rear of this structure which was no longer felt when it was enlarged.

The rear of structure R-11-a abuts on the higher ground of the so-called corridor connecting the South and East Groups. At this point, while bed rock rises from the level of the ball court fields, part of this height is due to buried structures. One, indicated by " Y " in the section,

Figure 2.5b, is a vertically-walled and mortar-covered structure extending under the ball-court structure. The end, shown in elevation ("a" in the key) is 40 cm northeast of the stairway, which rests, at least in part, over it. A low terraced platform, ( Z ) the terraced side, hardly more than stepped, being battered, was apparently added later. The present floor of the corridor covered these and also extends under the Ball Court Structure, at least in its latest form.

The lower terrace of Structure R-12 was built against the latest walls of Structure R-11-b. Structure R-12 was therefore built in connection with, or more probably, after the remodeling of the Ball Court structure.

A late buttress or extension was built against the northeasterly end of Structure R-11-a, extending 2.3 m to the rear from the rear end of the platform wing (Fig. 2.4). The end curved in to meet the main end wall at this point. It was badly ruined and we do not know its original height.

## Details of Construction

In our discussion of construction, the composite cross-sections in Figure 2.5 will be of considerable assistance. The symbols used are lettered on the plate. The symbol "a" indicates walls shown in elevation, "b" represents walls and stonework in cut section; "c" and "d" show two kinds of concrete, and "e" represents crushed stone and a little line, all that is left of concrete pavements which covered the fields; " $f$ " is a solid fill of small broken stone and earth; " $g$ " indicates pure rock fill; and "h" shows the approximate surface of the mound as found.

For those particularly interested, at the end of the paper is a statement of the precise senses in which we use the terms block, slab, broken rock, pure rock fill, concrete, mortar, finishing plaster and stucco.

## Preparation of the Ground

Excavations at several points in the northerly and southerly playing fields, and in the alley, revealed bedrock at between 50 to 75 cm below the pavement, which to the eye was perfectly level, and which, as measured with the instrument, sloped very slightly to the southwest. The surface of bedrock, where uncovered, was remarkably smooth and quite soft. In fact at the northerly end of the alley we thought at first it was an earlier floor. Considering this, the area, involved, the ravine to the northeast, and the rise in bedrock under Structure R-11-a, the suspicion arises that most of the area was roughly leveled off by considerable cutting into bedrock. The northeasterly part of the northerly field, perhaps nearly half, is a fill of large broken rock. Here at least we seem to have the


Figure 2.4 Piedras Negras South Group Ballcourt Structures R-11-a and R-11-b; Section A-B and elevation looking northwest; cross section through central stone at right angles to $A-B$.



## Piedras Negras

South Group BallCourt - Composite Sections

Figure 2.5 Piedras Negras South Group Ballcourt, composite sections.


Structure R-II-b

modern combination of cut and fill for obtaining a level surface. Except over the area of pure rock fill, the actual foundation of the pavement was a solid fill of earth and small broken rock ("f" in the key, Fig. 2.5).

## Walls

All of the structure walls are of course retaining walls, but those of the latest building phase are superior to the average terrace walls of the city.

The vertical end and rear terrace walls are built of large blocks, some of which, because of their considerable depth, approach the point where they would have to be called very thick slabs under our definition. We neglected to verify definitely the probable fact that they were laid in mortar. If this was present, it had disappeared at the surface.

The stones are roughly worked and fairly straight on the exposed face, the ends more or less squared, but the hidden edges as a rule are quite irregular. A typical stone from the end wall was about 12 cm thick, measured 40 cm on the exposed face and extended into the hearting about 25 cm . Others were as much as 25 cm thick. They are laid more or less in courses, with little or no chinking. (Fig. 2.2d, e). The stones of these walls appear to be typical, from superficial observations, of the South Group as a whole. They are decidedly larger, especially longer, than those of Acropolis palaces, the masonry of which we know best. There were no remaining traces of plaster finish, but none was expected, as these walls are badly ruined.

They may also be contrasted with earlier walls at the ball court. The original high rear wall of Structure R-11b was partially cleared and may be seen in Figure 2.3c. It is made of smaller and rougher blocks, with considerable chinking, and the stones were certainly not laid in mortar. The side wall of the buried platform addition Z (Fig. 2.5c) is built up of relatively thin slabs. Possibly this was to get a relatively smooth battered surface, without beveling the edges of the stones. Thin slabs such as these were used in some of the best vertical free-standing palace walls on the Acropolis, but especially in vaults.

## Inner Slopes

The most interesting ball-court walls are the main inner slopes leading up from the front platforms. These are surfaced by slabs, placed end to end on the slope, like flag-stones. This method of surfacing has not been found elsewhere at Piedras Negras, except as the surface of a level plaza, and seems to be a common one on other ball courts with sloping inner faces.

The slabs here are laid directly on pure rock fill, which implies that at least the outer portion of the fill was more or less carefully laid up, so as to bring the slabs into one plane surface, as found. The slabs are only roughly
fitted, and vary a great deal in size. The larger are about 50 cm by 90 cm , the length running from top to bottom. Most are considerably smaller than this. The average thickness is about 5 cm . There was one exception at either end of the slope of Structure R-11-a, where, fallen to the field, we found broken parts of nicely squared and tooled stones. One is 14 cm and the other 18 cm thick, and both give the impression of being parts of broken-up plain lintels, or other specialized cut stones. In addition, unusually large but thin slabs were found in position near both ends of the Structure R-11-a slope, and at the southerly end of the Structure R-11-b slope. From this we gain the impression that special attention was paid to the ends of the slopes. The general character of these slabs appears plainly in Figure 2.1a, b.

The lowest slabs were securely looked in place by being imbedded slightly in the concrete of the platform, as revealed by our trench into Structure R-11-a and shown in the section, Figure 2.5b. The slabs were undoubtedly covered with plaster, which was found in position at some points, and probably this received a coating of fine finishing plaster, which had disappeared.

## Floors

The floors at the tops of both structures are of concrete, that on Structure R-11-a being much whiter than that on the other. In neither case was remaining finishing plaster recorded, and both were quite soft.

The concrete pavement in the alley was still softer, without remaining finishing plaster. Where not disrupted the surface was easily found by brushing. A section cut through it is shown in Figure 2.3a. The fields at the ends were covered with a layer of crushed stone and light-colored earth (Fig. 2.5c), doubtless the remains of concrete, but so far as we ascertained, it was there entirely disrupted.

The best concrete thus far observed at the city was used to cover the platforms. About 20 cm thick, and resting directly on pure rock fill, it extends about 1.6 m from the base of the inner slopes and then curves gently down to meet the alley floor. The concrete was badly disrupted, presumably by trees long since disappeared, but where it survived, it was quite hard, and broke into large pieces instead of crumbling. A piece, set on edge, is shown in Figure 2.3c. The surface in shadow is the top, the surface in the sunlight is a cross-section. It consists of crushed stone firmly cemented together, a uniformly smaller size having been selected for the surface.

For some reason the architects were especially concerned about the juncture of this platform with the alley pavement, and laid a double row of small stone slabs along the entire length of each platform, which aided us greatly in locating corners. These appear in the photographs, Figure 2.1a-c, and Figure 2.3a, and


Figure 2.6 Field drawings of South Group Ballcourt field markers and sculptured stones.
in section in Figure 2.5a, b. The lower row, sloping up toward the platform, was buried under the alley pavement. The upper row carries this stone foundation from a point below the alley pavement to a point below the sloping side of the concrete cap of the platform, which overlaps it. Since the whole platform and alley at the section examined, rests on the same solid fill, one wonders why added foundation stability was desired along this line. This buried double line of slabs definitely does not belong to an earlier structure, unless all other vestiges of it, including the alley floor, were later removed, which is more than improbable. Lines of slabs in this position have been observed at several ball courts. Possibly they also were buried foundation constructions, and only to a small extent the surfaces of the platform slopes.

## Fills

Our trench into Structure R-11-a was not carried beyond the slope, but, when added to a pit sunk into the top, indicates that the hearting of these structures, like almost all platforms, pyramids and terraces so far examined, is pure rock fill. There seems to be no sign anywhere in the city of a solid concrete fill, though in some minor instances we have encountered solid rock and earth in the hearting. In fact the latter is used at the very bottom here. A solid masonry fill (slabs and blocks laid in mortar) has been found behind one building (Structure J-6).

Reference to the section in Figure 2.5 shows that the rock fill under the main slope consists of stones considerably larger than those under the platform, and further that this type of foundation can be used successfully to support either concrete or flat stone surfaces.

## Stairways

We did not trench into either the late stairway of Structure R-11-a nor with certainty, the earlier one of R-11-b. However, we did uncover what seems to have been the lowest course of the southerly side wall of this latter supposed stairway, as noted above, the rest of the wall having been removed. In line with this, its base immediately behind the latest vertical terrace wall, was the end of a steeply sloping and very crude retaining wall, which may be seen in Figure 2.2b, beyond the bench or altar. It extends to the northeast indefinitely, but ends here abruptly, on a well defined line. Apparently it is an early structural wall, designed to retain the fill under the early stairway, on a line about under the middle step, and about 1.3 m out from the principal early rear wall, which undoubtedly passed behind the whole stairway. Such rough structural walls were found under the main stairway of the large pyramid, Structure J-3, on the Acropolis. The fact that this wall abuts on nothing further confirms our belief that there was a stairway side wall here which was later pulled down to floor level.

## Objects

A considerable number of objects were recovered during the excavations at the ball court. They fall into two groups: sub-floor caches found in position, and objects found on the structures and in debris fallen from them.

We take pleasure in recording our obligations to several friends of the Museum, all of the Academy of Natural Sciences, Philadelphia, who kindly examined such of the objects as were submitted to them: to Dr. Henry A. Pilsbry, who identified the shells; to Messrs. Samuel G. Gordon, F. J. Keeley, and Horace J. Hallowell for mineralogical identifications; and to Mr. James A. G. Rehn, who advised us of the animal species represented by the bones.

Positions of the five definite known caches, all in the southerly playing field, are indicated by their numbers on the plan, Figure 2.4. They were all found 15 or 20 cm under the surface, resting on the earth and rock foundation fill, and covered by the layer of crushed stone representing the original concrete pavement of the field.

All the pots were badly broken, probably by the roots of centuries of vegetation, as the sherds in each case were found at one spot and in some cases more or less outlining the original shapes of the bowls.

## Cache 1

This was an orange colored simple silhouette bowl without supporting legs. ${ }^{1}$ Four obsidian pieces had been placed in or immediately beside it. These are almost certainly to be classed as eccentric, though three are roughly pointed. They average about 7 cm in length, 2 cm in width, and 1 cm in thickness. The two shown in Figure $2.7 \mathrm{~b}, \mathrm{c}$, illustrate both types. The scale is in centimeters.

Cache 2
This consisted of two broad shallow simple silhouette bowls, without supports, one inverted over the other. Both are polychrome. A careful search revealed nothing else of an imperishable nature with them.

Cache 3
This consisted of two simple silhouette bowls without supports, both polychrome, one painted on the outside with a mat or textile design. We could not establish the probable fact that one had been inverted above the other. Among the sherds were an obsidian flake, a pointed fragment of a small obsidian flake knife, and an obsidian core.

## Cache 4

Heavy sherds, rough and apparently black on the outside, smooth orange inside, found close together, are the only evidence for this cache. There was some evidence that there were two bowls, one inverted over the other, but this was uncertain.

Cache 5
This was an orange-colored bowl, without contents of an imperishable nature.

Nearly all of the remaining objects were found in disturbed positions on and about Structure R-11-a, a few potsherds coming from the debris at the southeasterly corner of Structure R-11-b and one figurine head being found on its top. Before discussing positions in detail it will be well to state what was found.

## Pottery

The sherds comprise a considerable variety, at least when seen by an untutored eye. They are thick and thin, plain and decorated. Forms include large bottle-necked vessels, bowls, cylindrical vessels, the hollow handle of a supposed incense ladle, and doubtless others. Field notes indicate at least three examples of supporting feet. Besides painting, incised designs, carved decoration, bosses, fluting and other relief effects are present. There is one miniature olla, spheroidal with constricted neck and two perforated ears or handles.

## Figurines

Parts of twelve figurines were recovered, one an animal form, the others more or less human. Three were certainly whistles. Three heads are especially interesting as being more or less grotesque, two with large bulging eyes and sharply protruding chin or beard.

## SpindleWhorls

There are one or two of these, which are mere disks cut from potsherds and perforated in the center. Possibly they


Figure 2.7 Objects.
should be classed as counters. A third of pottery, made specifically for the purpose, is plano-convex in crosssection, and perforated.

## Counters

This is a term of convenience for six objects, cut from potsherds. None is perforated. One is embellished with a drilled depression at the center, surrounded by a circle of eight similar drilled depressions. This and most of the others are roughly circular, but one is approximately rectangular. This latter is cut from a sherd bearing part of a beautiful carved design. With these we mention a crude piece cut from a sherd, which may have been a pendant. There is a crude incised design on one side, possibly part of a design on the parent vessel, with a crude incised cross on the reverse, centrally placed. The piece is somewhat circular, though very irregular in outline. The edge has been grooved all around, and there is one small perforation near the edge.

It may or may not be significant that these unperforated objects cut from sherds have not been encountered, according to our field catalogues, in our much more extensive excavations in the West Group. Only three have been found in the East Group, all on the Platform of the Twenty-five Altars (Structure O-7) which is nearly and possibly should be assigned to the South Group. Only two others are known at this site. They are respectively from the debris of Structure R3, a South Group pyramid, and from Structure V-1, a supposed dwelling in the Southeast Group. However, others may have escaped classification in the field, and may turn up among the sherds, now being studied.

## Stone Objects

These were not plentiful, but show a wide variety of forms. An almost complete trough-shaped or heavy grooved metate had apparently fallen from the rear wall of Structure R-11-a. Being a roughly squared block, 30 cm wide, 45 cm long and 23 cm high, it would make an excellent building block, and may have been discarded and so used. It appeared to be of limestone. The groove, about 20 cm wide, curves down from the top surface near either end, reaching a maximum depth of 13 cm at the center.

This type of metate has been found in the South, Southeast and West Groups, and is the most common form encountered. We therefore have no reason to suppose it is a late or degenerative form at this city. The groove is found worn down to various depths, and in one instance to within a centimeter of going clear through the bottom. it seems to be identical in type with the heavy grooved metates at Chichén Itzá, described by Strömsvik, who is inclined toward the belief that they are a late type there (Strömsvik 1931).

Portions of three manos or hand stones for grinding on the metate were recovered. All are of the cylindrical type. Two are illustrated in Figure 2.7h,i. Both are oval in cross section, with one side flattened by use. The first is of limestone, the second of volcanic rock, presumably imported from the highlands.

The flattening extends to the end of each of these grinding stones and although the original length is unknown, in other respects they conform to the type used with grooved metates at Chichén Itzá. Strömsvik has proved the late use of the simple grooved metate at Chichén Itzá, and we may perhaps conclude that it was in use throughout the Mayan era, a possibility which he recognizes.

In Figure 2.7e, we show an interesting small point, with a very broad receding tang or base. This is the only point of this type yet encountered. The base or tang seems very broad for a spearhead, and perhaps it is a special type of knife. The material is a mottled bluishgray flint, with a little red at one spot. The end of the base is formed by the original surface of the nodule, as shown by the thick patina still present there. Thus far true flint has been exceedingly rare at Piedras Negras, nearly all cutting tools and eccentric pieces being of obsidian or a very poor quality of chert.

A second much larger flint or chert point, the base broken off, was sent to Guatemala City. It is triangular in cross-section, being formed from a large flake by the removal of two or three relatively large flakes without secondary flaking. It is as far as it goes similar to the modern Lacandon points described by Maler (1901:37) and to the "hastate and tanged points" from British Honduras described by Joyce (1932:xix).

We show in Figure 2.7g, a much battered hammerstone of chert. The object, Figure 2.7 f , is a roughly rounded piece of obsidian showing considerable wear on the flaked sides and back. The bottom is worn completely down to a smooth, though not polished, surface. The maximum diameter is 2.5 cm .

The fragmentary stone object shown in the same figure, 9 a , is puzzling. In general form it fits in a series of small footed metates found in other portions of the city. However, instead of a plain upper grinding surface, there is a broad depressed groove along the left edge, and a raised border which apparently ran all around. There are no feet on the recovered fragment. The material has been identified as a granitoid igneous rock. The fragment is well tooled, and shows no signs of wear by use.

## Shell

Two pink land shells, indigenous to Guatemala, Pomacea ghiesbreghtil (Reeve) also called Ampullaria ghiesbreghti, were recovered. Two wide holes had been bored in the one shown, Figure 2.7 d , apparently with a hollow drill.

Possibly the resulting disks were the desired product of this work.

## Animal Bones and Teeth

These include much broken identifiable fragments as follows: opossum (lower left jaw); peccary, species uncertain (teeth and head bones); deer, Odocoileus (long bones); and turtle, species uncertain, probably a softshelled turtle, (small fragments of shell).

## Positions of Objects

Of the foregoing objects of the second group, two of the three mano stones and three of the six pottery counters were found far out in the floor of the southerly playing field. The supposed incense ladle handle was found on or in the pavement of the alley. Any or all of these may have been thrown in the floor material, as dropped on the finished floor. All of the others were found in the mantle of disrupted debris on the upper floors of the structures, or in the debris which had fallen from the structures, especially at the north end and in the angles formed by the stairway on the rear of Structure R-11-a. With the minor exceptions noted, the bulk of this material, which came from the top and along the rear, may be presumed to have been deposited during or after the remodeling of the structures, as the probably late lower rear terrace wall of Structure R11 -a was standing almost to full height. The five caches in the southerly playing field, the positions of which are located by numbers on the plan, as stated, were probably deposited at the time of the original construction, or before, as they were in the floor of the buried terrace which we have seen in all probability preceded or was contemporaneous with the earliest period of building.

If Piedras Negras pottery eventually falls into a temporal series, it may confirm or negate our tentative deduction that this ball court was early at the city, based on the neighboring early monuments. If the pottery of the playing field caches should fall into a group differing from that associated with the structures, it may assist in dating the additions to the structures.

Some of the pottery found on the top of Structure R-11-a formed more or less complete vessels, with many sherds of the same vessel close together, though always much disturbed. It is not improbable that much of the pottery from this structure was cached, perhaps with some of the other objects, in structure floors.

At least, we may assume as probable that the custom of making sub-floor deposits, including pottery, was in vogue at an early date, and we know that it persisted to the time when Structure O-13 was erected in its latest form. The latter supported three hotun markers, ranging
from 9.16.10.0.0, to 9.18.5.0.0 (Morley readings), "Lintel" 2, dated 9.11.15.0.0 differs greatly from the others in style, and in Morley's unpublished opinion was probably reused on this temple.

The wide spread in time of this custom of making sub-floor caches is of importance, for it will assist greatly in establishing architectural sequences, once pottery sequences are worked out, or vice versa. The cached vessels at Piedras Negras are in general disappointingly plain and simple, but the polychrome vessels in the southern field here show that this is not always the case.

The animal bones occurred in fallen debris, yet segregated in two principal groups, one at the northerly end and the other in the southerly angle of the rear stairway of Structure R-11-a. Sherds abounded in the same general positions.

## Date

As hinted above we have as yet no means of definitely dating these structures. The court is of course "Old Empire." We can say that the final form just described differs from an earlier one in nonessential but possibly significant additions. Finding Stela 45, probably a reused archaic-style stela, placed in the earlier part may indicate that even in its original form the court was built a considerable time after monuments began to be erected who knows how long after the city was occupied? But the stone may have been inserted after the structure was erected, and no temporal relation whatever between the two can be deduced with certainty.

We have however in the adjoining South Group Court a considerable number of readable hotun markers ranging from 9.5.0.0.0. to 9.12.0.0.0. (Morley readings) with other unreadable ones which on stylistic grounds will probably be found to fall into an early series, for the most part between these extremes. We are hardly prepared to say that the architecture of the South Group differs significantly from that of the others, for our excavations are too limited, especially here. But there are hints at least that it does. In particular we may mention Structure R-3, apparently a stone-walled temple without vaulted roof, and with a stone lintel, "Lintel" 14, the initial series of which is 9.5.5.?? (Maler's Stela 29).

Perhaps a relative dating will eventually come from the pottery, which apparently was cached in the floors, and some of which is polychrome. In the meantime, it seems probable that in its earliest form, at least, the court was early rather than late at the city.

## Preliminary Note on West Group Ball Court (Structures K-6-a and K-6-b)

Surface examination, plus a little hurried clearing in the alley between the structures, enables us to state some differences, and suggest others, between this and the South Group unit just described.

The West Group Court is about the same length, though the structures are narrower and a little lower. There are no walls or structures of imperishable materials enclosing the end fields, so far as surface indications go. There is no sunken court effect and there are no circular stone markers in the alley. The edge of the inner platform of Structure X-6-a, at least near the southerly end, is not sloping, but consists of a vertical block wall, somewhere between 50 cm and 1 m high, depending on the alley and platform floor levels, which have not been accurately determined. The total height of the wall as found is 70 cm . A vertical wall here is very unusual, though there seem to be other examples at and near Cobá (Pollock 1932:46, 78). There is, of course, no line of slabs at the base of this platform. It seems reasonably certain that the main face at the rear of the platform was not surfaced with slabs, which are nowhere in evidence. Two members of the field staff believe they remember seeing a short exposed section of this main inner façade, and that it is a vertical wall, instead of sloping as at the South Group court, though we do not mean to state it as a fact. The observations were not recorded in our notes. This is unfortunate, as sloping inner faces are apparently the rule at Old Empire ball courts.

It seems not unreasonable to wonder if some of these differences may be due to a time element. We have no means of definitely dating either court, but that in the South Group as above stated is in the immediate neighborhood of monuments ranging from 9.5.0.0.0 to 9.12.0.0.0 while the West Group Court is even closer to a group of monuments ranging from 9.12.5.0.0 to 9.16.0.0.0 and one of these may be 9.10.0.0.0 (Morley readings).

## Other Ball Courts

In his latest paper Blom gives a list of known ball courts of the Maya area, with their discoverers, including those at Chipal, San Francisco [El Alto], Chichel, and Xolchún, all in Guatemala, found by Robert Burkitt. In his bibliography, as shown by advance sheets at least, he does not mention the published reference for these. The source is doubtless volume 21(1) of the Museum Journal, University Museum, University of Pennsylvania, 1930, where Burkitt publishes drawings of obvious ball
courts, though he did not label them as such. It appears to the writer that Structures 9 and 10 at Copán probably functioned in part as a ball court at some time. The inner platforms are shown plainly on the model at the Peabody Museum, and the edge of one of these seems to have sloped, and to have been covered with slabs (Gordon 1896:20).

## Terminology

The Mayan builder had a considerable variety of processes and methods at his disposal, which varied with locality and probably with time. To describe them we are forced to use modern terms, but we can add clarity, and save much verbiage in the long run, by giving them special and definite meanings for our own use. There seems to be little standardization in the matter and it seems wise to explain the connotations of the more important terms used here, and as they will be used in future descriptions of buildings at this site. This is without prejudice, however, to a more refined terminology to be developed later, if further knowledge requires one.

## Blocks

Building stones, at least roughly worked. The upper and lower surfaces are parallel. The exposed edge is fairly straight and smooth. The ends may or may not be squared. Dimensions vary widely, but by our definition, the thickness is relatively great as compared with length and breadth. Fallen blocks nearly always denote a fallen wall, which may have been free-standing or a mere retaining wall.

Slabs
A slab differs from a block in being relatively thin in comparison with length and breadth. Usually both length and breadth of slabs are greater absolutely than the same dimensions of blocks used in the same construction, and the absolute thickness is less. The slab is universal in vaults, and is common in the best Acropolis vertical free-standing walls, and in moldings, cornices, burial cist covers, etc.

## Broken Rock

Stone artificially broken into irregular formless pieces, presumably with sledges. The pieces vary in size from that of a closed fist to 50 cm or more in greatest dimension. Smaller sizes will be called crushed stone. The simple term rock may be taken to mean broken rock unless the context indicates otherwise.

## Pure Rock Fill

The hearting or core of nearly all substructures, terraces and platforms thus far examined. The term always means that we are dealing with broken rock and nothing else. We
know that in some cases at least, the rock is not merely thrown in, but more or less carefully laid up in sections. The size of rocks in any one unit of a structure tends to be about the same. Air and water are free to circulate in the open spaces between the angular sides of the rocks. Where they are large, they are wedged tightly together by their own weight and the angular sides prevent one stone from slipping across another. Where small, they fall out if the retaining wall is removed. The larger rock fills formed exceedingly stable foundations. Whether the builders took advantage of the drainage possibilities we have nothing as yet to indicate.

## Raw Materials

At this site all building stone is limestone, the bedrock of the country. The two parallel planes of building blocks and slabs usually come almost ready made. All that is necessary is to split the stone along the bedding planes, which offer a wide range of thicknesses, from a 1 cm to 25 cm or more.

Except when slabs and blocks were carefully dressed, which was not the rule, it seems probable that there was nearly as much labor in preparing broken rock for fills as in preparing building stones proper. Almost never does one see a flat, surface on a stone of a rock fill. The question arises as to whether a distant supply of stone suitably stratified for slabs and blocks, or a positive desire to have all sides of fill-stones rough and irregular, accounts for the distinction. We have not as yet located any quarries.

## Concrete

Crushed stone or small broken rock (often both, the smaller stone at the top) mixed with a binding material, presumably lime mortar. There are several varieties, differing in present hardness, color, sizes and proportions of stones, and probably in the mortar mixtures.

## Mortar

A mixture, presumably using lime as the cementing agent, usually gray in color. We neglected to ascertain the
presence or absence of sand in the mixture, though sand is readily obtainable at present on the river bank. It is the binding material used in stone walls and vaults. In some instances at least blocks and slabs are laid in it like the bricks of a modern brick wall.

## Plaster

Mortar when applied as a coating to walls, vaults, floors, pavements, stairways, benches, etc.

## Finishing Plaster

The thin fine-textured second coating found on plastered surfaces in many protected places. It is white or yellowwhite in color, and appears to be nearly pure lime. The surface was nicely smoothed, possibly polished. With one or two minute exceptions, we have encountered no traces of painted plaster at Piedras Negras. Finishing plaster has been found thus far only on floors and the lower parts of walls, where it was protected by at least 30 cm of debris. Very probably it was applied to most or all plastered surfaces.

## Stucco

We reserve this term for ornamental plaster work, which was used both inside and on the façades of at least some of the buildings, probably of many. Sticks, stones and potsherds were used as strengthening elements in building up stucco designs. In several instances traces of paint have been found on stucco fragments which were no better protected by debris than floors.

## Note

1. The superficial descriptions of pottery and figurines in this paper are based only on field notes of the writer. The pottery and figurines of the city as a whole are being intensively studied by Miss Mary Butler of the 1932 staff, who will describe them fully at a later date.

# Palace Structures J-2 and J-6, with Notes on Structure J-6-2nd and Other Buried Structures in Court 1 

Linton Satterthwaite

## Preliminary Note

The report which follows was originally prepared, and the plates were printed, after the 1932 season. At that time the two principal units under discussion had been only partially excavated, and this fact was naturally reflected in the text, and in the plates. Excavation of the two palaces was completed in 1933, and deep trenching and tunneling then taught us much about the prior history of the court on which they stand.

Rather than scrap the plates and further delay the appearance of what is only a preliminary report of limited circulation anyway, we have used them, and have tried to bring the text up to date by considerable interpolation, and by footnotes. As a result there are inevitably some passages in the text, which lack proper illustration in the plates. We hope that nothing will be actually unintelligible.

In particular we should point out that the plans and sections, though drawn from careful measurements, in most places are based on the assumption that intended right angles really are such, and that intended straight lines are straight lines. Nowhere at Piedras Negras does such an assumption agree with the facts. If there are any true right angles in the buildings of the city (we have found one or two) they are probably the result of chance. Since complete excavation, both buildings have been redrawn, and the major deviations from what was obviously in the architect's mind have been recorded. These deviations were not great enough to affect the general appearance of the building, but suffice to show that the masons were quite careless, or that the architects were not able to, or at least did not, lay out an exactly rectangular plan.

A plan, in which angles as well as linear measurements are carefully recorded is, we believe, thoroughly worth while, once buildings are cleared to floor level. Apart from showing the degree of care, or of knowledge of draughtsmanship of the builders, they may, on occasion, by special distortions indicate the cause and manner of collapse, and also the inclusion of older walls in a new building.

Apart from this sort of inaccuracy, our plans are reliable, but they omit some things learned since. A reader who wants to complete them may do so as follows:

Figure 3.1. Extend the northeasterly wall of Room 6 so that it runs 2.1 m southeast from the outer doorway of this room. Here it ends, the southeasterly portion of the wall resting against the formerly exposed and of the original palace (which consisted of Rooms 1 to 4).

Figure 3.2 and 3.3 Extend the southwesterly wall of Room 5 southeast until it meets the outer or front wall (not shown at all on the plate) at a point 1.4 m from its beginning as shown on the plate; the front wall which it here meets is 1.4 m thick, and extends northeast to a doorway 1.7 wide. The end of this wall forms one jamb of the doorway, the end of the original palace forming the other jamb. The reason for the extraordinary thickness of this wall is the fact that it includes within itself the remains of a heavy pier of an earlier period.

Figure 3.4. Make the front wall of Room 3.9 cm thick and extend it in a southwesterly direction to a doorjamb 4 m from the northeasterly end of the room (we guessed only 3.4 m ). From here, moving in a southwesterly direction, insert a doorway 1.7 m wide, then a pier 1.3 m wide, then a second doorway 1.8 m wide and a second pier 1.2 m wide, the piers being 90 cm thick, like the wall. Extend the partition wall between Rooms 2 and 3 clear to the front façade, which gives the other jamb of the last mentioned doorway, which is 1.7 m wide.

Piers in Room 2 had completely fallen, but there is just room enough to place two piers and three doorways in it, of the same approximate widths as in Room 3.

Starting at the face of the vertical retaining wall in Structure J-6-2nd (shown in diagonal cross-hatching at the far left in the plate), from there extend the front and rear walls of J-6-2nd about 2 m to the southwest, to meet the original end wall of the chamber, which must also be added.

Figure 3.1 Structure J-2: plan, sections, and interior elevations.


Figure 3.2 a. Structure J-2: looking to medial wall through southwesterly doorway of Room 2; b. Structure J-2: showing northeasterly end of Room 1, looking over remains of a pier, from the south; c. Structure J-2: looking through interior vaulted doorway, from Room 6; d. Structure J-2: portion of medial molding and upper zone near southwesterly corner from southwest and above.


Figure 3.3 a. Structure J-2: pier, doorway, and plinth, Room 2, from west; b. Structure J-2: Room 3, Lacandon incense burners in place before removal; c. Structure J-2: cross section through wall, medial molding and upper zone shown in Plate 2.2.d; d. Structure J-2: cross section through walls, floor, and fill, southwesterly end of Room 2, looking northeast.

To correct several wrong guesses indicated by broken lines on the plan, extend the northeasterly side of the transverse wall between Rooms 2 and 3 back into the hearting, i.e., across the rear wall of Room 3, which ends against it. But bind this transverse wall to the rear wall of Room 2. Also, set the rear wall of Room 3, 30 cm behind the position assigned to it in the plan. These corrections all reflect information not at hand when the plate was made, but are important since they prove that Rooms 2 and 3 were not built at the same time.

Also indicate a break and change in type of masonry of the rear wall of Room 1, about 1.5 m northeast of the niche containing Throne 1. Indicate the stump of a partition wall 45 cm thick, which was inserted in the rear wall immediately behind the thicker and later partition wall between Rooms 1 and 2, which is correctly shown. These two items are important because they prove beyond reasonable doubt that Room 1 was built after the partial demolition of an earlier structure, the same against which the end of Room 3 was placed.

Extend the side slopes of the niche vaulting in Room 1 (Fig. 3.4, Section E-F) to a height 41 cm below the cap-stones of the room and then join them by a horizontal line; in Section A-B extend the rear soffit slope of this niche to the same height and draw a horizontal line forward to meet the soffit slope of the main vault. The reasons for this reconstruction are explained under the heading "Throne 1 Description."

The above notes cover everything we would now add to the plans of the two buildings themselves, and we would now show, subject to corrections indicated, practically all broken-hatched portions as solid black.

Further, excavation of the areas shown in stipple on the plans revealed no additional interior fittings, which are entirely confined to Room 1 of Structure J-6.

We give many dimensions and levels to the centimeter as measured. This does not mean that the same dimension would read exactly the same if the measurement was made at slightly different points. Usually it would not. It seems to the writer foolish to vary measurements as recorded, and insert innumerable "abouts" before them, provided the reader will remember that an impression of extreme precision on the part of the Maya architects or of the excavators, is not intended.

## Acropolis Palaces: Introductory Remarks

There are on the Acropolis at Piedras Negras twelve buildings which we have called "Palaces." Several involve more than one structural unit. The term "palace" as used here has no functional significance whatever. It is retained for want of a better one, and because of all the known buildings at the site these appear to be the ones which should be compared with buildings at other cities to which that term has been applied.

Of the total number, seven Acropolis palaces, Structures J-2, J-9, J-11, J-13, J-18, J-21, and J-23, show a design based on two long parallel masonryvaulted galleries, the vaults supported by two outer walls or rows of piers and by a common medial wall. In all palaces of this type there is a room at either end (if both ends stand free), the long axis and the vault of which run

Figure 3.4 Structure J-6 and J-6-2nd: plan, section, and interior elevations.
transversely to those of the galleries. Structure J-12 has the same ground plan, and is therefore included under the heading palace, though its roof was at least supported on perishable materials, if it was not of thatch. All buildings of this plan, which we call Plan Type 1, stand entirely free, excepting Structures J-2, J-12, and J-21, which merge into high platforms at one end; and of these Structure J-2 was originally entirely free.

The remaining four Acropolis palaces, Structures J6 , J-8, J-10, and J-22, consist of single vaulted galleries, without end rooms. In each case the vault was supported by a free standing wall or line of piers at the front, and by a rear wall built against the hillside or against older structures, and acting as a retaining wall for fill behind. Room 6 of Structure J-2 was also of this structural type. Because of this circumstance we shall occasionally refer to these buildings as "built-on" structures. Two of these (Structures J-8 and J-22) turn right angles, apparently adapting themselves directly or indirectly to the terrain. The roof surfaces of all four appear to have been nearly flat and to have acted as terraces or promenades in front of other and higher Plan-Type 1 buildings to the rear.

This variety we call Plan-Type 2 and it seems to be an adaptation of Plan-Type 1, or of a supposedly earlier type, for use on steep slopes.

The long galleries of most palaces of both Plan-Types are divided into rooms to some extent by the addition of transverse partition walls. Some of these partition walls are obviously secondary, the results of remodeling, and many may be so.

The arrangement of these buildings about Courts 1, 2 and 3, which lie at different levels on the Acropolis, and the major features of their ground plans may be seen on the partially completed plan of the city issued with the first of these Preliminary Papers (Satterthwaite 1933). The plan of Structure J-2, described below, is probably the least typical of the Plan Type 2 group as a whole, and is first presented merely because it is the only full-sized one of the double-ranged type which we have excavated completely. Before general conclusions are drawn, it should be compared with the plans of the other Acropolis palaces on the map of the city. In particular it is the only one with a transverse end room, which apparently was not at least originally connected with the main galleries.

So far as surface conditions indicate, Structure J-6, also described below, does not differ materially from the other three single-gallery buildings (Type 2) except that it is the longest, and was provided with an unusually large and in part megalithic stairway. There seems no reason to suppose that the two Plan Types of palaces, i.e., singlerange "built-on" and double-ranged free-standing, differed greatly in function. The single-range palace, Plan Type 2, is found on the Acropolis only where in all probability there was no room for a double-range building, because
of the sharply rising bedrock of the hill. The use of the roof as a promenade, if our inference on this point is correct, would appear to be a mere adaptation, once the placing of such a building had been decided upon. At any rate, buildings of this structural class are not to be thought of structurally as mere chambers placed within terraces. Had the builders desired them to stand entirely free, they would have needed only to thicken the rear and in some cases the end walls, and to complete the rear and end upper façades. ${ }^{1}$

Most of the Acropolis palaces of both types are standing at one point or another to heights above the spring of the vault. The bulk of our information is based on surface observations and measurements, which suffice to indicate the major features of ground plan and structure with certainty, but as to arrangements at floor level we know little. In most of these buildings our excavations to date consist of mere trenching for crosssections. Structure J-23, classed as a palace on the basis of its plan, though an extremely narrow one, and Structure J-2, which is full sized, have been completely cleared, and were entirely devoid of benches, altars or other interior structures of imperishable materials. Partial clearing in Structure J-12, a typical palace on the basis of plan, but roofed without the use of the vault showed the presence of at least one small bench placed against the medial wall. Structure J-6, completely cleared, was found to have a small L-shaped bench besides other more unusual interior features described below, but these are all in one of its three rooms.

## Structure J-2

## Position and General Description

The position of this double-range vault-roofed palace is best seen on the general plan and sections of the city, above referred to. It stands at the southeasterly edge of Court 1 of the Acropolis facing that court, which is only about 30 cm below its floor, but also and more truly facing the West Group Plaza on the other side, which we consider the front. The floor is about 9.8 m above the plaza, with which it is connected by a stairway running the whole length of the building, and which is no less than 32 m wide. The steps are badly ruined, but clearing a strip from top to bottom near the line of the single passage through the building, and another strip three doorways to the southwest, as well as at each side, left no doubt that we were dealing with a stairway and not with terraces at the points examined. The whole slope in front of the building was very even, leaving little doubt that we were dealing with one continuous bank of steps. The risers were in the neighborhood of 30 cm in height.

The stairway rises 9.4 m receding 14.3 m horizontally in the process, and rose at an angle of about 32 degrees. The stones had shifted forward too much to make possible accurate measurements of risers and treads. There is some indication that one of the steps, about halfway up, was wider than the others, forming a terrace or landing. If so, the actual angle of ascent was slightly greater. Almost certainly balustrades of about 90 cm thickness flanked the steps on either side. Only the central portions of the upper steps of this stairway are indicated in the plan and sections Figure 3.1.

The northeasterly end of the building stands free, though close to the corner of the high rectangular platform-terrace J-7. The corner of the J-2 substructure at this end was rounded on a radius of about 4 m . With such a curve, there was no need for specially cut curved stones, and they were not used. There was no stairway at the end to give direct access to Room 4 (the end room). It was possible to enter Court 2 by a narrow promenade around the front and free end of the building. Also a small stairway gave access (apparently) to this court from Structure J-1. However, perhaps the main entrance to the court was through the only three doorways of the building itself which pierce both the medial and outer walls on the same transverse axis, giving a straight passage through (Fig. 3.1). These are somewhat northeast of the center of the building and also in direct line with the central doorway of the throne room of Structure J6 across the court, behind which the throne, described later, was centered. These three doorways are placed to the northeast of the longitudinal centers of the galleries of the building itself, and of the stairway. In the original plan there was another series of three such doorways, one behind the other, on the other (southwest) side of the center axis, and a markedly symmetrical arrangement of the passage may be said to result from repair or rebuilding operations, or else from a change in the original plan after building began.

For purposes of comparison with other palaces of the Acropolis, this one must be thought of as consisting only of the rooms numbered 1 to 4 on the plan, which were built first. However, it abuts directly on rooms numbered 5 and 6 , which are later, the roofs of which were apparently continuous with the surface of the platform terrace J-5, and with the roof over Room 3.

The southwesterly wall of Room 3 (end wall of the original palace) supports not only a half-vault of that room, but a half-vault of Rooms 5 and 6, as shown in the section A-B, Figure 3.1. The addition was therefore thoroughly integrated with the original palace.

The structure when seen from the southeast occupies an extremely commanding and important position at the head of the great broad stairway rising from the West Group Plaza. It commands a view over the plaza well
into the East and South Groups. It is flanked on its left (northeast) by the great pyramidal temple, Structure J4, with its eight stela, Round Table Altar (Altar 1) and a monumental megalithic stairway at the base. On its right or southwest is another high pyramid, J-3, crowned by a peculiar, apparently open, platform, with four stela at its base. In front on the plaza is the large inscribed rectangular stone table, Altar 2.The altar is approximately opposite the fourth doorway (counting from the right or southwesterly end) while the fifth doorway is the central one. It was about 13.5 m out from the stairway.

When seen from the northwest, from Court 2, the impression is reversed. It is then in a small secluded court, at court level. The stairways rising on the three other sides of this court serve structures whose floors are nearly as high as the roof level of Structure J-2. The court is dominated by Structure J-6, with its megalithic stairway leading to its elaborately carved stone throne. Whether intentionally or not, Structure J-2 served not only to ornament the West Group Plaza, but to shut off Structure J-6 from view until it burst suddenly on the observer close at hand as he entered the court. There was plenty of effort to make Structure J-6 magnificent, but it was hidden from the city at large.

With Figure 3.1 at hand, a detailed description of the ground plan is superfluous. Most of the building was reduced to a mere mound. As at Palenque, the galleries (Rooms 1 and 2) are more or less open porticos, with thirteen nearly square piers. The doorways are wider than the piers between them, nine on the front, seven at the rear. The stippling on the plan indicated excavation not yet complete, but this has been remedied since the plate was made, and it is certain that the galleries in this palace were not subdivided by partition walls. Room 4, the northerly end room, was never connected with the galleries. All other known end-rooms on the Acropolis, thirteen in seven palaces, were originally connected with each gallery, usually by narrow doorways at the extreme ends of the rooms. The cul-de-sac labeled Room 3 is also unique on the Acropolis. An end doorway into Room 3, and a doorway between the galleries near their northeast ends had been carefully filled up, as shown by white hatching. The latter filled-up doorway is shown in Figure 3.2b.

We are reasonably sure that arrangements for fastening the bottoms of curtains in the doorways are absent in this building and in Structure J-6. Whether they occurred at the tops of doorways can never be known.

Room 5 could be entered only from the front (southeast) or from Room 6, which was also furnished with a doorway leading directly to Court 1 . The remaining vaulting at the southeasterly end of Room 6 leads us to suspect that this will have to be subdivided by the addition of a tiny separate chamber at this end when
excavation is completed. ${ }^{2}$ The interior doorway between Rooms 5 and 6 is vaulted, and still standing, but is not as high as the rooms. We have tried to show its design in the elevations shown in connection with Sections A-B and CD in Figure 3.1 and by the photograph, Figure 3.2. We have a considerable number of narrower vaulted interior doorways in other Acropolis palaces, and possibly this may be sufficient round for supposing that the doorways between the main galleries, especially the two flanking the central one, which are of about the same width as this, were spanned by vaults. But these units are of different periods. The northeasterly of these doorways in the medial wall, as noted, was eventually walled up. The exterior doorways were doubtless spanned by lintels, the almost universal practice for exterior doorways. The lintels here (and probably in all the Acropolis buildings) were of wood. No stones large enough for lintels were encountered in the debris, and we could hardly have failed to find some of them, no matter how badly broken, especially on the side toward Court 1.

The rear part of the vault of Room 3 was standing complete, though badly displaced and broken. A little of the vaulting remained in place at the southwesterly end of Room 2. From these vestiges we know that the vault of Room 3 ran transversely, at right angles to those of the galleries, and we may suppose that it turned a right angle at the front and became an integral part of the vault of Room 1. ${ }^{3}$ There was sufficient in place to say with certainty that the ends of the vaults in Rooms 3 and 2 were sloping and not vertical. This is in conformity with the almost universal practice on the Acropolis palaces.

Although preserved to this considerable extent, the vault-stones here were so displaced that we cannot give the exact height of the vault-spring in Room 3. It was in the neighborhood of 2.5 m . We feel justified in deducing the vault-height as about 90 cm . In Rooms 5 and 6, lower portions of half-vaults are in perfect condition with much plaster in place. There is there only a suggestion of an offset or shoulder at the vault-spring. Capstones, are 3.4 m above the level of the floor in Room 3 according to our calculations. The vault height in Room 6 is clearly 95 cm the vault-spring height 2.5 m .

The vaults of the main galleries of course ran longitudinally, those of Room 3 and 4 transversely. The vault of Room 5 ran longitudinally, that of Room 6 from front to rear, except that with little doubt at the front it turned a right angle to the left (northeast). The doorway connecting these two rooms is vaulted as noted, but the capstones are only 65 cm above the spring, because of the narrowness of the doorway as compared with the rooms. This vaulting runs from front to rear. The joining together of these four elements gives a rather complex vault-plan.

Floors and the lower parts of interior walls retain their smooth coat of finishing plaster, without signs of
color. The whole building, inside and out, where not especially decorated, was with little doubt similarly finished in smooth plaster.

Near the angle formed by Room 6 and the rear wall of the palace proper, the exterior medial molding and about 45 cm of the upper zone of the palace were sufficiently in position to yield a reasonably accurate partial section, though the lower vertical wall bulges a little. This section is indicated in Section E-F, Figure 3.1, and on a larger scale in Figure 3.3c. The molding is a two-member type consisting of an upper element rectangular in cross-section set over another element triangular in cross-section.

The maximum height of the roof at center was very close to 4.5 m above the floor. The surface on the longitudinal axis, above Rooms 5 and 3, at this height, is fairly level, though disturbed by vegetation. More important, it is fairly well covered with crushed limestone, probably the remains of the concrete surface. There are no building blocks, loose or otherwise, on this surface, and it is probable that there was no roof-comb.

Set firmly in the steeply sloping upper zone was a thin slab projecting about 20 cm (Figs. 3.2d and 3.3c) and, below it on the top of the molding were several coarse potsherds. The debris along the base of this rear wall was thick in potsherds, both clean and with stucco adhering, and in fragments of stucco ornament, many with the potsherds used in building them up still imbedded in the fragments. The former presence of elaborate stucco ornaments in high relief on the upper zone is plainly indicated.

The fragments include considerable numbers of spheroidal bodies, arranged in strings, which perhaps represented beads. One of the few fragments recovered at the front is a good likeness of a round earplug, 45 mm in diameter. Since beautifully modeled stucco heads have been recovered elsewhere in the city, we have some indication, far short of proof, that the decoration here included human figures. The heads in question, found in the fills under Structure K-5, and R-5, and in roof-debris of Structure J-29, indicate that the art of stucco modeling at this site had kept pace with stone carving, and perhaps was not inferior to that of Palenque.

Perhaps potsherds were found by Maler on the roof combs of Yaxchilan, leading him to conclude that incense was burned on them (Maler 1903:125), but if so it seems just as probable that they resulted from the disintegration of ornamental stucco work. Mr. John S. Bolles, of the Carnegie Institution of Washington Expedition to Calakmul in 1932, reports informally the presence of quantities of potsherds on the surface at the base of one of the pyramids there. Possibly their presence may be explained in the same way.

A narrow step or plinth surrounds the building on the outside. This is, at the doorways, a mere continuation
of the floor. On this building, it is quite irregular, the width varying between 5 and 20 cm . This plinth seems to be universal at Piedras Negras, and is common in many parts of the Mayan area.

At the rear, the plinth, where it passes before the doorways, forms a single step about 30 cm in height from court to floor level (Fig. 3.3a). At the extreme southwest there is an additional and lower step, with a sloping plaster-covered, slab-faced riser, running from in front of the doorway an undetermined distance toward Room 6 (Fig. 3.2a). This appears to have been buried under the court floor, though the latter may have been lower here. ${ }^{4}$

## Objects

Aside from potsherds and a heavy flat pottery fragment (possibly of a tortilla griddle?) from the stucco fragments, stucco debris, and a few polychrome sherds from under the floors, ${ }^{5}$ no objects contemporary with the builders were encountered. The sherds are in process of study, with those of the city in general, by Miss Mary Butler, of the 1932 staff.

In the back of Room 3 we found three complete Lacandon incense burners, the sherds of two others, smashed by falling roof stones, and the isolated face from a sixth. The three whole vessels, apparently disturbed, lay one before the other, almost touching, the rear one against the rear (end) wall of the chamber, near the northerly corner. The two to the front rested on a level flat slab which lay on about 20 cm of debris. It was quite level and may have been intentionally placed as a rude altar for the censers. Only one of the vessels, however, was level on its base (Fig. 3.3b). They were covered with a soft limy stratum washed from the higher debris to the front which protected them from the vault-slabs which later fell above them.

The two crushed examples lay at about the same level, 0.5 m or so to the south. All had been coated with a thick-white soft stucco-like material.

## Details of Construction

## Miscellaneous Dimensions

Front and rear galleries, spanned by vaults running longitudinally, were probably intended to be of equal width, but the front room is more or less consistently 5 cm narrower than the rear. Measurements at floor level vary between 1.6 m and 1.7 m for the front, and 1.7 m and 1.8 m for the rear. Thickness of the front walls and piers varies between 1.0 and 1.1 m ; of the medial wall, between 90 and 95 cm ; of the rear walls and piers, between 95 cm and 1.1 m . The vaults sprang, as stated before, at about 2.5 m above the floor. The height of the capstones, that is the greatest height of the room, was as
we have seen, calculated at 3.4 m for the galleries, and observed as 3.5 m for Room 6 .

Room 4 is 2.1 m wide, a considerable increase over the galleries. Its southwesterly side wall is 90 cm thick, the opposite (outside) wall about 1.1 m thick. Room 3 is 1.6 m wide, conforming closely to Room 1 of which it is really a continuation at a right angle. The southwesterly end wall, an outside wall originally, is 1 m thick, the opposite and inner wall 75 cm thick. The vault, in place at the rear but badly broken, an unusual combination, seemed to spring at about 2.5 m above the floor. The wall between Rooms 5 and 6 is thinner than any in the palace proper, being only 70 cm thick, though it supported halfvaults on either side. The outer or front (northeasterly) wall of Room 6 is only 50 cm thick, as thin as any vaultsupporting wall of the city. The interior length of the open portico, which we call Room 1, including the width of Room 3 is 28.4 m ; that of Room 2 is 26.5 m ; Room 3 is 4.4 m and Room 4, 4.5 m in length. We now have information on Rooms 5 and 6, some of which is not reflected on the plan. Room 5 is 2.9 m long and only 1.5 m wide, due to the inclusion of an ancient pier in its front wall, which is therefore 1.4 m thick. The dimensions of Room 6 as shown are 6.1 m by 1.6 m at the front end the width rises to 2.4 , but the vault here runs in the direction of this measurement.

Outer doorways vary between $1.7 \mathrm{~m}, 1.8 \mathrm{~m}$ and 1.8 m is obviously the figure aimed at. The only exceptions are Room 5, the outer doorway of which is 1.3 m in width; and the blocked-up doorway of Room 3 , which was only 1.4 m wide. The width of piers varies between 1.2 and 1.3 m with 1.25 m as a fair average. Inner doorways (including that between Rooms 5 and 6) are 1.3 m wide except the central one in the medial wall between Rooms 1 and 2, which is 1.6 m wide. Inner doorways are thus definitely narrower than outer ones, though all are of a fair width in this building. The width of the piers between the outer doorways of Rooms 1 and 2 varies from 1.2 to 1.3 m , the intended width being about 1.3 m . The average dimensions of piers were therefore 1.3 m wide by 1.1 m thick.

Most of these measurements are at floor level, where there has been no appreciable disturbance of walls. It is evident that the builders allowed themselves a departure of 5 cm or so from dimensions probably called for by their plans. We should also state that the builders never achieved true right angles but merely approximated them. In this matter our plates are faulty, but will be corrected on final publication.

The lower supporting line of slabs of the twomember medial molding projects 32 cm from the outer wall. It is 6 cm thick. On it the lower member, triangular in cross-section, is built up of small very thin slabs laid in mortar and rising in tiny steps to the under side of
the upper member. This step or negative corbelled effect was undoubtedly hidden under thick plaster. The angle of slope is something less than 45 degrees from horizontal. The point of juncture with the upper member is 19 cm above the under side of the large supporting slab, and when the whole was plastered over, the height or thickness of the lower member was about 20 cm . The point of juncture is about 15 cm outside the plane of the main wall below the molding.

The upper member is built of two courses of superimposed slabs giving a total thickness of 10 cm ; it was probably rectangular in cross-section, though it is too badly broken to show how far out it projected over the lower member. The whole molding is thus about 30 cm thick. It meets the steeply sloping wall of the upper façade on a line about 20 cm inside the plane of the main wall below. We describe this arrangement as an inset upper façade.

The slope of the upper façade as measured is 13.5 degrees from vertical. It was probably slightly steeper before the lower wall began to bulge slightly.

We have no certain data on the total height of this upper zone. It was in place to a height of only 45 cm above the molding. However, in the discussion of vaulting, we give our reasons for thinking that the vertical height of this zone, from the top of medial to top of upper molding, was only about 90 cm . In any case, the height of the upper zone was much less than that of the lower.

## Walls, Piers and Vaults; Masonry and Possible Changes in Plan

In this building it is easy to draw a distinction between walls and piers. This is evident on the plan, and is reflected in the masonry. The walls are built for the most part of roughly dressed blocks, tailing deeply into the interior, and of heavy slabs. They are essentially slab and mortar walls. ${ }^{6}$ The stones are poorly selected from the paint of view of uniform size. The medial wall appears to be poorer than the outer walls around the end rooms, some of the stones, except at doorways, not even having flat roughly parallel upper and lower surfaces (Fig. 3.2a, b). Despite this irregularity, there is very little chinking. Especially selected and roughly squared blocks are freely used at all observed doorway corners, both in medial and outer walls and in piers (Fig. 3.2a, b).

Piers were faced for the most part with well-selected medium-sized or large blocks, with parallel upper and lower sides, and some slabs, the stones used at the corners being roughly squared (Fig. 3.2b and Fig. 3.3a). Chinking with small slabs, sometimes several superimposed, is common in the piers. Piers, nevertheless, are essentially short sections of wall. The close proximity of the corners resulted in corner stones forming a large part of the total surface.

Vaults were constructed of relatively thin slabs, laid in mortar. Beveled edges were not observed, and
indeed they are almost (though not quite) non-existent on other known buildings of the city. There was too little standing to say anything about beam sockets, vaultniches, and other details of vault design and construction. Perforations in fallen capstones were not noted.

The exposed stones of walls, vaults, and piers extend deeply into the interior. There is no hint of the veneering of other regions, which can scale off and leave the wall structurally intact.

The selection and relatively careful dressing of blocks is coupled with some bonding, accomplished by alternating the directions of the long axes of the corner stones as the wall or pier is built up. Photographs illustrating pier masonry bear catalogue numbers 33-35 to 33-39 inclusive.

The medial wall is bound to the abutting transverse walls of Rooms 3 and 4 as shown by solid black on the plan, Figure 3.1. The southwest transverse end wall is bound to the front and rear walls as shown, and almost certainly to the northeasterly end wall, though we failed to note the fact. The inner transverse wall of Room 4 is shown as bound to the rear wall, but in fact was not. But there is no evidence that a plaster surface on the rear wall ran across the end of the transverse wall, as it does on the other end, and if this occurred it should have been apparent. The ruin at the front end of this transverse wall was too great to say whether or not it was bound to the front wall, but presumably it was not. The masonry of this wall (the rear wall of Room 4, but transverse to the building as a whole) was continuous for its entire length, from front to rear walls of the main building. This proves definitely that there was never any connection between Room 4 and the galleries. It shows that the practice here was to erect the main front and rear walls ahead of this transverse wall, though perhaps they rose together, the outer walls a little ahead of the inner. It also suggests that both the outer walls and this transverse wall were in place before any plastering was done.

The transverse wall which separates Room 3 from the rear gallery (Room 2) is not only not bound to the main rear wall, as expected from conditions at the other end, but it abuts upon a smooth plaster finish on the inner face of the rear wall, which is intact behind the end of the transverse wall, as indicated by a white line on the plan. This is what we looked, for and failed to find at the other end. The transverse wall would therefore seem to be secondary to, and later than the main rear wall. But it is bound to the medial wall, the backbone of the whole building. At this end the evidence suggests that the transverse wall is contemporary with the medial wall and the original building.

Further, if one remembers that this wall, which separates the rear of Room 3 from Room 2, carries balanced half-vaults on either side (Fig. 3.1, Section A-
B), it will be realized that the existing vaulting of both of these rooms was erected after this wall was in place, for one of those half vaults is at the end of Room 2. There is no break in the masonry of the supporting wall, which we are discussing, and no lintel, to indicate a mere walling up of a doorway. There is no question but that the end vaulting of Room 2 was placed after the erection of the wall in question. Room 2 and its vault, therefore, could not have run directly into Room 3 and its existing vault, as Room 1 very probably did.

We must, therefore, conclude either that there was a general rebuilding of roofs and medial wall at this end, at which time the transverse wall was added, or that the passing of the plaster between Rooms 2 and 3 is not a certain criterion for determining really secondary features, and assume that no passage ever existed here. While the rear wall was certainly built and plastered before the transverse wall was built, the difference in time need not have been more than a few days. We have therefore adopted the latter conclusion, which as we shall see, is strongly confirmed in Structure J-6. That is, we consider the continuation of plaster along a wall against which another wall abuts as evidence, but not as conclusive evidence, that the latter truly is secondary.

The question has another application in the same room of this building. Plaster is in position on the jambs of what we consider a blocked-up doorway in the southwesterly wall. Here we have it on two sides, in a central position, giving a doorway of reasonable width. But there is a catch here also. This wall is standing to the height of the vault spring, and supports remnants of the half-vaults on either side. Yet there is no lintel spanning the doorway. The vaults rest in part on the supposed secondary wall filling the doorway. We must conclude from this much more conclusive evidence either that a doorway was built but abandoned due to change in plan before vault construction, that there was a lintel failure and its elimination during repair, or that there was in fact a tearing down and rebuilding of vaults at this end of the palace, during the course of which a stone or wooden lintel was removed and the doorway filled up and made a part of the rest of the wall. If the latter is what happened then it is still possible that the plaster between Rooms 2 and 3 indicates a former connection between them. This criterion, if we could be sure of it, would be extremely useful, as the plaster passes behind practically every transverse partition wall and its supported vaulting, wherever observed on the Acropolis.

To further confuse us is another circumstance. Incorporated in the section of wall separating the two most southwesterly doorways of the rear room (Room 2 ) is the perfectly obvious stump of a pier, rising to a height of about 60 cm , which, without question, is either the maximum height it ever reached, or the height to
which it was reduced when this wall was built. This can indicate either a change in plan after the pier was begun, misreading of plan by the masons, or a tearing down and rebuilding, which might be occasioned by a collapse.

The additional doorway indicated by this pier stump as part of the original plan, if not of the original building, would have been directly behind the southwesterly of the medial wall doorways, and have provided two more or less symmetrically placed passages clear through the building, instead of only one, well off-center. But there is no stump left of the other jamb of this doorway, the masonry being continuous for the whole wall, even at floor level, except for the stump of the pier above mentioned. If such a doorway was actually built, with both jambs in place, we should expect remnants of pier or wall on either side of the doorway to be left in place, if anything at all was left, as is certainly the case. The floor is everywhere in excellent condition, and the complete collapse of a pier or wall forming the missing jamb is highly improbable.

It seems to us therefore that this pier stump most probably represents a change in plan during the course of construction, rather than the tearing down of completed walls and vaults. If this is so, the other two puzzling features at this end of the building can perhaps be best set down to the same cause, and our best guess is that originally it was planned to have Room 2 and its vault run directly into the transverse end-room (No.3) (as does the front gallery, Room 1); and also that there was to have been an end doorway as in Room 4; that at Room 3 the outer walls got to full height, but the vaulting had not been placed when the change was decided upon. At this hypothetical juncture, there remained only to turn a right angle to the rear with the supposedly as yet unfinished medial wall, and to block up the end doorway, to account for the observed facts. We must remember, however, that the outer part of the upper façade at this end must have been removed when Rooms 5 and 6 were added. If this had not been done, it should have been visible in the cross section revealed by the collapse of the front part of both Rooms 3 and 6.

## Vaults, Upper Zone, and Roof

The fallen condition of these features renders a precise description impossible, but we can arrive at highly probable approximations which should be of value when these palace buildings are studied as a group.

In Room 6, a late addition to the palace proper, we know that the capstones of the vault were 3.5 m above the base of the outer wall, and that the vault-spring (with a very slight offset) was 2.5 m above this level. This gives a vault-height (vertical distance between spring and capstone) of only 95 cm . The floor of this room is 12 cm higher than that of the palace proper, but the outer wall


A


B


C

Figure 3.5 a. Structure J-6: exterior stairway from east and above; the rough dry wall at top of stairway was laid up in course of excavations; b. Structure J-6: section through end of Room 1-a and fill behind it, from southeast; c. Structures J-6 and J-6-2nd: same view as $b$, after removal of fill; corner of J-6-2nd is at left.
goes down to the same level. The slope of the soffit of this vault was about 32 degrees from the vertical.

Since this room is of about the same width as Rooms 1,2 and 3 , and the roof must have been continuous over all, these figures are probably approximately correct for them also. However, in our reconstruction we use the slope of Room 3 as 34 degrees, assume the same cap exposure ( 30 cm ) which gives a vault height of 90 cm . The difference is negligible and within the variations of the builders themselves. In the wider Room 4, wider cap exposure, and possibly higher capstones resulting in a thinner roofcap may have existed. In any case, rather flat low vaults seem to have characterized this building.

As has been stated, we know the approximate height of the roof, at the center, but we do not know it at the edge. We have data on no other building at Piedras Negras to which we can turn for assistance. However, at Yaxchilan is a building (Structure 7) very similar to this in cross-section, being double-ranged, with almost identical spans, and also having a steeply sloping upper zone. There portions of the roof-concrete are in place both at the center and on the upper cornice. We measured this in 1934, and found the roof sloping down from center to the edge on a curve the chord of which slopes at an angle of about 13.5 degrees from horizontal. If we use this angle here, the upper façade height (top of medial molding to top of cornice) comes out at 91 cm , equal to the vault height. If the medial molding was the same thickness as the cornice, on this basis its bottom was at the level of the capstones, as expected by analogy with many Palenque palaces.

This is a hypothetical figure. In any case, it is perfectly certain that the upper zone was very low in relation to the lower zone, in agreement with the indications of a low vault height. With this reconstruction the roof thickness over the capstones of the main galleries was about 74 cm . This reconstruction cannot, in the nature of things, be accurate. But the evidence available is, in the writer's opinion, sufficient to assure us that it is approximately correct.

## Floors

Floors are of concrete, surfaced with polished white finishing plaster. The concrete foundation, only about 5 cm thick at the southwesterly end of Room 2, where it was observed carefully, is laid directly on pure broken rock fill. It contains river pebbles and crushed limestone cemented together into a hard mass, broken only with great difficulty with a heavy crowbar. Picks were practically useless on it. On this is a 7 or 8 cm layer of dark brown clay, fairly stiff, with occasional pebbles. Above is a layer of light brown clay of equal thickness, with occasional pebbles intermixed. To this was applied a coating of apparently pure lime, about 1 cm in thickness,
of a bright yellow color. On this was the final coat of white lime, apparently pure, which was about 3 cm thick. Concrete, clay and plaster layers are indicated in the section, Figure 3.3d. The clay layers were absent at other points, and have not been conserved in floors of other buildings.

The floor in the central doorway of the medial wall was so hard that an attempt to break through it was abandoned, the labor being too great for the probable reward. The floor in Room 4 was hard, but not excessively so, while that in Room 3 was quite soft by comparison, though only 2 m or so distant from the excavation in Room 2. The floor at this part of this room was never exposed to the weather. We must consider the possibility that water percolating through limy masses of debris for centuries and emerging under the concrete floor foundation into the comparative open of the pure rock fill may leave deposits of lime at this point, converting the original concrete into a harder concretion of largely natural origin. The stones of the fill are often a dead white color, due apparently to a secondary coating of lime. If the Mayans really constructed floors of the hardness encountered in Room 2, they equaled the best modern work in cement.

It should be noted that the plinth or step surrounding the building is really nothing but the low masonry wall forming the edge of the floor, from which the outer sides of walls and piers are set back. At the point examined, the floor, except for the finishing plaster, extends right under the medial wall (Fig. 3.3d). ${ }^{7}$ Apparently the first step in constructing the building proper was to build up the fill to the required height, surrounding it with a retaining wall (the plinth) extending a little higher and then to cover the fill with the concrete floor, making of the whole a level platform. The walls were then erected on the platform. Considered structurally, the plinth and floor are really a very low and final platform or final terrace, and are an integral part of the substructure. However, architecturally the plinth is part of the building proper, and it is nearly always vertical, as here, and better made than terrace walls.

In this case the substructure, as seen from the front, is nothing but the front part of the fill forming the latest level of the whole of Court 1. The floor of the latter does not run under the floor of the building, the building floor and the court pavement are one continuous unit though at different levels. It should be noted that the floor of Room 1 dips downward appreciably between the piers. This is common on single range building, but is not applied to the rear gallery of this building.

Fills
The foundation below floors was examined in the two end rooms and near the southwesterly end of Room 2,
to a depth of about 1 m . In the end rooms it was of pure broken rock, apparently of uniformly medium sized stone. A section through Room 2 is shown in Figure 3.3d, already referred to. The floor here rests on pure rock fill of small sized stones, which in turn rests on a deposit of much larger ones, the top of which slopes up from front to rear. As to whether the use of two sizes, and this slope, observed at only one point, have any significance, we do not venture an opinion.

Additional work in 1933 taught us a good deal more about the foundations of this building.

At either end earlier battered wall terraces were incorporated into and form part of the hearting of the substructure of J-2, though they were completely buried by the new construction. That at the left (northeast) is best known. It rose from a floor apparently continuous with Structure J-1, to a height of 2.3 m , sloping back 90 cm in 2.1 , or about 24 degrees from the vertical. Remains of an uneven white plaster finish were present, and apparently the walls were plain. A subsidiary platform, 65 cm high, was placed on this with its front 1.2 m back from the edge of the main platform. This is also battered, though more steeply at a slope of about 15 degrees from vertical. Its nicely finished plastered top surface is only 3 cm below the finished surface of Structure J-2. The level of the latter, and by implication, of the Court 1 floor, may thus be supposed to have been determined by the level of this older structure. The corner of the earlier structure is curved on a radius of about 1.1 m (at the base) and is much sharper than the curve of the later platform which buried it. (Radius 4 m at the base). The face of the latter was probably broken into two terraces of equal height, the intact remains of the lower terrace show vertical, not sloping, faces.

A tunnel was carried through the fill under the three doorways which give access to Court 1 and from the end of this tunnel a pit, just in the court, was dropped to bedrock. The tunnel gave a cross section to a depth of 2.5 m this established beyond question that Structure J-2 belongs to a period when the complexion of this court was entirely changed. The pit passes through an earlier floor measured as 3.8 m below the final court level. We were apparently passing through an earlier exposed pavement, not a building, though this is not certain. Bedrock was encountered at 5.4 m below the final Court 1 level, and dips sharply downward to the front. Buried terraces or stairways can therefore be predicted under the great stairway of Structure J-2, associated with this floor and with the two buried platforms which still rise, within the J-2 hearting, almost to its floor level on either side. The simplest interpretation of available information is that at least the rear portion of the great stela-bearing terrace J1 is contemporary with these buried platforms. If the rear part is a single unit this conclusion cannot be escaped,
since the left of the two buried platforms rests in that case on the J-1 floor. The front stela-bearing part of J-1 must be either contemporary with or later than the rear part, and it is highly probable that trenching will definitely prove this buried complex to antedate the erection of the stela (Stela 1 to 8 ), which run from 9.12.0.0.0 to 9.14.10.0.0 according to Morley. Such proof will be no great achievement, since this buried complex is almost certainly very much earlier than 9.12.0.0.0 for a variety of reasons which will be set forth when the buildings of the city can be discussed as a whole.

## Date

We cannot say much about the date of this building, except in a general way. We think it is one of the earlier vaulted palaces because it is next to the heaviest (see discussion under Conclusions). If we are on the right track in using that criterion, the departures from the most typical palace plan do not help us. The more typical plan occurs not only in lighter, but also in heavier and even in non-vaulted examples (Structures J-9 and J-12) respectively). It certainly was not one of the earliest buildings on the Acropolis, because it lies over an earlier complex. It almost certainly preceded Structure J-6 in its final form quite apart from the relative weights of the two, because the throne in that structure, carrying a late date (9.17.15.0.0) was placed on the line through the main passage through this, a scarcely fortuitous circumstance. To invert this interpretation, it seems to the writer, would be to make the tail wag the dog.

Pottery sequence at Piedras Negras may help eventually. Altar 2, if it belongs to this building, may have been erected long after it, and so is of little help. According to Morley, this altar is the seventeenth hotun marker erected in the West Group, ending a series which runs back to 9.12.5.0.0 without a break. But they are associated with only four buildings. Probably each building is as early as the earliest monument before it, which here could mean only that Structure J-2 is as early as 9.16.0.0.0, the date of Altar 2. But this does not help much. So far as the writer knows, there is no evidence to suggest that a building is no earlier than the earliest monument before it, or even on it. Where a monument is incorporated in the building itself, by re-use as a building stone, by use as a lintel or wall panel, or where it appears to have been specially designed for use in the building in which it is found, perhaps contemporaneity may be inferred. Unfortunately nothing like this was found in Structure J-2. The monuments indicate a date before the end of building activity; the stratigraphy proves a date a good while after it began. This applies to the palace proper. Rooms 5 and 6 were later, how much we are not sure. We will discuss the relation of this building to nearby structures later on under the heading Conclusions.


B


C


D


E

Figure 3.6 a. Structure J-6: cross section through parts of Room 1-a and Structure J-6-2nd, and fills; b. Structure J-6: view of construction shown in above section after removal offill and northwesterly wall of Room 1-a, from south; remnant of stairway seen from behind at right; c. Structure J-6: Room 1, showing rear wall, main vault spring, end of niche of Throne 1, from east; d. Structure J-6: vaulting at northeasterly end of Room 3; arrow indicates position of beam socket, from south; e. Structure J-6: vaulting at southwesterly end of Room 3, from northeast.

## Structure J-6

## Position and General Description

This is an example of the single range palace of PlanType 2, and of the structural class which we call for convenience "Built-on." Its rear wall does not stand free. It consisted of three principal chambers placed end to end, which we have labeled Rooms 1, 2 and 3 on the Plan (Fig. 3.4). Room 1 contains a connected small chamber, Room 1-a, elevated above the main floor, Room 1 and the surface of the monumental stairway in front of it were completely cleared in 1932, the remainder of the building in 1933. The floor is elevated 4.3 m above the floor of Court 1. As in the case of J-2, the position of this building is best understood by reference to the general plan and sections of the city, in Paper No. l of this series. The central one of the five doorways of Room 1 is in line with the three doorways forming a straight passage through the longitudinal walls of Structure J-2 as stated, rather than on the center line of the stairway. The center of the doorway is about 75 cm northeast of that line.

Room 3 extends to the northeast over the platform terrace, Structure J-7, the floor of which is nearly on its level, and merges at the end into the terraces of the pyramid J-4. This room was built later than some parts of Rooms 1 and 2, but probably before the latter were incorporated into Rooms 1 and 2 as found. At the other end, Room 1 merges into an older filled-up building, Structure J-6-2nd, a small part of which was left exposed. In visual effect, J-6 and what remains in view of J-6-2nd formed a continuous mass connecting, at this elevation, the pyramid to the north (J-4) and the terracing below the northeasterly end of the palace structure, J-8 which in turn merges with the pyramid to the south (J-3). Standing in the central doorway of Room 1 of the building under discussion, looking down the stairway and across Court 1 is the palace, J-2; on the left is the high terrace-like platform, Structure J-7, with its own broad stairway leading up from the court to its floor, a little below the observer's level. Beyond to the left towers the pyramid and temple, J-4. To the right, the same effect was repeated. A broad stairway rises from the court to the platform terrace J-5, a little higher than that opposite, and beyond to the right is the pyramid J-3.

There is little doubt that the roof of Structure J-6 was nearly flat, and continuous with a terrace at the rear, as shown in the cross-section A-B in Figure 3.4. At the southwesterly and, remains of a stairway not shown lead down from the terrace at the rear to the level top of the fill over J-6-2nd, which was almost certainly continuous with or but little higher than the roof of J-6. (For the relation of terrace and building see Section A-B, Figure 1.2. From below the court, therefore, one looked up
over Structure J-6 to a terrace of slightly greater length, which rose from behind it to the long façade of Structure $\mathrm{J}-9$. The latter is a palace of Plan-Type 1, almost exactly parallel to Structure J-6, with three central doorways, the floor 10.7 m above Court 1 .

In one sense, therefore, the building being described seems to be subordinated to the general scheme of hill terracing. However, in effect, the fact that the ends do not stand free is largely negated by the length of the building. The great stairway fronting Room 1 makes this part of the building very impressive when seen from the court below.

Rooms 2 and 3 were not excavated until 1933, and are therefore stippled in the plan, Figure 3.4. The debris here showed no hint of piers, though those of Room 1 projected above the surface before excavation. The 1933 digging disclosed two piers and three doorways in Room 3. An equal number of piers and doorways almost certainly made up the whole of the lower façade of Room 2, but had completely fallen, along with the front edge of the floor. ${ }^{8}$ There were satisfactory remnants of vaulting only at the rear of the niche in Room 12 and at the northeasterly end of Room 3.

Room 1 has an L-shaped bench at the northeasterly end, 40 cm wide on the longer arm of the $\mathrm{L}, 50 \mathrm{~cm}$ wide on the shorter portion, and 60 cm high, placed as shown in the plan, Figure 3.4. At the other end of the room five equal steps rise at an angle of about 45 degrees to the floor of a small chamber, Room 1-a, raised 1.5 m above the floor of the rest of the room. This chamber is partially cut off from Room 1 proper by the difference in height and by a pilaster against the rear wall arising from the chamber floor and the next lower step (Fig. 3.7b), and merging into the vault above. Possibly there was a corresponding pilaster on the front side, found fallen at this level.

Part of the rear half of the vault and the end wall were here in place and it is certain that the transverse end wall of the chamber was vertical well above the vaultspring, and was probably vertical clear to the capstones (Fig. 3.5b). We have partially preserved vaults at corners in nine buildings in the city (all on the Acropolis except Structure P-7) and there is only one other example (mentioned below) among them where the end wall does not slope inward as it rises, in general conformity with the vaults on the side walls. The other example was a secondary affair, but this was the original end of the vault. However, it was hardly visible. The implication is that sloping ends were used for esthetic reasons at least at this period.

This chamber, Room 1-a, was about 2.5 m high at the center (floor to capstones), because its floor is only 67 cm below the vault-springs at the sides. Unless there were openings in the main front wall (here really one


A


C


B


D


E

Figure 3.7 a. Structure J-6; pier in front of southwesterly end of niche, Room 1, from north (numbered 2 in text); b. Structure J-6: Room 1-a and stairway, from Room 1; c. Structure J-6: badly fallen pier in front of northeasterly end of niche, Room 1, from south (numbered 3 in text); d. Structure J-6: section through debris, Room 1, showing pier at left, fragments of Throne 1 in position on floor before removal, niche and bench on right, from northeast; e. Structure J-6: niche and supporting bench of Throne 1, with partly disrupted stones of bench in position as found; arrow indicates specialized offset slab at right.
of the side walls of the chamber) it was dark and poorly ventilated. In both these very general features (darkness and low vault spring) it resembles the central sanctuary of Structure P-7, which contained an altar or shrine, ashes and great quantities of potsherds. However this chamber contained nothing, there was no evidence of fire, and there was no stone altar unless it was placed against the southeasterly wall (the front wall of the building as a whole), which had completely fallen to the chamber floor level (Fig. 3.7b). The chamber was built as an original and integral part of Room 1, as we shall show in a later section.

Behind the central of the five doorways of Room 1 is a niche in the rear-wall, apparently built to receive and set off a complex of four pieces of carved stone with supporting masonry, which we have called Throne 1. Since niche and throne appear to form a unit, we describe both in a special section below.

We have no direct evidence on this building for the two-member medial molding as found in J - 2 , and as shown in Section A-B, Figure 3.4. It seems to be characteristic at the city, and occurs on several neighboring buildings, Structures J-2, J-8, J-9, and others; the form here was probably the same.

Our reconstruction of the vault, shown in Section A-B, Figure 3.4, could be improved upon. The niche vaulting certainly rose higher, and is discussed in more detail below.

There was no part of the upper zone in place. Perhaps it should be shown as sloping. Structure J-9, immediately above and to the rear, has a portion of a vertical upper zone in place to a height of 50 cm above the two-member medial molding so that a vertical upper zone appears to have been known at the city.

A plinth, really the edge of the floor, as on J-2, runs along the front of the building. It extends about 15 cm beyond the outer sides of the piers and wall. In front of the doorways it forms a single step, about 30 cm high, leading down to a broad stop or promenade, 1.3 m wide, which apparently ran in front of the whole building, until it merged with Structure J-7 at the left. As in the front room of Structure J-2. the floor slopes down slightly between the jambs of doorways.

From this a monumental stairway leads down to Court 1 (Fig. 3.5a). The five lower steps are megalithic, a single line of large stones forming riser and tread of each step. These stones are badly weathered, but there is practically no doubt that they conform with other stairways of this type in having battered risers, and treads which slope up from front to rear. The stones are roughly squared, but of varying sizes. The long dimension of the stones runs from front to rear. Sizes vary between 40 by 45 cm and 90 by 100 cm . The thicknesses vary between 18 and 24 cm . Where a stone is not as long as the width of
the tread, the rear of the latter consists of fill. The treads of the two lowest steps are about 95 cm wide, those of the next two about 60 cm , the width of the fifth being about 80 cm . The width of this flight of megalithic steps is about 1 m , and it rises to a projecting terrace about 1.5 m high which forms wings extending about 3 m on either side. The corners of this terrace are not rounded, as on both levels of Structure J-2.

The front wall of the terrace is battered, but the side walls are vertical. From the rear of this terrace a steeper flight of four or possibly five fabricated stone steps leads to the narrow promenade fronting the building above. These upper steps were badly ruined. They seem to repeat on a small scale the shouldered effect of the lower flight, when seen in plan, but this was uncertain.

The stairway as a whole repeats the essential characteristics of a special type at this city, of which we have four, or possibly five, other examples scattered through the South, East and West Groups. The essentials are a broad lowest flight, the steps formed by heavy cut stones, one course to a riser, and a terrace of no great height reached by this flight, the terrace projecting out from the structure served by the stairway, and also projecting on either side of the lowest flight, thus forming lateral shoulders. In the three cases carefully examined, the heavy stones are cut to form battered risers and sloping treads, as first observed by Dr. Mason in the stairway fronting Structure R-3, and on Structure J-1, where it is perfectly clear, and this is probably typical of all of these stairways. Despite weathering, in all cases it is fairly certain that we are not dealing with hieroglyphic stairways. In all except one case the structure to be reached is higher than the first terrace, and in all such cases, as here, the second flight is built up of small stones, and we have no evidence that their risers or treads were sloping. The apparent total of essential characteristics is therefore the projecting shoulder-forming low terrace reached by a broad flight of megalithic steps cut to form risers which slope backward from the base, and treads which slope upward from the horizontal in the direction of ascent.

The whole building and stairway were without doubt plastered over. Finishing plaster on the buried floors of the rooms was in good condition without traces of color except one bright-red spot the size of a dime near the L-shaped bench in Room 1. This tends to show that, had the floor been painted, traces of the color would have been found everywhere. This is confirmed by the unusually good preservation of the orange-red paint on the broken pieces of the throne, which lay directly on the floor, some face-up, others face-down. Apparently floors at the city were not colored. The rough thick first coat of plaster was in place on buried portions of the inner walls at some points in Room 1, and on walls and vaults
at the northeasterly end of Room 3 (Fig. 3.6d). Finishing plaster has not been found on walls of the city except close to the floor, as here, and where found it has been without color.

If the outer façade of the building was decorated with stucco relief, all traces had disappeared. There were no fragments, or potsherds which might have come from them, on the stairway. However, while the presence of sherds below the former position of a façade may indicate stucco decoration, their absence hardly proves the absence of stucco, sticks and very small slabs of stone to the exclusion of sherds have been observed in stucco fragments at the city. We have also several small worked stones probably fashioned for reinforcing purposes. Unless found in actual fragments of stucco, these easily escape detection.

Two small fragments of modeled ornamental stucco were found, together with a smooth piece of painted stucco or plaster, in the debris above the bench in the niche of Throne 1.This showing is so poor that we believe they are not remains of interior stucco decoration in the niche, but probably had been included as fragments in the roof masonry, or in the fill behind the rear vault.

## Throne 1, Description

The evidence for our restoration and assembly in the Museum of this carved stone unit is given in detail below. The restoration is shown in the frontispiece. Our basis for classifying it as a throne is the scene depicted on "Lintel" 3. There the central figure sits on a throne the component elements of which are, in essentials and in many details, identical with those found here. The throne was found under circumstances which left little doubt that it was forcibly torn down and broken up, whereupon Structure J-6 was abandoned. These circumstances will be related in more detail below. From an esthetic point of view the destruction is regrettable, for the state of preservation of the recovered fragments is almost perfect; but the evidence of intentional destruction in ancient times is of considerable scientific interest (Thompson 1931). Bright orange-red paint, in many places in good condition, still covers nearly all of the sculptured surfaces.

The throne cannot easily be disassociated from the building. It consists of a large flat seat or table, supported at the front by two slab-like tapering stone legs, their bottoms let into the floor.

The rear of the seat rested on a depressed ledge at the front of a masonry bench, which completely filled a niche in the rear wall of the room. The principal surface of the bench was at the same level as the top of the seat, the supporting ledge being lowered by the thickness of the latter. Seat and bench were therefore in effect one continuous surface.

On the bench, at the rear, without doubt centered behind the seat, was the elaborately carved slab which we are calling the screen for want of a better term. This was set on edge against the back wall of the niche, and formed a background for the priest or ruler who in all probability sat cross-legged on the seat during ceremonies.

The niche, somewhat wider than the throne, was roofed with vaulted surfaces sloping toward the center from deep offsets at the sides, and sloping toward the front, over the throne, from the rear (Sections E-F and A-B, Fig. 3.4, and Fig. 3.7). This vaulting is shown in Figure 3.4 as extending to a flat ceiling at the level of the spring of the main vault of the room.

This reconstruction is undoubtedly incorrect, as more careful observation in 1933 established the fact that the rear vaulting is still intact to a height of 82 cm . Since it begins 56 cm below the spring of the main vault ( 1.6 m above the floor) this means that it is still in place 26 cm above the main vault spring level. The slope of this rear vaulting was measured as 23 degrees from vertical and the slope from the sides toward the center of the niche was measured as 22-21 degrees, beginning at the same level. There was no offset at the spring for the rear vaulting, but on the side the offset was the very unusual one of 20 cm .

The only reason which we can think of for this very deep offset at the sides is a desire to bring the side slopes close enough together to be bridged by a capstone laid from one side soffit to the other, and this at a level sufficiently below that of the capstones of the main vault so that natural arch action would relieve the niche capstone of excessive load. Reconstructing the main vault at a soffit slope of 23 degrees, in agreement with that of the niche, and assuming a 30 cm , capstone exposure, we get a main vault height of 1.9 m . Reconstructing the soffit slopes at the sides of the niche until their tops are 30 cm apart, the most likely capstone exposure at Piedras Negras, we reach a level 41 cm below the main vault capstones. At this point the niche arching could have been capped with one slab 35 cm or more wide, and of the usual length, allowing a 30 cm exposure from side to side. Forty-one centimeters (vertical measurement) of main rear vaulting would rest on this before the capstones of the main vault would be encountered.

This, we believe, is the most probable form of this niche vaulting. If we carry it any higher, it becomes pointed, as seen from the front, a form for which we have no evidence at this city. If we roof it much lower, we must either assume that the ceiling of the niche was formed by an offset or negative shoulder projecting no less than 35 cm from the rear, or that wooden beams ran from side to side. In the reconstruction shown in Figure 3.4 this is what we did assume. But on that assumption there is no structural reason for the deep offsets at the
sides, which, as we shall see, were a matter of special concern. As soon as we discard the possibility of wooden beams, the deep side offsets become understandable and necessary.

To reconstruct the niche as here suggested, simply extend the side slopes as shown on Figure 3.4, Section EF, to a height 41 cm below the main capstones or ceiling of the room, and then join them by a horizontal line. On Section A-B extend the slope of the rear of the niche to the same height and extend a horizontal line to meet the main vault slope.

As we have stated, the throne looked directly out on Court 1 of the Acropolis through the central one of five doorways at the head of the monumental stairway, this doorway being directly in line with the three doorways piercing Structure J-2 on the opposite side of the court.

The front edge of the seat, so far as recovered, bears a single line of fourteen glyph-blocks, and on a basis of our restoration there was room for five more. The edges at the side were plain, if we may judge from a single fragment recovered, showing a perfectly smooth edge, 42 cm long. But the possibility remains that there were glyphs on the sides, extending only part way to the rear.

Both side and front faces of each leg bear glyphs, six glyph-blocks in single column to a side and ten in double column to a front face, or twenty-two on each leg. The principal inscription reads from left to right on the seatedge, the observer facing the throne; thence to the left edge of the left leg; thence to the front, read in double column; thence down the right edge of the left leg; and from here to the right leg, which was read in the same order as the left. Left here is left of the observer, facing the monument.

The screen seems to be a large serpent mask, front view, with teeth and mouth curls at either side, two nose plugs in the center, and supraorbital plates above the eyes. If this interpretation is correct, the eyes are formed by two large squarish openings, cut clear through the stone except for the two nearly life-sized human busts set within them. These face the center from either side. They were in large measure out from the stone and were silhouetted against the rear wall-of the niche, though the faces were carved in low relief, and not in the round. Hands and shoulders more nearly approach a full-round treatment. The face at the right of the observer is largely a plaster restoration, controlled by fragments including the eye and chin. Other minor plaster restorations appear clearly in the photograph. When in position, the supposed eyes of the mask were in effect shallow niches within the stone, about 34 cm wide, 30 cm high, and about 16 cm deep.

Decorative elements at either side of the mask, possibly involving large serpent-scales, include a vertical panel of four glyph-blocks each, and there is a horizontal
panel of four additional glyph-blocks in the upper part of the mask at the center. All three panels are sunk below the general plane of the surface. The twelve glyph-blocks on the screen are carved in much lower relief than those of the seat, those in the left panel being little more than deeply incised. There is thus a total of seventy known glyph-blocks, with considerable probability that five or more are missing from the seat-edge.

The length of the screen is 1.9 m at the top, 1.8 m at the bottom, the height at the left is 0.6 m at the right 0.6 m . The thickness varies from 14 to 16 cm allowing for inequalities on the back, which was only roughly smoothed. Top and side edges were nicely tooled. On them are very clear remnants of smooth white plaster which have been broken off along a well-defined line 1-2 cm from the back, showing clearly where the plaster had formerly turned up against the rear wall of the niche. The bottom edge of the stone is quite rough, and devoid of plaster. This edge undoubtedly rested on the bench.

A sizable, roughly semi-circular section had been cut out of the bottom, just to the left of center. This is not a break, though it was crudely done. It must have been made before the screen was last placed in position, as there were traces. of smooth white plaster along the bottom of the front face, showing where the plaster surface of the bench turned up to meet the screen; and these traces followed the curve of this cut-out semi-circle. The plaster on this edge of the screen was unfortunately removed in cleaning, but shows, though none too clearly, on-field photographs.

A large part of the seat (principally the rear) was either thrown out on the stairway and exposed to the weather, or so broken up as to be unrecognizable. We have restored its width as equal to the bottom length of the screen, i.e., 1.8 cm though we might have chosen 1.86 cm , the screen length as measured at the top, or anything between. The depth (front to rear) as restored is 92 cm , a less certain dimension, but surely correct to $15-20 \mathrm{~cm}$. The thickness at the edge is 13 cm , which increases by a centimeter or so toward the center of the stone. The top was flat, plain, and nicely smoothed, so far as known, as was the edge of the single fragment of the side recovered. The bottom was only roughly worked.

A description of the left leg suffices for both as they are practically identical in form and size. Viewed from the front, it tapers from a width of 29 cm at the top to 21 cm at the floor level, which is indicated very plainly by white plaster broken off on a line just below the glyphs. The distance from the line of breakage of the plaster to the top is 52 cm , which corresponds within a centimeter to the height of the ledge which supported the bench top at the rear. The corresponding measurement on the right leg exactly equals the height of the ledge ( 53 cm ); adding the thickness of the seat we get 65 cm , which is the height
of the bench behind the ledge. The leg continues to taper for about 13 cm below floor level. This portion was let into the floor, and is very rough. The thickness of the leg is only 12 cm so that it is essentially a slab, rather than a column or pier like the legs of the great table altars of the plazas. The backs of the legs are only roughly smoothed.

The niche, up to a height of about 1.6 m was well preserved, and on the left was in position to about 2.2 m above the floor. Below its vaulted roof it is a simple rectangular recess in the rear wall of the room, 2.4 m wide and 50 cm deep (Fig. 3.4). This was completely filled by the masonry bench, already referred to, the front of which was flush with the wall of the room. The bench, 65 cm high, was badly disrupted at the center, but it was perfectly clear at the sides that the front edge had been lowered to form a ledge 15 cm wide and 12 cm below the main surface (Fig. 3.7e). This is the ledge previously referred to as having the same height as the effective height of the legs. Remnants of the plaster surface were in place at both ends of the rear part of the bench, establishing its full height of 65 cm beyond question.

The plaster floor in front of the niche was badly broken but by skinning off the surface we were able to locate within reasonable limits the former position of the left leg. This we place in the center of a hole in the concrete base of the floor, which was filled with soft and darker material in which fragments of the white surface plaster were mixed to a depth of 10 to 20 cm . The hole was about 60 cm in diameter, its center 60 cm out from the bench and 60 cm to the right of the left end of the niche, the observer facing the niche. The base of the right leg was found in a position corresponding to this point, on the right. It was partly imbedded in a similar broken area, though larger and less well-defined. It was still partly upright, twisted somewhat out of place, though the sculptured face still faced more or less to the front, and there was a large fragment of the seat-top against it. Probably it had not been entirely torn from the floor, and we may consider our location of the legs in the restoration as quite close to correct.

We have arbitrarily added 10 cm for front overhang of the seat, and the distance from the front edge, thus established, to the rear of the supporting ledge of the bench, 92 cm , is the depth of the seat-top as restored.

The photographs (Figs. 3.6c and 3.7a) show plainly that as originally constructed the ledge extended to either end of the bench. On the right side it is well preserved for a distance of 45 cm from the end. This would seem to indicate that the seat was as wide as the niche. But this would mean an overhang at the sides of about 45 cm beyond the legs. A scale drawing will demonstrate that an overhang of much less would still be out of reasonably probable proportion. Lacking proof, our best assumption is that the seat was of the same width as the screen, which
gives a reasonable overhang, and, more important, agrees with the throne shown on "Lintel" 3 .

Very probably when the throne was in place, the portions of the ledge extending beyond the bench, at the sides, were built up to the level of the rest of the bench, though we have not done this in our restoration. This is confirmed to a slight degree by failure to find finishing plaster on the ledge.

The position of the screen on the bench against the back wall of the niche is indicated by the scene on "Lintel" 3 , and proved by the line of broken finishing plaster along the back of the top and side edges, and along the front face at the bottom.

Small biconical holes similar to those on Altar 2 were drilled through the edges of screen and seat. One is placed at the center of the screen, passing through the top edge and emerging in the border above the central glyph panel. There is another 33.5 cm to the right. (observer facing screen), but none in the corresponding position to the left. Two more are at the extreme upper corners both entering at the top edge, that at the left emerging on the front, the other at the right edge of the stone but close to the front. Below each of these latter is an additional perforation passing from the side edges to the face of the stone. That on the left is 32.5 cm , that on the right 36.5 cm below the top.

Five similar perforations pierce the lower edge of the recovered portion of the seat. All lead from points between glyphs on the face to the bottom surface of the stone, passing behind the lower plain border. Counting from the left of the recovered glyph-blocks, there are perforations after the third, fifth, seventh, ninth and eleventh glyph-blocks We might expect another between the thirteenth and fourteenth blocks, but there is none there.

There are thus three known glyph-blocks on either side of the extreme left and right perforations, and possibly we should conclude that the third and central perforation was at the center of the seat. This is the informally expressed opinion of Dr. Morley. As restored, the center line of the seat passes through the middle of the ninth known block, leaving room for a hypothetical additional block at the left and four at the right. The known glyphs are consistently 9.5 cm in breadth, so that, even considering the seat as 1.9 cm in width (the length of the screen at the top) we are limited to 19 glyphblocks on the front. To give a symmetrical arrangement of both glyphs and perforations with the central hole at the center of the seat, we would restore only four instead of a possible five blocks, two at either end of the known series. If this were done, pendants might be hung from the perforations, without hiding the glyphs on the legs. But the holes on the top of the screen lack entire symmetry, and the fringe hung from the throne shown
on "Lintel" 3 extends clear across the legs. In view of the close correspondence between that depiction and this actual throne, it seems probable that the large blank squares on the legs and seat-edge of the "Lintel" 3 Throne represent glyph-blocks, and that there was no objection to partially hiding them.

Because an unexpressed or missing calendar-round date 10 Chuen 19 Zip may have occurred between the calendar-round date on the seat and the first one on the left leg, and also because a secondary series connecting the 10 Chuen 19 Zip with the calendar-round date on the seat is missing or unexpressed, we have restored the maximum number of blocks, and placed four of them at the right and one at the left. To be logical, we should have restored all five supposed missing blocks at the right, to allow for 10 Chuen 19 Zip , plus a three-block secondary series to reach back to the 12 Manik 5 Zotz on the seat. But this is, of course, entirely hypothetical.

Possibly the perforations on the screen and seat served for attachments of skins and tassels. The screen shown on "Lintel" 3 is partly covered by a jaguar skin, and a tasseled fringe appears to hang from the lower edge of the seat.

The known glyphs on the edge of the seat are definitely in their correct order, as proved by the fractures of the stone, except that the fractured surfaces between the fourth and fifth glyph-blocks are scaled off so that the fit is not perfect. But we consider doubt here as practically non-existent. There is nothing in the fragments to prevent interpreters of the text from adding or subtracting hypothetical blocks at either end of the series on the seat, within the limits indicated, or further from assuming that the band extended back four or five glyphs on either side. The glyphs on a fragment of another throne (according to tentative identification) do turn the corner (Miscellaneous Sculptured Stone no. 9, probable date 9.11.10.0.0 according to Morley).

Sizes of glyph-blocks seem to indicate considerable variation in the care with which they were laid out. Those on the seat edge are very consistently 9.5 cm wide and 9.5 cm high. Those in the upper central panel of the screen are 6 cm high, the two end glyphs 9 cm wide and the two central ones 8.5 cm wide, perhaps an intentional symmetrical arrangement. The heights of the glyphs in the side panels of the screen are 4 cm in each case, but the width of the left panel is 6 cm , that of the-right only 5 cm .

Glyphs on the edges of the legs vary around 7 cm in height, the widths on the two left edges being about 7.5 cm but on the right sides 8.5 and 9 cm (left and right legs respectively). The glyphs on the front faces of the legs vary from 8.5 cm to 9.5 cm in height, the widths from 12 cm down to 9 cm . The last variation is of course mainly due to the tapering of the legs. The greatest care
seems to have been taken where differences would be most easily detected in the central panel of the screen and-on the seat-edge.

Because of the good state of preservation of the vertical walls of the niche, it follows that any force of stones falling from the building onto the throne must have been directed a1most straight downward, or rearward. This is especially true of the screen and the missing rear portion of the seat.

The four units of the throne were broken into 44 fragments of sufficient size to merit numbering and location in position, to say nothing of three or four dozen small chips, and the pieces of the seat not found, which comprised much more than half of the whole seat. All but three of the recovered fragments were found scattered in confusion on the floor and in the doorway in front of the niche. Nearly all the major pieces were cleared, photographed and drawn in position before removal (Fig. 3.7d).

Fragment 5 is the lower portion of the nose of the mask, between the eyes, and to get to the position in which it was found, it had to travel 6 m horizontally, while dropping only about 1 m from its original height.

Fragment 2 is the right end of the screen, weighing nearly 200 pounds, yet its center lay about 1 m to the right of the right end of the niche and only about 0.6 m out from the wall, and it must have described a curve around the corner of the niche to arrive at the position in which it was found, an unlikely condition in a natural collapse. Fragment 19, on the other side, is the base of the left leg, originally imbedded in the floor. It was found nearly 1.5 m to the left of and behind the point where it was originally imbedded, while Fragment 10, the top half, was found 2 m distant, directly in front of its original Position. In a natural fall, the seat-top would have fallen on it and kept it, with other parts of the same stone, in approximately the same location, especially the imbedded lower part.

Part of the headdress of the right-hand bust, and a fragment which fits it, both from the screen, were found outside on the stairway, close to the top but over 7 m to the right of the center of the doorway before the throne (observer facing building). The head of the left figure was found on the stairway, 2-3 m in front of the doorway. Such displacements as this cannot be accounted for even by the unpredictable action of roots, of which there was no sign in the limy light-colored deposit on the floor.

Such instances of relative positions requiring human action for their explanation could be multiplied indefinitely. That the destruction occurred before (possibly immediately before) that of the building, is rendered practically certain by the fact that nearly all fragments (which covered a wide area) lay flat on the floor in immediate contact with the smooth plaster surface and
therefore preceded the fall of debris from the building. They were immediately overlain by fallen vault-slabs from the roof, to a depth at the rear of about 1.6 m and at the front of about 80 cm , effectively sealing them from any movement after the collapse of the roof (Fig. 3.7d). If the falling roof broke up the throne, many fragments, especially of the screen, would have been mingled with roof slabs, not uniformly under them, as was the case.

The front edge of the floor, in the doorway before the throne, was found sunken and broken, with Fragment 5 of the throne lying in this depressed area below floor level. This destruction of the floor was not found elsewhere in Room 1, though throughout its length the substructure was buttressed by the stairway. The pier to the right of the central doorway (facing the building) was so undermined that it had collapsed, the bottom courses, still in relative position, being tilted up at the rear (Fig. 3.7c). All other piers of Room 1, and those of Room 3 stood to heights of 75 cm or more. These circumstances suggest the possibility that this pier was purposely made to collapse, though they fall far short of proof. Natural failure of the substructure at this point, behind the stairway seems unlikely. The failure in Room 2 is, of course, understandable.

With one exception, all recovered fragments of the seat are parts of the front edge, or fit such parts. A great deal more than one-half, including all of the back part, is missing. All the rest of the throne complex, except missing small fragments, was found. There appears to have been some selective process involved. These back pieces of the seat are precisely those which, of all others, could not have fallen outside the building in a natural collapse. If the aboriginal destroyers removed them or completely destroyed them, leaving nearly all the sculptured fragments in the building, the fact is noteworthy.

We do not believe we removed them unknowingly. All debris removed from the throne room, between points 2 m on either side of the niche, was carefully segregated between dry-walls of our own construction on the stairway. The lowest 30 cm of this area in the room was removed with knife and trowel, every stone examined, and the earth eventually sifted. After we had recovered and assembled all the pieces, including many tiny fragments, from the building, and knew exactly what was missing, the debris from this area, by then collected on stairway, was removed by two picked men, who had been at work recovering the known pieces for two weeks, had seen them assembled, and who had proved exceptionally sharp-eyed throughout. Had the missing pieces of the seat been thrown out by the pick and shovel work above the 30 cm level, this second search should have yielded some of them. Many stones were submitted but none passed the test for thickness, color of the stone, and smoothness of the top. A sharp lookout while excavating the rest of Room 1 also failed to turn up these missing pieces.

In conclusion we should state that all debris on the whole surface of the stairway and from the court at its northeasterly side, was removed by workmen instructed to examine every stone, and three pieces from the screen (already mentioned) were found. If there remain any parts of the throne which have not completely weathered, they are probably buried in the angle between the stairway and the flanking terraces at the right (southwest) of the substructure, which is deeply buried by debris and has not been examined.

## Throne 1: Inscriptions and Comparisons

In a letter Dr. Morley reads the inscription ${ }^{9}$ on the seatedge and legs [as shown in Table 3.1].

Table 3.1 Decipherment of the Inscription on Throne 1

| Katun 15 |  |
| :---: | :---: |
| (9.15.18.16.7) | 12 Manik 5 Zotz |
| (9.17.9.5.11) | (10 Chuen 19 Zip) |
| $\begin{aligned} & 1.0 .10 \\ & (9.17 .10 .6 .1) \end{aligned}$ | 3 Imix 4 Zotz |
| $\begin{aligned} & 3 .(3) \\ & (9.17 .10 .9 .4) \end{aligned}$ | 1 Kan 7 Yaxkin |
| $\begin{aligned} & 4.8 .16 \\ & (9.17 .15 .0 .0) \end{aligned}$ | 5 Ahau 3 Muan End of a hotun |

Long-count numbers and 10 Chuen 19 Zip are not expressed on the Monument, and the three kins of the Secondary Series 3.3 is eroded, as indicated by parentheses. It is the 10 Chuen 19 Zip and a secondary series connecting it with 12 Manik 19 Zip for which we have allowed four glyph-blocks, and should have allowed five, at the right in our reconstruction of the seat, assuming as we did that it was expressed. The assumption is arbitrary, and without more pieces the proper position of this line of glyphs cannot be known with certainty. If we assume the inscription ran around to the side edges, as was true in a possibly similar case at Chinikiha (see below), and certain in a fragment probably from another throne at Piedras Negras (Throne 2), mentioned above, we have no basis whatever for determining the position of this group of glyphs, other than the holes.

Thompson has read the 12 Manik 5 Zotz of this inscription as a determinant of Katun 15, showing the vague or 365-day year 237 days ahead of the solar year, counting 24 leap-days to a century from 7.6.0.0.0 as the base (Thompson 1932:373-374).

Between the Katun 15 and the calendar round date 12 Manik 5 Zotz on the seat-edge is the composite glyph which Spinden believes denotes observation of the sun at the horizon (Spinden 1930), and which Gates reads in a similar manner as the sun entering between sky and earth (Gates 1931:70). It occurs twice again on the left
and right legs of this throne (each again before a calendar round date) on Altar 2, "Lintel" 2, and on Stela 36. Perhaps it is worthy of note that in none of these cases has it a coefficient, as at Tikal where it apparently means kin (Morley 1915:72) and that in all it has a constant prefix.

Another interesting glyph on this monument, considered by Spinden to be the sign for the equinox, is the kin-glyph, half-darkened by hatching. This occurs on the left edges of both legs, and also on "Lintel" 3. When first discovered, it was thought that a carved piece of furniture of this particular sort was unique, but it seems not unlikely that adequate investigation in the Usumacinta region will bring more to light.

We have very good reason for suspecting that there is at least one other at Piedras Negras. The back or screen of the throne shown on "Lintel" 3 is similar to this one, but differs in details. Furthermore, the contemporaneous date of "Lintel" 3, according to Morley, was 9.16.10.0.0, twenty-five tuns prior to that of the throne under discussion. "Lintel" 8 (unpublished), though badly eroded, undoubtedly showed a wide seat or table with tapering legs. The lower figures on Stela 40 also rests on a table or seat supported by tapering legs.

There is now at the Peabody Museum, Cambridge, a small leg supposed to have come from this site, which may well belong to a throne of this type. It is illustrated by Maler who came upon it at Carmen (Maler 1901:64). The dimensions of this leg, kindly supplied by Dr. Tozzer, are, as approximately translated into centimeters: height 47 cm , breadth 17 to 20 cm , thickness 15 cm . The height of the glyph panel is about 32 cm . The leg tapers slightly from top to bottom and suggests the possible existence of a throne smaller than Throne 1. It is entirely too small for a table altar of anything like the size of the five known examples at the city.

If three assumptions with respect to "Lintel" 3 are granted, the approximate dimensions of the throne shown on it can be worked out. The assumptions are that the artist copied an existing throne; that he copied it, as well as the human figures, with reasonable accuracy in the matter of proportions; and that the tallest figures, allowing for headdresses, were actually about five feet, four inches in stature.

On these assumptions, the top of the screen on "Lintel" 3 would be about 2 m above the floor, much too high to place it in the niche of Throne 1, the vault of which springs at 1.6 m . The exposed part of the leg of the throne of "Lintel" 3 would have had a height of about 50 cm , too much for the leg at Cambridge, the total length of which is only 47 cm , of which about 14.5 cm is plain. Most of the latter part was needed for insertion in the floor.

Possibly this is idle speculation, but the discrepancies are great enough to allow for a considerable error in
estimating the height of the figures, and the sculptors of this period were certainly good draftsmen. If the proportions of the throne of "Lintel" 3 are not imaginary, we have a fair hint of the former existence of three thrones of this type at the city, Throne 1, the throne shown on "Lintel" 3, and a throne of which the Peabody leg is a part.

Partial confirmation comes from Miscellaneous Sculptured Fragment 9, read by Morley as 11 Ahau 18 Chen (9.11.10.0.0) which seems to be the corner of and probably the whole end of another seat. If so, it was only 65 cm from front to rear edge. The "Sun at Horizon" glyph, with the same prefix, also precedes the calendarround date here. We tentatively call this Throne 2, though its official designation remains Miscellaneous Sculptured Stone 9.

Maler describes and pictures a stone seat at the not-far-distant ruin of Chinikiha, the inscribed edge of which appears very similar to that of the seat part of Throne 1. Further, it "had rested against a wall" and was found in or about a structure which, though called a temple, seems to have been associated with "adjacent apartments" and may have been a palace (Maler 1901, Plates I, II).

The most certain similar, though not an identical, construction was at Palenque. Immediately behind the central of the three principal and wide doorways on the westerly side of the palace structure, House E, is a sculptured oval stone plaque let into the medial wall and looking out onto the southeasterly court through the doorway. The plaque and location are well shown by Maudslay (1889-1902:4, Plates 3, 41, 44). There are remains of a painted inscription on the wall above it, remarked by Maudslay and by subsequent observers. On the basis of marks on the walls Stephens postulated the former presence of a seat below (Stephens 1867:318) and this was drawn in place below the plaque, by Del Río (1822). The latter shows what must be intended for hieroglyphs on the seat edge, and sculptured figures on the front faces of the legs. There was what seems to have been a "sky band" at the back, below the plaque, possibly painted on the wall or perhaps on a low stone analogous to the screen of Throne 1. Stephens, judging from his drawing, thought there was a vertical member at the back of the seat. This is a fairly close correspondence in position and design with our Throne 1.

The figure at the center of the roof comb on Structure 33 at Yaxchilan is seated on a broad bench with tapering legs remarkably like the seat of our Throne 2 (Maler 1903. Plate XLII). There are thus strong hints that this type of monument was known at the three principal Usumacinta sites and at one of the minor ones, and this without excavation to any great extent except at Piedras Negras, where we have hints of three, two of which could not have turned up without excavation.

## Structure J-6-2nd and Other Buried Structures

Reference to the Plan and to Sections E-F and C-D, in Figure 3.4, will show that Room 1-a of Structure J-6, and at least part of Room 1 at the southwest occupied the position of an older dismantled building, Structure J-6-2nd. The front and rear walls of this earlier building are shown in hatching descending to the left in the Plan and to the right in the Section C-D. The front wall and the floor of J-6 is continuous with that of J-6-2nd. That is, the vertical part of the front wall of J-6-2nd was used as the front wall of the later building, but with a new and narrower vault, supported by it and by a new rear wall. The latter is about 80 cm forward of the old rear wall of J-6-2nd.

In 1933 we followed J-6-2nd to its southwesterly end. The end, measured along the inside of the front wall, is 2 m southwest of the face of the secondary transverse retaining wall shown in diagonal cross-hatching in Figure 3.4. This end wall has a soffit slope above the vaultspring, like the rear. To also penetrated the rear-mall of Room 1 of Structure J-6 and established the fact that the lowest courses of the J-6-2nd rear wall still extend the northeast at least as far as a point behind the center of the right or southwestern doorway of Room 1. This confirms our belief that the front wall, if not the piers, of Room 1, was originally erected as the front wall of J-6-2nd. It is further confirmed by our inability to detect with certainty any break in the masonry of that wall, and by a somewhat vague difference between the masonry of the two piers nearest to this wall and that of the others, which make a more liberal use of large thin slabs. Even these piers may have originally served J-6-2nd (compare Figure 3.7a with 3.7 c ).

A necessary deduction from these facts is that the vaulting of J-6-2nd, I found in place at the end where the room is only 2.5 m wide, continued over the portion to the left (northeast), which is 2.9 m wide. The only alternative is to suppose that over the wider part there was a series of transverse vaults, their bases on wooden beams as in the Mexican buildings at Chichén Itzá, or on transverse partition walls of which there was no sign. Either of those assumptions is improbable in the highest degree.

We assume therefore that the vaulting of J-6-2nd was longitudinal in its entirety, but that at the southwesterly end its span was less and the height of the capstones lower than the rest, which, unfortunately, was entirely removed by the Maya before erecting Room 1 of J-6. The juncture of two vaults, one lower and narrower than the other, end to end, offers less complicated technical problems than were solved in the vaulting of Rooms 5 and 6, with their low connecting doorway, in Structure $\mathrm{J}-2$, as theoretical reconstructions of the vaults involved will show.

In any case, even the narrowest part of J-6-2nd is 2.5 m wide, and J-6 certainly followed a wider structure. There is every reason to suppose that it followed a structure with a common outer wall thickness of 75 cm and a span of 2.9 m , except for its end, which was reduced to 2.5 m in span, for some reason not very clear, but possibly connected with the hidden contours of bedrock.

Because positive evidence of the vaulting of the wider part of J-6-2nd is lacking, we might have placed question marks after the figures for J-6-2nd in the Summary Table at the end of this paper, which have for their basis the assumption that a longitudinal vault spanned the known width of 2.9 m . We have, nevertheless, every reason to suppose that that assumption is correct, and believe that asterisks, indicating a theoretically reconstructed vault, are all that are called for.

The front wall of the wider part is 75 cm thick, as we have seen. For the narrower part, this increases to 1.2 m and very soon to 2.4 m , without any break in the masonry, showing clearly that the thickening of the wall, the first stage of which narrowed the room, has nothing to do with structurally possible vault-span ratios. The spring of the vault is 2 m above the floor, the reconstructed capstone heights (assuming 30 cm of capstone exposure) being 3.8 m for the narrower and 4.1 m for the wider part, with corresponding vault heights of 1.8 m and 2.1 m respectively.

This earlier building, Structure J-6-2nd, may possibly be part of another early building which was only partially dismantled. This cannot be known with certainty without further excavation, but it almost certainly was not, and we will here call the second early unit Old Rooms 1 and 2. The floor of Room 1 is continuous with this also. The transverse partition wall between Rooms 2 and 3 is the northeasterly end wall of this earlier unit. Its rear wall at least up to the spring of the vault was left intact as the rear wall of Room 2. It still passes behind the transverse partition between Rooms 1 and 2, running (in a southwesterly direction) to a point at floor level which is about 1.5 m short of reaching the niche of Throne 1 . Here, on an irregular line sloping upward and to the northeast, the highly irregular character of the stone used changes to the more or loss natural coursing characteristic of well-selected slab walls, in which the upper and lower surfaces of the stone, are parallel to each other. From here on, slab masonry, clearly observable on the surface, without cross-section views, is used for the rest of the rear wall of Room 1 , including the niche.

It is therefore clear that Room 1 made at least partial use of the front wall of Structure J-6-2nd, and of the rear wall of Old Room 1, and its span was thus determined by a decision to use those old walls.

The rear vaulting of Room 1 is, however, continuous with that of Room 2, since it is entirely fallen at the
junction of the new and old parts of the rear wall, it is impossible to say from inspection whether Room 1 is merely an extension of Old Room 1, with its vaulting spliced to that of the latter, after the removal of the old unit's southwesterly end wall, or whether an entirely now system of vaulting was erected over both Rooms 1 and 2 . We will take this up shortly.

The other (northeasterly) end wall of Old Room 2, which was not torn down, runs behind the end of the rear wall of Room 3, and what appears to be a remnant of the medial cornice or molding at this end also runs behind the rear half vault of Room 3. It is, therefore, clear that Room 3, both wall and vault, as well as Room 1 in its final form, is later than Old Rooms 1 and 2.

The reason for thinking that part of the originally outside medial molding of Old Room 2 is preserved in the end vaulting of the later Room 3 is that, contrary to known practice elsewhere, and at the other end of, this same Room 3, the soffit here does not slope out directly from the vault-spring. Instead it goes up straight, or with a slight negative slope, if anything, for about 30 cm . Above this all is in ruin. If the builders, erecting Room 3 against the formerly outside end of Old Room 2, desired to make this end roughly conform to the other with a minimum of labor, they might have trimmed down the now incongruous medial molding. If its lower member was the usual apron variety, this would result in the form we find, to about the height we find. There is no other apparent reason for the difference in the lower part of the vaulting at the two ends. This form at the base of vaults has been observed by the writer at Yaxchilan, but not at Piedras Negras, and never in combination with the usual design in the same room.

As will appear later, it is of considerable theoretical importance to determine whether the vaulting of Old Room 2 was torn down and replaced when the final Room 1 and its throne were erected. The fact should be here noted that, if it was torn down, at a time subsequent to the erection of Room 3, we would expect care to be taken that the end vaulting of Room 3, including this remnant of the earlier cornice at its base, was not disturbed. The removal of all the vaulting of Old Room 2 could easily be accomplished without disturbing this lower 30 cm of the original outer and end upper façade; and to disturb it meant the removal and rebuilding of the end vaulting of Room 3, for no apparent purpose. It follows that the presence of this little remnant of the upper façade of Old Room 2 is proof that Room 3 is later; but no evidence that the vaulting itself, and therefore the front wall or piers of Old Room 2 persisted to the end.

We found part of a soffit slope rising from the inside of this northeasterly end wall of Old Room 2, tied to the rear vaulting on the rear wall of Old Room 2. Unfortunately this rear vaulting was entirely destroyed
toward the middle of the room, so that it could not be followed to the portion at the other end, which runs without a break into Room 1. This again will not help in determining whether or not the original vaulting came down. If it did, we have every reason to suppose that it all came down, and a new and soffit would naturally have been built and tied to the new rear soffit slope. There is therefore no evidence here precluding the possibility that the vaulting and the missing piers of Room 2 in its final form were not later than the rear wall.

We are now free to discuss some positive bits of evidence tending to show that the front wall or piers of Old Room 2, as well as Old Room 1, were removed and therefore the vaulting with them, to make way for a new set of piers and vault which ran the length of Rooms 1 and 2 in their final form. This may have occurred either in J-6-2nd times or Throne Room times, more probably the latter. To facilitate discussion, which will be none too clear and certain, the interested reader should complete Figure 3.4 as suggested, and number the piers on the plate from left to right, remembering there were probably two piers of like dimensions in Room 2.

The rear wall of Old Rooms 1 and 2 runs southwest to a point a little beyond pier 4. From here on (the change following an irregular line rising from the floor) the masonry is composed of longer and more regularly selected slabs than are found in all other rear walls of this complex, or in any of the walls of Structure J-2. This extreme slab character agrees with the front wall of J-62nd (but not with its rear wall), and disagrees also with the front wall of Room 3, and the Room 3 and Structure J-2 piers. It agrees with piers 3, 4 and 5; but appears to disagree slightly with piers 1 and 2 . These are badly ruined and it is difficult to decide. Compare Figure 3.7a with 3.7c.

It is obvious that piers 1, 2 and 3, being opposite this late part of the rear wall of Room 1, which includes the Throne 1 niche and overlaps the old portion, are contemporary with the niche, or else, dating from an earlier time, were retained to support half of the latest vault. Because of the more precise agreement in masonry type between niche and pier 3 we are tempted to assign piers 1 and 2 to J-6-2nd, and pier 3 to Room 1 in its final form, that is to the Throne Room period, but this distinction is uncertain.

Since the front wall of J-6-2nd, and piers 1, 2 and 3 are all opposite the new part of the Throne Room rear wall, it is certain as implied above that if any earlier vaulting was supported on these piers, it was torn down when the Throne Room was built.

Piers 4 and 5 are better preserved than any of the others, and exhibit the more regularly slab masonry type to a marked degree, in agreement with what is left of pier 3, and in disagreement with piers in Room 3 and
in Structure J-2. Although they are opposite a rear wall dating from Old Rooms 1 and 2, they are therefore probably contemporary with pier 3, and therefore with the Throne Room period of construction, or possibly with J-6-2nd.

If there was any splicing of the new Throne Room vault to undisturbed vaulting of Old Room 2, it must have occurred over a wall or pier. Therefore, if it occurred at all, it occurred over one of the missing piers of Room 2, i.e., within Room 2 unless pier 5 dates from J-6-2nd times. It did not occur over pier 4 or 5 unless we are entirely misled by the agreement in masonry type, of piers 3, 4 and 5 , with the masonry of the later part of the Throne Room rear wall. Also we know positively it did not occur over pier five, because the rear vaulting is in place opposite this pier, passing without a break above and across the partition running back from this pier. The evidence of masonry types thus loads to the conclusion that removal of old piers (or front walls) extended into Room 2.

If we are wrong in distinguishing between pier masonry, the new Throne Room vaulting might have been spliced to pre-existing vaulting over pier 4, as it is opposite the old part of the rear wall. On this hypothesis, the splicing would be to older vaulting, but the latter would date from J-6-2nd times, all piers-being considered contemporary with J-6-2nd. In this case, the Old Rooms 1 and 2 walls must be an integral and original part of J-6-2nd, or else all that was left of an earlier building dismantled when J-6-2nd was built. The only way to avoid the conclusion that front wall or piers, and therefore the vault, of Old Rooms 1 and 2 were removed, either in J-6-2nd or in Throne Room times, is to make them an integral Part of J-6-2nd as originally planned and built. So far as known parts of plans are concerned, this is possible, but improbable.

Behind the rear end of the final partition wall between Rooms 1 and 2 is the stump of an earlier transverse partition wall. Its left or northeasterly side ran on the same line as the same side of the final partition, and both are in line with that side of Pier 5. The early partition was only 45 cm thick. It now appears to have been inserted in the Old Rooms 1 and 2 rear wall. They both end against it, without binding, an unusual arrangement. The stones of the Old Room 1 wall are smaller than those of the Old Room 2 wall. If the partition projects forward from a buried ruin to the rear, these two walls may differ in age. Both are certainly later than the partition, if they are not contemporary with it. The writer cannot work out any plausible reason for the presence of this stump except that it is contemporary with the walls on either side, and dates with them from an Old Rooms 1 and 2 period. In that case the difference in masonry between Old Rooms 1 and 2 must be assigned to contemporary use of two quarries, or
some such reason. If the stump belongs to a buried earlier ruin, it is difficult to understand why it was not cut back to a point behind the roar walls which we find exposed, unless the partition remained in use after the erection of Old Rooms 1 and 2. In that case the differences in their masonry would be entirely understandable, with Old Rooms 1 and 2 erected at different times. This would mean, however, that although Old Room 2 might be later than Old Room 1, it was not erected as part of J-$6-2 \mathrm{nd}$, being cut off from it, at least for a time, by this early partition.

As seen from Room 1, plaster remaining on Pier 5 still runs behind the later partition where it abuts the pier. The partition certainly is later than the rear wall of Old Rooms 1 and 2, if they are contemporary with the stump, mentioned before, since its inner end abuts this stump of the first thin partition; and further, although it was erected after the pier, it must have been part of Room 1 (or J-6-2nd) rebuilding, since it was necessary to hide the protruding stump of the early partition. The conclusion seems probable that this plaster on the rear of Pier 5 merely means that piers, perhaps also vaults, were not only built, but plastered, before the final partition was erected, though the latter was part of the same job. This is quite certain unless we are wrong in dating pier 5 as later than Old Rooms 1 and 2. We have seen something like this in Structure J-2. The same thing occurs in Structure J-9, provided partitions there are part of the original plan, for which proof is not at hand. At any rate, it seems highly probable that here in J-6 plaster does run behind an architectural element which, as was known at the time of plastering, or before the job was completed, was to be placed against it.

It will be clear that the writer believes that the rear walls of Old Rooms 1 and 2 belong to the earliest building on this site, at this level; and that vault and front wall or piers were removed in building J-6-2nd or Room 1 ; and that they antedate everything else. He is bound to state that this is not certain. In this connection an observed agreement in masonry between the rear walls of J-6-2nd and of Old Room 2 is very disconcerting. But the smaller stone which was used for the Old Room 1 rear wall, which is the one which would have to have been connected with J-6-2nd argues the other way. So does the uncertain distinction in the masonry of piers 1 and 2 . So does the improbability (to the writer's mind) that the old partition would have been allowed to project just through a new rear wall instead of being broken off to a point behind it, if it was already in existence. Also, if Rooms 1 and 2 were always part of J-6-2nd, built complete, rear walls and all, at the same time as J-62nd, why was Room 3, obviously built as an addition, given heavier piers? Hidden contours of bedrock might possibly account for the for-ward position of the rear
walls of Old Rooms 1 and 2, as compared both with J-62nd and Room 3 although what evidence we have (which is considerable) points to the contrary. But it does not account for the heavier piers in Room 3, and there is no explanation at hand, unless they are earlier than J-6-2nd. If they are, so are the rear walls of Old Rooms 1 and 2.

In any case it is reasonably clear that Structure J-6 as a final whole includes four distinct periods of building: Old Rooms 1 and 2 or else the hypothetically prior partition stump, Room 3, Structure J-6-2nd Room 1.

It may be that there were six periods, and this is the most likely, if the peculiar thin partition wall stump comes through from a buried building to the rear. In this case, putting Room 3 before J-6-2nd on the basis of distinct outer wall masonry and heavier piers, and therefore Old Rooms 1 and 2 and the stump also before J-6-2nd, the various units, in probable chronological order, would be as follows: The building of the partition stump, Old Room 1, Old Room 2, Room 3, J-6-2nd, Room 1 with its throne at 9.17 .15 .0 .0 . This order is compatible with all juxtapositions, and with all indications of masonry, provided it is allowed that the front piers or walls of Old Rooms 1 and 2 were torn down in the last or next to the last period.

The writer is fully conscious that such a discussion cannot be fully followed by the reader without complete drawings, and many more photographs of masonry. It is indulged in because the chronological position of Old Rooms 1 and 2, and therefore of Room 3, is of importance in discussing vault-wall relationships later on. Merely to establish that Old Rooms 1 and 2 may have preceded J-62nd will be of service in that connection. We may sum up the problem by saying that they must have been erected at a different time unless Old Rooms 1 and 2, as contemporary integral parts of J-6-2nd, were built around an old thin partition with a desire to preserve and use it, or unless they were built up to its mere stump, from either side, the stump itself being preserved to full vault height; or unless this thin partition was built, along with the rear walls, as part of the original J-6-2nd structure, but off center behind one of its piers, inserted between the rear walls but not bound to the pier. Any of these propositions seem to the writer less probable than that Old Room 2 and J-6-2nd are remnants of distinct buildings.

A trench through the floor of J-6-2nd shows that at least this part of its floor was the first structure placed over bedrock at this end of the complex. The bedrock is only 50 cm below the floor at the rear, but dips down toward the front. The fill is complex, but not on any regular plan. The bulk consists of broken rock mixed with a purplish clay, and is solid. An early buried terrace wall was encountered at the front, and this may have been the original terrace supporting J-6-2nd, but it was crude and is probably a constructional feature.

On the slope of the bedrock is a thick layer of stiff purplish-brown clay, mixed with small and large broken limestone rock, which has the appearance of being a natural deposit. However, in it was a lens of soft black clayish earth and charcoal, with many sherds, indicating an occupation of near-by parts of the Acropolis antedating Structure J-6-2nd. Based on position found, these should be contemporary with those on the bedrock below the earlier Court 1 floor, and probably pre-date the structure over them. The lens is entirely within the bottom layer of clay, except that at the rear it touches bedrock. A few sherds were found in the fill above the otherwise sterile bottom layer, and must have found their way there at the time of the erection of the substructure of J-6-2nd. Since the building on the latter is late, if vault-span ratios mean anything, there is probably a considerable time interval between these two groups of sherds. But there remains the possibility that the J-6-2nd floor predates its walls.

Trenching at floor level revealed a crude constructional retaining wall 90 cm behind and parallel with the face of the J-6-2nd rear wall, with a complex fill between. The fill, however, dated from the time of erection of Room 1 of Structure J-6, and straddles the lowest courses of the J-6-2nd rear wall, all that remains at this point.

During the 1933 season a system of deep trenches was run into Structure J-7, and by tunneling continued under Room 3 of J-6. Tunnels were also run into the hearting behind the Room 3 rear wall, and into the terrace rising from its roof. The results here cannot be properly discussed without plates. We can, however, state that Structure J-7 involves three or more general building levels which run under and behind Room 3, and under the substructure of J-9, against the base of which Room 3 was built. A small number of potsherds ware secured, most of which can be assigned to one or the other of the four building periods thus shown to have preceded the erection of Room 3. However, the series is too meager to promise much enlightenment on pottery history at this city, though when a pottery sequence is established, they may act as checks on the dating of the buildings.

Very interesting finds on the lowest of the buried levels consist of burned fragments of wattle-clay, with the impressions of small sticks or canes on one side, the other side being smoothed and coated with white plaster. Two postholes in a stone and concrete low platform on this level make it perfectly plain that at this early time there were wooden buildings with wattle-and-daub walls on the Acropolis, and that these were nicely plastered. They were associated with stone-walled buildings nearby, but there is no reason to suppose the latter were vaulted.

One of the latter was painted red on the outside, at least in part. Color on early Acropolis buildings is thus established. Here as in buildings found at the surface,
there was no evidence of interior painting of walls. It is entirely possible that outside walls of surface structures also were colored, the evidence having disappeared with exposure.

Excavations here, coupled with those under Structure J-2, make it perfectly clear that Court 1 of the Acropolis was originally very different.

## Objects

Potsherds, a bird-effigy whistle of pottery, and one cachejar were the only objects of the minor arts encountered while clearing Structure J-6 itself. The jar was placed in the floor of Room 1, under the retaining front wall of the supporting bench of Throne 1, its center 30 cm northeast of the center of the bench. It was in an upright position, let into the concrete floor so that its top was only a centimeter or so below the finishing plaster, which had been carried over it. Presumably it was cached in connection with the erection of the throne, but it may appertain to the earlier Structure J-6-2nd or Old Room 1. The jar was unslipped and plain, but rather more graceful in form than most cache vessels at the city. It is a small olla with slightly constricted neck and outcurved rim, and gently bulging body. A flat cover, which is a mere pottery disk, had broken and fallen inside.

The contents were: two odd-shaped concretions; one flint chip; two small pieces of jade, 3 mm thick, polished on one side, smoothed on the other; one small perforated red shell plate, similar to many found with Burial 5; one fragment of thin pink shell; four pieces of sting-ray spine; and one small lump of a white chalky substance, coal black on one surface. Reference has already been made to finds dating from periods preceding the various units of Structure J-6.

## Date

The last date on the throne, 9.17.15.0.0 as read by Morley being a hotun ending and the terminal date of the inscription, is in all probability roughly contemporaneous with the erection of the throne. We have seen how intimately the throne was associated with the building itself. There is nothing in the masonry to suggest that the niche was not constructed at the same time as most of the rear wall of Room 1, and all of Room 1-a. Its insertion after that time would have involved changes in the support of the main half-vault above, a difficult undertaking, and would have left its mark in the masonry. It seems probable that this niche was designed to receive the supporting bench and the rear of the Throne. If such is the case and the date contemporaneous, Room 1 in its final form, including Room 1-a. was erected at about the middle of the last quarter of Katun 9.

We have outlined above our belief as to the sequence going back from this date. J-6-2nd certainly preceded the

Throne Room. So did Old Rooms 1 and 2, which probably also preceded J-6-2nd. If so they were remodeled to the form found at a time contemporary with J-6-2nd, or later. Room 3 followed Old Room 2, without question, and Uaxactún probably preceded J-6-2nd.

Trenching and tunneling in 1933 definitely established that Room 3 is later than the substructure of Structure J-9, including the floor of the latter. Apart from the possibility of late rebuilding on that floor, therefore, the whole J-6-1st complex is almost certainly later than Structure J-9, and trenching behind J-6-2nd would almost certainly prove that unit later also. All J-6 units, and J-9, are clearly later than J-7 and its two buried levels, We shall discuss the available data on the dates of these units further under Conclusions.

## Details of Construction

## Miscellaneous Dimensions

The widths of Rooms 1 (including Room 1-a) and Room 2 in its final form were in all probability the same, as there is every reason to suppose that the two missing piers of Room 2 were of the same thickness as the pier against which the partition wall dividing them was built. On this assumption the room width of both was about 2.1 m , the most consistent measurement. In places this figure drops to 2.0 , and elsewhere rises to a maximum of 2.3 m . Thickness of the front walls and piers varies between 70 and 80 cm , with 75 cm as the probable thickness called for by the plan. Piers vary between 1.2 - and 1.3 -in width, doorways between 1.6 and 1.7 m . The vaults sprang at 2.2 above the floor, with an offset of about 10 cm .

It must be remembered these figures do not apply with certainty to the older structure which formerly occupied the position of Room 2 and at least part of Room 1.There is nothing remaining of front walls or piers which can with certainty be assigned to that earlier period, except the end wall of Old Room 2, which extends to the façade, and is about 1.3 m thick. The width of Room 3 varies between 2.1 and 2.2 m and is therefore the same as the others. But the front wall and pier thickness is consistently 90 cm as opposed to an average of 75 cm for Room 1. The vault sprang at the same height, (measured as 2.16 m ). Doorways vary between 1.7 - and $1.8-\mathrm{in}$ width, piers between 1.2 and 1.3 m in close agreement with Room 1, and with Structure J-2.

Room 3 is therefore a little heavier than Rooms 1 and 2 because of its thicker front wall, but all are lighter than Structure J-2, room widths being greater and front wall and pier thicknesses less than in that building. Structure J-6-2nd is the lightest of all because of its fairly light front wall and its wide span.

The partition wall between Rooms 1 and 2 is 70 cm thick, and hid the stump of another (not indicated on
the plan), belonging to the earlier building, which was only 45 cm thick. The wall between Rooms 2 and 3 is 1.3 thick, and was originally the outer end wall of the original Old Room 2.

The length of Room 1 (exclusive of Room 1-a and its stairway) is 15.2 m and that of Room 2 is 7.9 m . The length of Room 1-a is 2.0 m , and its stairway extends 1.6 into Room 1. A single vault roofed Rooms 1-a, 1, and 2, and therefore was 27.2 m long. Room 3 is 11.4 m long, and this was the length of its vault.

The slope of the rear main half-vault at the northeasterly corner of Room 3 is about 23 degrees from vertical (Fig. 3.6 d ), steeper than corresponding slopes in Structure J2, and in J-6-2nd, the first of which had narrower, the second wider, rooms. The capstone height of the latter was probably limited by the terrace level behind.

The slope of the rear half-vault of the niche in Room 1 is about 23 degrees, as measured, and that of the partially standing side vault of the niche at the left (Fig. 3.7e) as measured, is 22 degrees. Using 23 degrees as the slope of the main vault over Rooms 1 and 2 gives a reasonable reconstruction, consistent with known facts, with a vault height of 1.9 m . The vault slope angles are from the vertical.

All these measurements are based on portions of vaults which have been disturbed little, if at all, and, allowing for inequalities in the stone, are probably correct within a degree or two. Possibly it is noteworthy that where artistic effect was probably the principal reason for the vaulting, at the end of Room 3, the slope is steeper (22.5 degrees) than that of the main vault, varying by 5.5 degrees. The end slope was unnecessary from a structural point of view, and could easily have been given a greater angle. We neglected to record the slope at the end of Structure J-6-2nd.

We know that the height of the terrace behind the roof of Room 3 was 4.3 above the Room 3 floor. Assuming 30 cm of exposure of the capstones, the height of the latter was 3.7 m . The difference, 60 cm , is the maximum thickness of the roof over the capstones. However, there was probably a slight roof-slope. If this was as much as 321 degrees from horizontal, the thickness was only 47 cm . A nearly level roof seems here called for, and this reconstruction seems reasonable. These figures give a vault height for Room 3 of 1.5 m . The reader must understand that figures such as these are given to the centimeter without intending to convey an impression of great accuracy.

Reconstruction of Rooms 1 and 2, assuming a 30 cm exposure of capstones, and using the vault slope of the niche in Room 1 ( 23 degrees) indicates a vault height of 1.9 m . If the roof thickness was the same as in the Room 3 reconstruction, the roof of Room 1 and 2 was a little higher. If so, the difference was slight. This
reconstruction of Rooms 1 and 2 yields approximately the same height as a reconstruction of J-6-2nd, assuming 30 cm capstone exposures there also. This is so because the greater width of J-6 2nd is spanned by flatter vaults which were satisfactorily measured as 30 degrees from vertical giving a vault height of 2.1 m .

Reconstruction of the three units, Room 3, Rooms 1 and 2 , and Structure J-6-2nd, assuming a 30 cm capstone exposure throughout, using the measured soffit slopes and measured vault-spring offsets in each, but further assuming a constant roof-thickness of 47 cm for each unit, will bring the total roof height over the centers of the rooms to 4.1 m for Room 3; 4.5 m for Rooms 1 and 2; and 4.57 m for J-6-2nd. Considering the length of the units under discussion and that our check on total roofheight is at one end of the complex (behind the center of Room 3) the maximum difference of 42 cm in theoretical roof heights is small enough to confirm, rather than otherwise, the differences in vault slopes as observed.

The assumptions we were forced to make constant amount of capstone exposure, and constant roofthickness, and the same rain vault slope in Room 1 as in its niche, bring us close to the result called for by surface indications behind and above J-6-2nd and Rooms 1 and 2, i.e., that the roofs of all three units formed, in the end, one continuous surface.

Accepting our guess that the main vault of Room 1 had the same soffit slope as its niche, we have 23 degrees for Rooms 1 and 2, following, unless the vaulting of Old Rooms 1 and 2 was not torn down when Room 1 was constructed in its final form (a possibility), a flatter slope (28 degrees) in Room 3. If the reader will grant, without positive proof, the hypothesis that J-6-2nd, with its much wider room, is later than Room 3, then a fairly flat slope of 30 degrees came next in this case. That is, soffit angles varied in time from 28 degrees to 30 degrees to 23 degrees. The reason in this case is clear, a wide span had to be bridged without carrying the total roof height above the terrace level behind the already existing Old Rooms 1 and 2 and Room 3. Further excavation will determine the actual maximum roof heights of J-6-2nd and Rooms 1 and 2 with more precision.

## Walls, Piers, and Vaults; Masonry

The piers and walls of Room 3 are essentially like those of Structure J-2. But the masonry of the Room 1 piers, with the possible exception of pier 1 on the extreme right (southwest), and its walls as well, differ in that they make a much more consistent use of rather thin slabs, resulting in a greater degree of accidental coursing. Compare Figure 11a and b, with Figure 3.6b and c and Figure 3.7. Notwithstanding the more regular nature of the stone in the Room 1 construction, there seems to be more chinking, than in Structure J-2.

There is a special course just under the vault-spring of Room 1 which consists very largely of small chinking stones, with some small slabs, the function of which was presumably to give the masons an easy means of leveling the top of the vertical wall so that the line of the vaultspring would be straight (Fig. 3.6c). This was the section of a built-on wall carrying maximum load (weight plus vault-thrust). Removal of small parts of ruined vaults on two other palaces (Structure J-8 and J-11) indicates that there was no binding between vault and vertical wall. The vault simply rested on the previously built vertical wall, which presented a level, more or less smooth, surface.

As in Structure J-2. especially heavy stones are freely used at corners in the walls, and they are true cut stone, though the surface is left quite rough (Fig. 3.6c). There seems to be some intentional a binding of corners, especially at the other end of the niche, not shown.

The walls of Structure J-6-2nd are interesting. The rear wall is built of well-selected stones, including some slabs, but for the most part they are blocks, thick in relation to length and depth. Stones are more regular than in Old Room 1 and Room 3, though similar to Old Room 2. There is little chinking. This wall may be seen in the center of the photograph, Figure 3.5 c ; the masonry is more like that of Structure J-2 But the stones are much more regular than in Old Rooms 1 and 2 and in Room 3. Compare this photograph with Figure 3.2a and b, and Figure 3.6c, remembering, however, that the J-6-2nd wall is a retaining as well as vault-supporting wall, while those of Structure J-2 had to stand free.

To the left in Figure 3.5c is the transverse end wall, shown in Figure 3.4 by diagonal cross-hatching. Notice how much cruder the secondary wall is, the stones being very irregular, with no real slabs and much chinking. This wall was put up after the front and rear walls, to which it is not tied, and 1933 work showed it to be a mere retaining wall. It still rises vertically well above the vault-spring, contrary to the general practice of sloping the upper parts of transverse walls, even mere partitions, to conform with the longitudinal vaulting. It is secondary, and Structure J-6-2nd formerly extended 2.2 m farther to the southwest as measured along the rear wall, under the present terracing below Structure J-8, and the original end was sloping above the vault-spring. The wall in question was built to retain the fill with which the end of this J-6-2nd room was blocked, as established in 1933. This wall probably was never exposed at all, though it may have been.

The transverse walls (except the above and the southwesterly end of Room 1-a, but including the two partitions) are vaulted in the sense of sloping out above the vault-spring. This feature was probably merely for effect. The partition between Rooms 1 and 2 was built against the rear wall and main half-vault, and against the
front pier, and presumably against the fallen front halfvault, after the main vaulting was in position. The rooms formed by the partitions are so long that the latter could have had no supporting effect on the vault as a whole.

The vault facing itself, here as in all examples observed at the city, is constructed of thin broad slabs laid in mortar and probably represents more or less true corbelling (Fig. $3.6 \mathrm{c}-\mathrm{e}$ ), but in the interior much reliance was placed on the mortar. The exposed edges of the vault slabs were rough and at least for the most part not beveled, the unevenness being covered by the plaster (Fig. 3.6d).

The main vaults, observed in Rooms 1 and 3, and in J-6-2nd, have an offset at the vault-spring of about 10 cm; that of Room 1-a has none. Here as elsewhere in the city it is evident that the offset was not necessary in erecting the vaults of the palaces.

In the remnant of the rear half-vault at the northeasterly end of Room, 3 is a beam-hole, preserving the upper half of the mortar cast of the beam. The diameter of the beam was 8.5 cm and the cast itself extends 25 cm into the interior of the vault. Beyond this is an irregular hole of about the same diameter which permitted the insertion of a stick a total distance of 1.3 m . This is in conformity with the findings of Mr. Roys in the northern cities (Roys 1934:50), which indicate that the beams were inserted to considerable depths. The top and bottom of this hole are simply the flat surfaces of vault slabs, and if the mortar forming the sides of the cast fell out it would be rectangular. A number of such rectangular openings occur in other Acropolis vaults, and doubtless they are all beam-sockets. This one is placed 55 cm above the vault-spring (vertical measurement) and 85 cm from the vertical portion of the end wall. (see white arrow, Fig. 3.6d).

The masons at this city showed considerable evidence of getting desired results with a minimum of labor. Where as here thinly stratified slabs are available, a thick plaster finish was all that was necessary to smooth over a vault and they did not bevel the edges of their vault-slabs. The idea, however, was not foreign to them. In the sidevaulting of the niche for some reason (strength over an unusually deep offset?) they used much thicker slabs, and these they roughly but definitely beveled (Fig. 3.7e).

An interesting structural feature occurs in the lowest of these slabs. It forms an unusually deep off-set $(20 \mathrm{~cm})$ and is a specialized squared slab 90 cm long, of which 70 cm is in the wall at the side of the niche. It is also of a width greater than the depth of the niche, so that it covers the inner corner and extends into the rear wall of the niche. The corresponding stone on the other side is exposed completely, though the outer corner has broken off (marked by the arrow, Fig. 3.7e). Both are very much longer than any other stones in the wall and
both are neatly worked and are specialized stones. The rear vaulting of this niche has no offset at the spring.

In this building, as in Structure J-22, we encountered what are undoubtedly specialized capstones. The are slabs, larger than those common in the vault-facing, and are further distinguished by having the two longer sides (and sometimes the ends) roughly worked. This was undoubtedly to get the two sides roughly parallel and assure a reasonably tight fit between capstones. Vaultfacing slabs are rough-worked to one straight edge only, the buried ends and back edges being irregular in the extreme. This is the case everywhere in the city so far as we know.

## Floors

The floors of all rooms are of concrete, resting directly on the fills, and covered with plaster and a final coat of white finishing plaster. J-6-2nd was no exception, except that here the foundation fill was solid. The bottom of the floor of Room 1 was fairly hard. The concrete evidently contained some iron compound, as it was a rusty yellow. The concrete of the floor of Room 1-a was not discolored, and was softer. In neither was there any evidence of the thick layers of clay superimposed on the concrete and under the plaster, as observed at one point only on Structure J-2.

The floor of J-6-2nd is continuous with that of J-6, but most of its finishing plaster had disappeared.

## Fills

An excavation about 50 cm deep in and in front of the niche of Room 1 showed that the foundation is a fill of fairly large, pure broken rock.

All of Room 1-a was removed, showing that its floor and stairway rested on a continuous pure rock fill of small-stones mixed with larger. The stones rolled out when supporting masses at the side had been removed to a sufficient depth, and were therefore not laid up stone by stone, as seems to have been the case in many fills of consistently large stones. A section through the rear of the floor and supporting fill of Room 1-a is marked " h " in white ink on Figure 3.2b.

This fill rested on the floor of Structure J-6-2nd, which is continuous, except for finishing plaster, with that of J-6. It was retained at the southeast by the front wall of J-6-2nd, also continuous with that of J-6. At the southwest (rear of Room 1-a and end of the building) it rested against a very crude sloping transverse wall and fill behind it, the lowest meter of which projects 50 cm beyond the upper part. The relation between Room 1a and its foundation, taken as a unit, and the transverse wall and its fill, also taken as a unit, is shown in Section E-F, Figure 3.4. The room construction is shown in solid black, the wall and the fill to the southwest which
it retains is shown in hatching, the lines descending to the right. The primary function of this transverse wall was to retain the fill to the southwest. The wall is again shown in section in Figure 3.5, B and C, and is marked in each case by the white letter " $g$." Notice that the chamber fill (h) passes between the terrace of the retaining wall (g) and the bottom of the rear or end wall ( j ) of the chamber (Room 1-a). That is, the floor was completely built before the erection of the chamber end wall, although it would have been easy to have carried the end wall down about 30 cm to rest directly on the projection of the retaining wall ( g ), with a consequent special foundation reaching clear to the main floor level. This tends to confirm the evidence on Structure J-2 that the practice was to lay floors complete, and then to erect walls upon them, as in other areas.

The side or northwesterly wall of Room 1-a, marked (i) in the photographs, like the rear or end wall, rose from its elevated floor level and not from the main floor level 1.5 m below. The fill under the Room 1-a floor, as well as the projecting lower portion of the crude retaining wall, passes under the side wall (i, Fig. 3.5c) for an undetermined distance into the hearting to the northwest, straddling the lowest courses of the rear wall of Structure J-6-2nd (Fig. 3.6a). In the plan, Figure 3.4, the crude retaining wall and its fill, shown as one unit by diagonal hatching, and the rearward extension of the fill under the chamber shown by rectangular cross-hatching, stop at the wall of J-6-2nd, because the plane of the horizontal section here cut through them in considered as very close to the main floor, in order to show the J-2nd wall, here only about 30 cm high. Both pass over this wall above this level.

In Figure 3.6b, all of Room 1-a has been removed, and only the first and second step of its stairway, seen from behind, i.e., from the south, remain in place, in the right foreground. Although the rear wall of Room 1 and the northwesterly side wall of Room 1-a were continuous, as soon as the stairway was passed the bottom of the wall shifted from the main floor level to that of Room 1-a, a labor-saving arrangement. In the plate the unfinished end of the full-height portion is shown as the builders left it. We have only removed the fill which covered it.

The continuation of this wall at the higher level, to form the side wall of Room 1-a, had been removed when the photograph (Fig. 3.6b) was taken, but the slab-and-mortar construction on which it rested is left hanging in mid-air. The small broken-rock fill below the latter, continuous with that under the floor of Room 1-a, has rolled out for some distance into the interior. The cross-section (Fig. 3.6a) is cut through the middle of the construction shown in Figure 3.6b.

It is evident from the ending of the full-height portion of the main rear wall in an unfinished state at the
point indicated, while it continued at the higher level to form the side wall of Room 1-a, that the two rooms were designed and built as a unit. The inference is confirmed by the absence of any break in the continuous line of well-preserved masonry between the rear or end wall of Room 1-a and the niche of Room 1. The fact that there was no offset at the spring of the vault in Room 1-a is not good evidence of its later construction, since in Structure J-9, immediately above, a 10 cm offset occurs at one point, but gradually disappears 2-3 m further along in the same room. Its presence in Room 1 and absence in the tiny dark chamber suggests that its function, at least at this period, was an esthetic or traditional one. This need not always be the case, as its use helps to reduce vaultheight.

The small chamber is certainly not a secondary feature, as we at first supposed it might be.

The reason for the elevation of the floor is hard to understand. The fill under it covered or contained nothing.

The side wall of Room 1-a (i.e., the southwesterly projection of the rear wall of Room 1, at and above the 1.5 m level) rested against and probably was more or less tied into a solid backing of mortar and slabs, as shown in Figure 3.6a, b. This hearting was so strong that what we left of it remained hanging in the air after the rock fill below had rolled out for a distance of 1.5 m toward the interior (Fig. 3.6b). The same construction was observed behind the niche of Room 1, at and above the level of the vault-spring, and also behind the half-vault of J-6-2nd. It is therefore probable that the rear half-vault of all units of the building, and the upper part of its supporting vertical wall, were tied to a solid mass of masonry hearting behind. This probably accounts for the fact that the rear wall of each room of Structure J-6 was standing to the height of the vault-spring, or higher, throughout most of its length.

This construction is one of several observed instances of mortar and stone masonry apparently used as mere hearting, but always in this situation. The usual thing at Piedras Negras is a pure rock fill; occasional rock-andearth fills are used in connection with it. It differs from Yucatecan mortar-and-rubble fills in its use of thick slabs rather than irregular broken rock and is essentially similar to interior vault construction. It seems to occur here only in this position in built-on buildings, and is apparently a conscious use of the cantilever principle for the rear halfvault. The situation is the same in J-6-2nd, rooms 1 and 3 of J-6, and in J-22, another built-on palace, and these are the only cases yet encountered.

The heartings of both benches in Room 1 are pure broken rock.

The fill behind or southwest of the crude transverse retaining wall, immediately southwest of Room 1-
a above referred to, was complex. In Figure 3.5b is a cross-section through it. The wall is shown by the white letter (g) as already noted. The units of the fill shown are indicated by (b), (b'), (c), (d), (e) and (f). The white letter (a) marks the broken down front wall common to Structures J-6 and J-6-2nd, across which the photograph was taken. The letters indicate the sequence of erection of the units marked, except that the wall ( g ) must have been carried up as the fill units rose in height.

The lowest meter (b) consisted of a pure rock fill of varying sized stores, from small to quite large, resting on the floor of Structure J-6-2nd. Large but irregular stones (b') were consistently selected to back the lower projecting terrace of the wall to which this level corresponds. This was possibly done to give firm support to the set-back upper portion of the wall, directly above, which has no such special backing. Such foresight is contrary to the general rule, and. more probably the large stones (b') held back all of the fill (b) temporarily, the lower portion of the wall $(\mathrm{g})$ being erected last as a unit.

On this unit of fill was placed a layer of much smaller broken rock, also without binding material, about 60 cm thick, (c). This supported a layer of larger irregular stone, about 45 cm thick, which had apparently been mixed with some poor-quality mortar (d). On this was a 20 cm layer of small broken stone, apparently the remains of poor concrete (e). At the 2.3 m level began a layer of medium-sized broken stone, probably originally a coarse rock fill, but with earth washed into it from above (f). The thickness was about 75 cm though this layer has largely fallen. Masses of falling pure rock fill, not shown on the plate, showed that the layer " $f$ " had been covered with pure rock fill of smaller stone, which in all probability supported the terrace floor above, which we suppose was continuous with the roof of Structure J-6.

At the higher levels, to the rear, we encountered the same slab and mortar type of hearting as seen behind the niche of Room 1 and the side wall of Room 1-a. In those cases it must have been placed after the demolition of Structure J-6-2nd. In this case (southwest of the crude retaining wall) it almost certainly had backed the rear half vault of Structure J-6-2nd. This type of hearting was therefore probably in use for the same purpose, at the time of erection of the earlier building.

The fill behind the crude retaining wall is the first of such complexity observed at the city, and especially it includes the first reasonably certain evidence of the spreading of layers of concrete through hearting material. It had not been observed elsewhere up to the end of the 1934 season.

The fill behind the rear wall of Room 3, below the level of the vaults, is small pure broken rock, lying against an earlier plastered terrace which is the base of
the northeasterly end of the substructure of Structure J9. The floor rests on that of Structure J-7, which formerly passed, with small platforms on its surface, below the J9 substructure an unknown distance into the interior. The fills below Room 3 are, therefore, those of earlier buildings. They are in general pure broken rock.

## Stairways

A fair impression of the construction of the interior stairway in Room 1 may be obtained from the photographs, Figure 3.6b and Figure 3.7b. Each riser is a wall of slabs, of a depth less than that of the tread. The uppermost rather thin slab which forms the tread is much deeper, so that it extends a short distance under the riser wall of the next higher step. The steps are thus tied together. This was not done, or at least was not done consistently, on the megalithic flight of the main outside stairway.

Treads and risers simply rest on pure broken rock fill, with a few selected slabs or large stones immediately under them, except that a little concrete is used at the rear of the risers, perhaps to level up the treads and to get a grip on the irregular surface of the fill.

We did not trench the main outer stairway. The upper flight rests on pure rock fill which was exposed at one or two points. The stones of the fill, observed only near the surface, were small.

## Sequence of Construction of Room 1

We can reconstruct in some detail the steps preceding the erection of the visible walls of Structure J-6, at the southwesterly end. The vault of J-6-2nd, whether standing or collapsed, was completely removed, except to the southwest, where it already had been, or was now filled up, with a vertical transverse wall to retain the fill. The front vertical wall was allowed to stand, probably to full height, as were probably the two southwesterly piers, perhaps others. For no visible reason, the rear wall was largely removed, perhaps for its stone, which was not, however, used again here. However, the lowest two or three courses were left in place, and this demolition was carried to the southwest only to a point about 4 m from the end, where the wall still rises to full height, with a remnant of the vault. This demolition was just about sufficient to permit the later erection of the crude sloping transverse retaining wall, and to extend it beyond the old building into the hearting to the rear or northwest, with little room to spare (Fig. 3.5c).

Then commenced the erection of the crude retaining wall and its complex fill. The fill was surrounded on three sides by well-preserved walls of the older structure and on the fourth by the new retaining wall. Its largest diameter was only 2.9 m and the reason for its complexity is not clear. It apparently supported nothing but a floor or roof above, and its strength must have been less than the usual
well-laid homogeneous pure rock fill of large stones.
When this fill and its wall were ready, the erection of Room 1 began. The main rear or northwest wall of the new structure (Room 1) with its niche was erected on the floor of the old, and ended at the southwest at a point just beyond the future position of the top step of the stairway to Room 1-a. A little beyond the niche, in the other direction, it was made to overlap and merge into the rear wall of another old building Old Rooms 1 and 2. Next, the fill, stairway and elevated floor of Room 1 -a were constructed, or, if begun before, were now completed. Next, the main rear wall was extended, but only on this higher level, to form the northwesterly side of Room 1-a. In the meantime, unless remaining front wall and piers of J-6-2nd sufficed, new piers had been erected. The transverse or end wall of Room 1-a was not built until the vault was in place, since the end of the northwesterly wall and vault was found in contact with the crude retaining wall, passing across the end of the transverse wall. This had no structural function whatever.

We can say with some degree of assurance that the niche of Throne 1 was built as part of the rear wall of Room 1, and if so, its vaults were also completed as part of the erection of the main vault at that point.

The partition walls between Rooms 1 and 2 were erected after the main vault over Rooms 1 and 2, but probably directly after. This final partition and its transverse ornamental vaulting was probably erected as part of the Throne Room construction, since otherwise the stub of the earlier thin partition wall at this point would have projected into the room. The only alternative is that the very thin old partition was not disturbed until later, which is unlikely, or that the partition and Room 1 were originally part of J-6-2nd. Room 1, the Throne Room, was therefore always as we found it. The L-shaped bench, of course, post-dates the final partition against which it is partly built, and may therefore either be part of the original plan or an afterthought. Finishing plaster of the floor occurs under this bench, but may date from Old Room 1. The same might be said of the throne and its supporting bench so far as structural necessity goes. But, in our opinion at least, the harmony of design of niche and throne taken together, and the unusual character of both, make it highly probable that the throne was installed as soon as the building was completed, and thus dates the whole process here discussed. Finishing plaster also occurs on the floor under this bench but nay easily date from earlier times, as belonging either to J-6-2nd or Old Room 1. It is of course possible that the throne replaced an original masonry bench extending out into the room, and serving the same function, or perhaps an earlier seatthrone of this type, though hardly the one shown on "Lintel" 3. But these are mere logical possibilities, and
there is no reason for denying the probability that the throne approximately dates the whole of Room 1 in its final form.

## Conclusions

Building Periods in Court 1
If we may be permitted to drag in Structure J-9, a PlanType 2 palace, the substructure of which (at least at its northeasterly end) descends behind Room 3 of J-6, we have under consideration no less than eleven buildings, units, and complexes. They are, with temporary designations where necessary, the following:

A: J-2 Sub: the buried floor under Court 1 and buried platforms under Structure J-2. J-2 palace proper, Rooms 1 to 4 of Structure J-2. Rooms 5 and 6 of J-2.

B: J-7 Sub-2, the lowest known building level below J-7, J-9, and Room 3 of J-6.
J-7 Sub-1, the upper building level below J-7, J9, and Room 3 of J-6.
J -7, the platform which runs under Room 3 of J-62 and under J-9.
J-9, the type 1 palace behind Structure J-6.
C: Old Rooms 1 and 2 of J-6, the (as we think) dismantled structure the floor and rear wall of which was used for Room 2 and part of Room 1 of Structure J-6.
Room 3 of J-6, the room which was built against the northeasterly end of Old Rooms 1 and 2.

## D: J-6-2nd.

Room 1 of J-6, which is partly in front of the rear wall of J-6-2nd, and which used part of its front wall and part of the rear wall of Old Room 1, as its own.

We know positively from superpositions and juxtapositions that the units of Groups A to D above belong, within each group, in the chronological order in which they are set down. We can make only a partially successful effort to out across these groups. With resources for plenty of deep trenching we could probably date all eleven units with reference to each other, and very probably tie into the series many of the buildings in Courts 2 and 3, and, no less important, the pyramids $\mathrm{J}-3$ and J-4.

Room 3 of J-6 is certainly later than the substructure and apparently the floor of J-9, at its northeasterly end at least, because the J-9 substructure runs down behind Room 3. We have not made the cuts to prove it, but
there is every reason to suppose that Old Rooms 1 and 2 of J-6, and therefore Room 1 and also J-6-2nd, stand in the same relation to J-9. We therefore join Group C to the bottom of Group B, the asterisk indicating the only doubtful case in the series:

```
J-7 Sub 2
J-7 Sub 1
J-7
J-9
Old Rooms 1 and 2 of J-6*
Room 3 of J-6.
```

In passing to Group D we deal frankly with probabilities, but they are worth-while because they tell us where to look for proof or disproof. Room 1 of Structure J-6 is known to be later than Old Rooms 1 and 2; and further, Room 1 used part of the front façade of J-$6-2 \mathrm{nd}$. Our best guess is that these last two stick together, Rooms 1 and 2 immediately following J-6-2nd because of the markedly similar slab masonry occurring in both, to the exclusion of other walls. This gives a slightly different series, with the same degree of probability for Old Rooms 1 and 2, indicated by one asterisk, but with less certainty indicated by two asterisks for J-6-2nd, because one probability is founded on another in that case, the position of Old Rooms 1 and 2 (in the list above) and the assumed chronological juxtaposition of J-6-2nd and Room 1 of J-6. Room 1 carries only one asterisk because there is the same probability that it post-dates Structure 9, as in the case of Old Rooms 1 and 2, and it certainly post-dates J-6-2nd.

$$
\begin{aligned}
& \text { J-7 Sub } 2 \\
& \text { J-7 Sub } 1 \\
& \text { J-7 } \\
& \text { J-9 } \\
& \text { Old Rooms } 1 \text { and } 2 \text { of J-6* } \\
& \text { J-6-2nd** } \\
& \text { Room } 1 \text { of J-6* }
\end{aligned}
$$

## Vault-Span Ratios

Now we will bring in another sort of probability, the assumption that in vaulted buildings, other considerations being equal, there was in operation a tendency to widen rooms and make outer walls thinner, resulting in the first case in more room, in the second in more light and air and less labor in quarrying stone and burning lime. Such an assumption is orthodox enough in discussions of vaulted architecture in general, but needs corroboration when applied to particular buildings. Other things were apparently equal in the cases of Structures J-2 (Palace Proper), J-9, J-6-2nd, and Room 3 of J-6, and probably in
the case of Old Rooms 1 and 2. The first four of the above were roofed with the masonry vault, and could have been made wider or narrower. In the case of Room 1 of J-6 and Rooms 5 and 6 of J-2, also vaulted, the dimensions were dictated by prior factors. At least part of the front wall of Room 1 is the front wall of an earlier building, which thus determined the front wall thickness, and its position. Part of its rear wall is part of another earlier building (Old Room 2). The position of these two earlier buildings thus determined both the wall thickness and the span, which thus lose chronological significance, which must be founded essentially on technical ability as the limiting factor on these dimensions.

Similarly, the rear wall of Room 6 of J-2 is in part the wall of an earlier structure, while the position of its front wall was determined by the necessity of running it across the end of the Palace Proper, already in position. These facts were determined in 1933. The thickness of the front wall of Room 5 was determined by preexisting heavy piers, as we have seen. These two rooms form one contemporaneous unit.

Table 3.2 Index of Wall Thickness and Room Width, Structures J-2, J-6, and J-9

| Structure | Index | Wall | Span |
| :--- | :--- | :--- | :--- |
| J-9 | 0.69 | 1.16 | 1.73 |
| J-2 Palace Proper | 0.62 | 1.05 | 1.70 |
| Room 3 of J-6 | 0.42 | 0.90 | 2.15 |
| J-6-2nd | 0.26 | 0.75 | 2.90 |
| J-6 Room 1 | 0.36 | 0.75 | 2.10 |
| J-2 Room 6 | 0.30 | 0.50 | 1.65 |

In Table 3.2 we have divided the front wall thickness by the width of the front room to give an index of weight, also setting down these two measurements for separate comparison. Where two rooms of a unit yield different percentages, we take the lowest. The same sequence is reached whether the two dimensions are combined in the index or not except for the two units below the line, which as we have seen, are composites using old walls.

The sequence [in Table 3.3] includes all the vaulted units of which we know in Court 1 together with Structure J-9 on Court 2, in which the front wall or pier thickness and the span are known. Piers and, therefore, the span of Old Rooms 1 and 2 are not known. We believe in all probability the sequence is a truly chronological one, except that the last two units may very well be contemporary, or possibly should exchange places, the one with the other. Despite the confusing fact that in both these last two units the builders were not free to
build as lightly as they may then have been able, we know that Room 1 of J-6 is later than J-6-2nd, and that it is very intimately associated with Throne 1 which carries a late date (9.17.15.0.0); and not only that Room 6 of $\mathrm{J}-2$ is later than J-2 Palace Proper but that it has as thin a front wall as is known in any vaulted building at the city. Therefore, the J-6 unit (Room 1) and the J-2 unit (Rooms 5 and 6) in all probability belong below J-6-2nd in the above table, from a chronological standpoint.

It should be noted that the above sequence, which is based on the front-wall-thickness to span ratio, with adjustment only for obvious external factors, nowhere does violence to various partial sequences which we have been able to establish from superimpositions, not to inscriptional evidence, but is in harmony with them.

Now if we can eventually gain confidence that the wall-thickness-span ratios in the above list really do indicate the passage of time, we can use them to bridge the gap to Structure J-2. Assuming the validity of these indices. with the exceptions noted, removing the asterisks where this criterion is available; and further assuming, from the indications in four deep excavations and from surface data mentioned below, that vaulted buildings are not going to appear in future sub-surface work, we can combine our various lists and set up building periods and episodes for this court as follows:

Pre-Vault Period<br>1. J-2-Sub (Directly over bedrock, fronts West Group plaza)<br>J-7-Sub-2 (lowest level reached here, probably lies on bedrock.)<br>2. J-7-Sub-1<br>3. J- 7

Vault Period
4. J-9
5. J-2 Palace proper (Rooms 1 to 4)
6. Old Rooms 1 and 2 of J-6*
7. Room 3 of J-6
8. J-6-2nd
9. Room 1 of J-6 (With Throne 1. 9.17.15.0.0) Rooms 5 and 6 of J-2*

On our assumptions, plus known superpositions and juxtapositions, Old Rooms 1 and 2 might have been in fifth place instead of sixth. They belong after fourth place with practically no doubt, because of position. They cannot go beyond the sixth place, as assigned, without dragging Room 3 with them, and this would vitiate the assumption that, extraneous factors being absent, walls were made thinner or spans greater, as time went on. The position given requires the assumption that the piers and vault of this unit were torn down and rebuilt, for which there is some evidence, as we

Table 3.3 Cross Section and Façade Measurements, Structures 2, 6, and 9

| Structure | J-9 | J-2 | J-6 |  | J-6 | J-2 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Room 1-4 | Room 3 | J-6-2 ${ }^{\text {nd }}$ | Room 1 | Room 6 |
| Walls |  |  |  |  |  |  |
| Front | 1.3 | 1.1 | 0.9 | 0.8 | 0.8 | 0.5 |
| Medial | 1.1 | 0.9 | X | X | X | X |
| Rear | 1.2 | 1.0 | X | X | X | X |
| Rooms |  |  |  |  |  |  |
| Front | 1.7 | 1.7 | 2.1 | 2.9 | 2.1 | 1.7 |
| Rear | 1.7 | 1.7 | X | X | X |  |
| Spring-Height | 2.1 | $2.5 *$ | 2.2 | 2.0 | 2.2 | 2.5 |
| Vault-Height | 1.2 | 0.9* | 1.5* | $2.1 *$ | 1.9* | 1.0 |
| Soffit-Angle | 28 | 34 | 28 | 30 | $23 *$ | 32 |
| Thickness | 0.9* | 0.7* | 0.5* | 0.5* | 0.5* | 0.6* |
| Over Capstones |  |  |  |  |  |  |
| Doorways |  |  |  |  |  |  |
| Outer Max. | 1.8 | 1.8 | 1.8 | ? | 1.7 | 1.3 |
| Outer Min. | 1.3 | 1.4 | 1.7 | ? | 1.7 | X |
| Inner Max. | 1.5 | 1.6 | X | ? | X | X |
| Inner Min. | 0.8 | 1.2 | X | ? | X | X |
| Pier Width |  |  |  |  |  |  |
| Max. | 1.7 ? | 1.3 | 1.3 | ? | 1.3 | X |
| Min. | 1.1 | 1.2 | 1.2 | ? | 1.2 | X |
| Average | 1.5 | 1.2 | 1.8 | ? | 1.5 | $1.75 * *$ |
| Debris |  |  |  |  |  |  |
| Depth |  |  |  |  |  |  |
| Indices (\%) |  |  |  |  |  |  |
| A | 69 | 59 | 43 | 26 | 36 | 30 |
| B | 51 | 47 | X | X | X | X |
| C | 31 | 27 | X | X | X | X |

*Asterisk indicates measurement on a theoretical restoration based on data believed sufficient for close approximations.
${ }^{* *}$ Double asterisk indicates approximation where measurement was not made.
have seen, and none to the contrary; or that Room 2 in final form was a composite of old and new vaulting of differing spans, which, as we have seen, is not unreasonable.

Rooms 5 and 6 of J- 2 are placed last because Room 6 has the thinnest wall in the city. This is not considered so sure a test as the index reflecting both wall and span. The index of this room would allow this unit to take eighth or ninth place. It is known to be after the fifth place, by superposition. It is quite probable that this unit was
contemporary with Room 1 of J-6. These are the only two units which occasioned the partial destruction of earlier buildings. For this reason we place both in the ninth supposed episode.

Old Rooms 1 and 2 of J-6 form the weak link in the chain. But the greater ruin of this unit requires evidence to be weak here. In any case the reader will understand that the above sequence is a tentative first attempt, and subject to revision.

Structure J-9 is the heaviest of all the palaces on the Acropolis, and next to the heaviest of all vaulted buildings at the city, and J-2 comes next in this respect. On the other hand, J-6-2nd is next to the lightest palace, with a span equal to the lightest, and Room 1 of J-6 came after it. But the heavy J-9 is later than at least three building levels under it, and J-2 later than a complex below it. Putting these indications together we may surmise that the two structures which are the principal subjects of this report belong close to the extremes in the chronological sequence of vaulted palaces of the city, which we hope eventually to work out, though the earliest, Structure J2 , dates from well after the founding of the city.

It is interesting to note that the colonnade or open gallery characterizes both, and that comparable piers and doorways of both are practically identical in their respective widths, the only change being in thickness of the piers. Among the other palaces of both types, which we hope to present in a later report, there is one outer doorway 2.16 m in width, but this is exceptional, apparently, in its building ( Structure J-18). There is one in Structure J-8 which measures 1.8 m in width, and another in J-11 of 1.89 m . All other known outer doorways in the entire series of palace buildings on the Acropolis are 1.8 m or less in width. In only three buildings do outer doorway measurements drop below 1.5 m in Structures J-9, J-2 (end room) and Rooms 5 and 6 of J-2. In all of these wider doorways also occur. Pier widths vary but little, the extreme being 1.12 m in Structure J-9 and 1.6 m in Structure J-23. It is, therefore, clear that in this class of vaulted building, lintel spans and pier widths remained essentially constant. Doorways were not greatly widened for more light and air, or other cause, as time went on. It follows that in studying these buildings, we do not need to discount the weakening effect of wider doorways or narrow piers as a possible inhibiting factor on thinner outer walls and greater vault spans, and the chronological significance of changes in them becomes the more probable. Neither is there reason to suspect roof combs in either of the structures here discussed, or in any of the other palaces.

## Miscellaneous

When one considers the positions of Structure J-2 and of J-6 in its various units and in its final form, it is easy to see why one is double-ranged and the other not, and why the latter lacks the end rooms. However, stripping off the rear gallery and end rooms of the J-2 Palace, for purposes of comparison, J-6 differs in being cut up into three rooms. One of these partitions comes from an old building, but that between Rooms 1 and 2 did not. And the older building was partitioned. Room 1 itself differs from anything else in either building in having a bench at one end, the niche and throne, and the peculiar

Room 1-a at the other end. We are probably justified in supposing Room 1 to have been designed especially for ceremonial affairs, but there is no reason to suppose that Rooms 2 and 3 did not serve the same general function as all those of Structure J-2, whatever that was. The only real differences are in the lengths of the rooms. There was apparently no structural need for cutting the addition to J-2 (Rooms 5 and 6) into two rooms. Their purposes were probably subordinate to that of the palace proper. In all but the Throne Room of J-6, and in all those of J2 , benches or other permanent interior constructions at floor level were entirely absent.

It is perhaps permissible to note, in an informal and preliminary report such as this, what has already been suggested in the foregoing table, that, taking the hint from these two operations, we are working on a hypothesis that vaulted buildings at Piedras Negras did not date back to the founding of the city. A good deal of deep digging must precede definite knowledge on this point. Surface hints are various. Among them is the presence of Structure J-12 on Court 2 of the Acropolis, which duplicates in all essentials the typical plans of the double-ranged Plan-Type 1 palaces, but lacked the masonry vault; and the presence in the Southeast Section of long single-range open galleries, also without the vault, essentially like Structure J-6, except that they are freestanding. Speaking generally, there is little in the plans of vaulted palaces, apart from end rooms and the special features of the J-6 Throne Room, and apart from secondary modifications, which is not duplicated in non-vaulted buildings still extant at the end of the city's history.

What deep-digging has been done, in Structures O13, K-5, R-3 (all pyramids) and here in Court 1 of the Acropolis under palaces, is in harmony with this general hypothesis. We believe, then, though we are not yet ready to prove, that while the two buildings which are the main subject of this report differ considerably in age, they both, along with all other vaulted structures of the city, followed a period when vaults were unknown, or at least not used.

These palaces are essentially the same in plan as the palace buildings at Palenque, with the addition of transverse end rooms, so common in the Petén and in the New Empire. They differ in many ways from anything at Yaxchilan, though it is probable that some of the buildings there served the same purpose. It is fortunate that so much is standing at Palenque and Yaxchilan for, with completion of excavations at Piedras Negras, detailed comparisons of the fundamentals of the vaulted architecture of the three principal Usumacinta cities will be possible. For knowledge of non-vaulted units, excavation appears to be usually necessary, and we have made but a beginning on this.

Appended is a summary table giving various measurements in the vaulted units covered in this paper, and also in J-9, which has been brought into relation to them. At the bottom are three indices designed to assist in tracing the development of vaulting. That in row A has already been referred to and is obtained by dividing the outer wall thickness by the adjacent room width or span. These measurements are on cross-section through the main units concerned, i.e., the end rooms of the original palace J-2 (Rooms 3 and 4) are excluded.

The index in row B (applicable only to Structures $\mathrm{J}-9$ and $\mathrm{J}-2$ ) is obtained by dividing the sum of the front and rear room widths, plus the front, medial, and rear wall thicknesses by the sum of the three walls thickness, expressing the percentage on the cross-section occupied by the walls. It has little meaning here, but when figured for all the double-range palaces, this index will be found not to disagree with the first, though it does not always vary from one building to the next, while the index of row A does.

The index in row C is obtained by dividing the medial wall thickness by the sum of the front and rear room widths. This again, when figured for all the doublerange palaces, with minor variations of one and two per cent, varies in harmony with the index of row A. That is, if Index A is less for one building than another, Index C is also less, or nearly identical. The absolute variations in medial walls are not so great as in outer walls, and this index, therefore, does not change to so great an extent as does Index A. This is why Index B, which covers the data reflected in both A and C. does not vary with so much delicacy as A. It seems best, therefore, to use A and C separately, in dealing with double-range buildings. Index A is the only one available if double-range buildings are to be compared with single-range buildings.

We should note that in figuring Index A, where, as in the "palace proper" of J-2, there are four rooms to be considered, we have disregarded the end rooms. This is because they are so short that the vault problem may have been easier there than elsewhere. On the other hand, in dealing with comparable rooms, we select that room of a building giving the lowest index, as representing the hardest problem actually solved. For Structure J-9 we use the rear room, the front giving a heavier index of 75 per cent. For J-2 we use the rear room also the front yielding an index of 65 instead of 59. Similarly for the addition to J-2 we disregard the heavy Room 5, its heavy index obviously resulting from the thick pier of an earlier building which is used in its wall.

It is interesting to note that in both the doublerange palaces represented in the table, the outer walls are thicker than the medial wall. From the point of view of merely resisting the downward weight of the vaults we should expect the reverse, since the medial wall supports a double half-vault which, without any
question, was heavier than either outer half-vault. The thicker outer walls might be due to either of two factors, or a combination of them: the fact that the outer walls in both buildings are much cut up by doorways, so that short sections of wall do double duty as piers; or the fact that they must resist side-thrusts as well as mere downward pressure. As a matter of fact, in examining the other double-range vaulted palaces as a group we find that with two exceptions (and those not the lightest) the piers always occur, and the doorways of the other palaces are wider, if anything. Yet in those buildings, the outer wall thicknesses (if we follow the order of our indices) come down to equal those of the medial walls, and then in the two lightest they are thinner than the medial walls. For this reason it seems to the writer probable that the outer walls in these two buildings are thicker than the inner ones perhaps partly because of piers, but also partly because side-thrusts are being allowed for.

It will be noted in the figures for debris depth, that the built-on buildings showed a slightly deeper deposit. This was observed throughout the Acropolis. The figure given is the average of two measurements inside the room, at front and rear walls, on a cross-section near an outer doorway and where vaults are completely fallen. They are approximations, of course, but care has been taken to select comparable parts of each ruin for measurement. Nowhere among the Acropolis palaces does the debris depth give any basis for supposition that roof-combs of any size were placed on these buildings, and this is in agreement with what we know of the Palenque palaces.

The Piedras Negras palaces are on a hill, which has greatly affected their arrangement. At Palenque the palaces (and the temples) appear to rise on largely artificial substructures placed in a relatively flat area. Apart from this, the Piedras Negras palaces themselves seem to have much greater affinity with Palenque than with Yaxchilan. This is seen in size, basic plan, absence of interior buttresses, and especially in wide doorways with wooden lintels as opposed to the narrower doorways with stone lintels which characterize most of the Yaxchilan buildings. The two double-range Piedras Negras palaces discussed in this paper, however, seem to be much less advanced structurally than any in the palace group at Palenque, having both thicker walls and narrower rooms. To come to a definite conclusion on such a point as this, however, requires an elaborate analysis of all the buildings at both cities.

## Notes

1. In the Southeast Section this plan-type occurs in freestanding, buildings, but without the vaulted roof, in two known examples, Structures S-17 and S-18.
2. Subsequent excavations prove this surmise to have been correct in a sense, the Room 6 vault turns a right angle at the front end.
3. A vault thus turning a right angle is well preserved in Structure J-8 finished in smooth plaster, the floors, at least, polished.
4. During the 1933 excavations this supposed step was found to be one side of an open slab-lined drain, running parallel to the rear to cover a distance of 9.5 m to the doorway of Room 6. Here the water entered a covered drain which passed under this doorway, curves below the floor to pass under the doorway connecting Rooms 5 and 6; it makes a reverse curve under the outer doorway of Room 6 in order to discharge on the terraces just to the southwest of the great stairway at the front. The covered drain varies between 20 and 30 cm in width and is about 50 cm in height. It was roofed with slabs. It is nicely graded. It is definitely later than the palace proper (Rooms 1 to 4) and was undoubtedly built when Rooms 5 and 6 were added. They would otherwise have completely blocked drainage at this end. At the other end of the palace, which was always open, there is no drain.
5. In 1933 a fair collection of sherds was secured from the bedrock below this building.
6. A photograph of a cross-section of the medial wall will be published in the final report, and can be had in the meantime on request (Cat.No.33-43).
7. Subsequent excavations indicate a universal practice of first laying the complete floor, really a low platform, and then erecting the walls and piers on the floor.
8. A careful final plan has been since made for final publication. To complete the plan used here, follow directions in the Preliminary Note of this paper.
9. Large detail photographs of the glyphs have been made at the Museum and are available to epigraphists.
10. The lintel spans on all the Piedras Negras palaces, plus excavation of at least one doorway in each, leave little doubt that wooden lintels were the rule, and probably universal, for all outer doorways. We have evidence on hand tending to show that stone lintels at this city were confined to a special type of small building and to one pyramid temple.

## 1. Pottery Vessels, Mary Butler

## Introduction

The terms used are defined as follows:

The pottery from Piedras Negras consists of that from general excavation, of value mainly for comparative study, and that from test pits which were dug for the purpose of trying to establish a ceramic sequence. Half of the pottery recovered during the field seasons of 1931 and 1932 is in the museum at Guatemala City; half is on loan at the University Museum in Philadelphia. This paper is based on a study of all the pottery from the 1932 season, and that half of the 1931 pottery which was lent to the University Museum. A note on the outstanding features of the 1933 pottery will be included. The small amount of material recovered in 1934 is not yet available for study.

Pottery classification is, in the last analysis, reduced to one of two major criteria: decoration or shape. Piedras Negras pottery is here classified on the basis of decoration, since most of the material is so fragmentary that a study of shape is to a large extent reduced to one of rim form, indicative of, but not defining, the entire vessel. ${ }^{1}$

A qualitative petrographic study, by A. Williams Postel of the Geology Department of the University of Pennsylvania, of the composition of the clays from which Piedras Negras pottery is made, establishes three groups of tempering material: calcite, calcite with a slight admixture of quartz, and quartz. Thirty-nine of the 47 sherds analyzed were tempered with calcite or with calcite and quartz. The other eight sherds were quartztempered, and confined so far to three wares. This quartz group subdivides into two types: One in which the quartz is unevenly graded (Red 1, Black 1), the other in which it is fine, evenly graded and in high proportion (Orange 3). The sherds tested from Jonuta show the same type of quartz tempering as the Piedras Negras Orange 3 group, but so much less quartz is present in each sherd that it is safe to distinguish the two types on the basis of quantity of tempering material.

The surface hardness of Piedras Negras wares varies only from 2 to 3 ; the porosity ranges from $9.8 \%$ to $26.3 \%$, without apparent relation to other criteria. As far as one can judge petrologically the firing temperature was under 700 degrees C.

Ware ("the sum of articles of a particular kind or class", Webster) is determined by slip color, although some groups or subgroups that are also homogeneous in clay composition and degree of firing are more fully defined.

Slip is used for the finer surface coat of clay wash, usually colored, applied to a vessel; paint refers to color decoration supplementary to this.

Negative painting, unless otherwise specified, includes both true and false techniques. In the former, following Lothrop's definition (1926a:144-145), the design itself is painted in a protective substance, presumably hot wax, over which a coat of a darker pigment is applied; a subsequent melting of the protective substance reveals the lighter design. In the false technique, the darker background is painted around the light design.

Capitalized names of colors refer to those used in Robert Ridgway's (1912) Color Standards and Color Nomenclature. Shapes have been classified as variant forms of bowls, dishes, plates, and jars.

Bowl. A vessel, the diameter of which is equal to or greater than its height, having the main zone of decoration on the outside.

Dish. A vessel, the diameter of which is greater than its height, having the main zone of decoration on the inside. While the distinction between bowl and dish may seem unduly arbitrary, and may lead to calling by one name vessels which seem to deserve the other, it does serve to give a definite meaning to each of these terms, often used loosely and even synonymously.

Plate. Like a dish, but very shallow.
Jar. A vessel, the height of which is greater than the diameter, having the main zone of decoration on the outside.

Bevel is the angle which one surface makes with another when they are not at right angles, Webster (Fig. 4.8.33).

Flange ("external or internal rib or rim", Webster) is used for horizontal external projecting rims or ribs, other than the vessel rim, running continuously around
a vessel; flanges are distinguished as labial, (Fig. 4.8.32); medial, (Fig. 4.8.31, 35-37); basal, (Fig. 4.9.59).

Ring base. A ring of clay attached to the base of a vessel (Fig. 4.7.11; Fig. 4.8.34).

Ring foot. A high, flaring circular base attached to a vessel (Fig. 4.6.17)

Dish indentation. A flat circular depressed area in the outer surface of a vessel base (Fig. 4.8.42).

Numbers used after the names of shapes refer to the series drawn in three plates following the first part of this paper, Figures 4.7, 4.8, and 4.9.

The scale used in the illustrations shows intervals of 1 cm .

The following abbreviations are used in Part I: MAI: Museum of the American Indian, Heye Foundation, Now York, NY; PM: Peabody Museum of American Archaeology and Ethnology, Cambridge, MA; UM: University Museum Philadelphia, PA.

## Polychrome Wares

## Polychrome A-1

Colors: Background, Morocco Red [7.5R3.4/6.0]; design, Xanthine Orange [5YR5.2/12.0], White [N9.5].
Paste: tempered with calcite. ${ }^{2}$ Buff-Pink [5YR7.0/5.0] to Vinaceous Tawny [2.5YR5.6/6.0].
Shape: owls: 53, 54; Dishes: 9; Jars: 3; Plate: 41.
Decoration: Negative painting only. Slight predominance of interior decoration.
Design: Geometric circles and variations of the circle (Fig. 4.1.1, 2); stripes; broad S-shaped lines (Fig. 4.1.6).

The main characteristic of this group is the use of negative painting as the sole method of decoration. The technique is usually the true one; where, however, white and yellow are both used in the design elements, there is a possibility of the final red layer having been applied by the false method. This group definitely establishes true


Figure 4.1 Polychrome sherds showing geometric and naturalistic designs. 1. Polychrome A-1, L-28-35; 2. Polychrome A-1, L-17-221; 3. Inner surface of a Polychrome A-1, sherd, showing glyph band, L-17-62; 4. Polychrome D, L-28-9; 5. Polychrome C, L-16-116; 6. Polychrome A-1, L-16-893; 7. Polychrome A-2, L-16-954; 8. Polychrome B, L-28-10; 9. Polychrome C, human hand, L-28-11; 10. Polychrome D, parrot wing, L-28-51a; 11. Polychrome C, human, L-17-76; 12. Polychrome C, snake (?), L-16-324; 13. Polychrome C, parrot wing, L-16-815; 14. Polychrome B, human head, L-28-106; 15. Polychrome B, snake (?), L-16-294; 16. Polychrome D-1, L-17-297; 17. Polychrome D, snake, L-16-290; 18. Polychrome B, L-16-275
negative painting as a technique is use during the Maya Old Empire.

It is a technique that depends on silhouette for its effect, and is therefore limited to fairly simple, stylized designs. While the S-lines are so used to suggest stylized animal or insect forms, the other designs are purely geometric, simple silhouettes well adapted to the technique, and almost entirely confined to this group. This ware has to our knowledge been found so far only at Piedras Negras.

## Polychrome A-2

Colors: Background, dark brown, ${ }^{3}$ or black; design, White [N9.5] or Mars Orange [10R4.5/10.0].
Paste: Tempered with calcite. Vinaceous Tawny [2.5YR5.6/6.0].
Shape: Bowls: 53? (Body pieces only).
Decoration: Negative painting. Exterior decoration. Design: Disks (Fig. 4.1.7).

Although only three sherds decorated in this manner have been found at Piedras Negras, they are of real importance, since similar sherds have been found at other Maya cities. A sherd from Hochob in Yucatan (AMNH), and a tripod bowl from Copán, with polychrome painting inside (PM), have on the outside the same negative-painted disk decoration. While Copán is, like Piedras Negras, an Old Empire city, Hochob is considered, because of its architecture, to belong to the Transitional Period.

## Polychrome B

Colors: Background, Morocco Red [7.5R3.4/6.0]; design, Xanthine Orange [5YR5.2/12.0], White [N9.5], Black [N2.2].
Paste: Tempered with calcite-and-quartz. Vinaceous Tawny [2.5YR5.6/6.0], sometimes banded with black.
Shape: Bowls: 53, 54; Dishes: 39; Jars: cylinder, 16; narrow-necked, 5; Plates: 41; Foot: round rattle, 72.
Decoration: A design, applied by a negative painting technique, serves as background for the main design, executed in black outline. Slight predominance of exterior decoration.
Design: Geometric (Fig. 4.1.3), including glyph forms (Fig. 4.1.11); naturalistic, human heads (Fig. 4.1.14); snake heads (Fig. 4.1.15, 18)

The geometric designs are more elaborate than those of Group A. The two vigorously drawn human heads recall codex face numerals. This type of polychrome seems to be an elaboration of the pure negative painting of Group A by the addition of line drawing to a silhouette technique.

## Polychrome C

Colors: Morocco Red [7.5R3.4/6.0] Mars Orange [10R4.5/10.0], Xanthine Orange [5YR5.2/12.0], White [N9.5], Black [N2.2]. Yellow, orange, black and white on a red background; or red, black, and white on an orangeyellow background.
Paste: Tempered with calcite. Onion-Skin Pink [5YR7.0/6.0], Terra Cotta [10R5.4/6.5].
Shape: Bowls: 53, 54, 42; Dishes: 33, 39, 60; Plates: 41; Jars: cylinder, 16; narrow-necked, 2, 3; Lids: 53; Feet: 67, 71.

Decoration: The basic technique is black-outlined mass painting, with occasional use of negative painting for details. Exterior decoration predominates.
Design: Geometric, including glyphs (Fig. 4.1.5, 8), YearBearer symbol (Fig. 4.2.1, 2), stepped fret (Fig. 4.2.12), simple stepped design (Fig. 4.2.11), running scroll (Fig. 4.3.3), checkerboard in brown and white (Fig. 4.2.3), designs suggesting textile technique (Fig. 4.2.9-10), and amorphous ones difficult to classify (Fig. 4.1.5). Naturalistic, including two definite (Fig. 4.1.9, 11) and one possible human figures, a parrot wing (Fig. 4.1.13), and elaborately rendered snakes (Fig. 4.1.12; Fig. 4.6.4).

There are, in this group, marked variations in treatment but only one style with enough examples to warrant considering it as a sub-group. It will be described as C-1. The examples of figure painting belong to what may be called the Chamá style. This is a style of painting scenes with human figures in them that is associated with the Chamá section of the Guatemalan, highlands, and is distinct in character from the styles of similar polychrome vessels from Honduras, Salvador, and the Petén. A red background with this type of polychrome is rare. It occurs on the Piedras Negras sherd shown in Figure 4.1.11; it occurs on a cylinder jar in the Chamástyle from Uaxactún (A. Smith 1932, Pl. 5), and on a cylinder jar from the highlands on which, as on one white Piedras Negras sherd, turquoise blue is used. The early date painted on the Uaxactún jar is no criterion of the age of the vessel, since the stratification at Holmul indicated that such cylinder jars did not appear in the Petén before the Holmul V period. The Piedras Negras sherds have the design on the outside, and belonged to cylinder jars or straight-sided bowls. The scarcity of this type of design at this city, and its contrast to the abstract character of most of the polychrome decoration there suggests that the sherds mentioned are trade pieces from the highlands.

## Polychrome C-1

Color: Background, Morocco Red [7.5R3.4/6.0]; design, Xanthine Orange [5YR5.2/12.0], White [N 9.5], Black [N2.2].


Figure 4.2 Polychrome sherds showing geometric designs; 1. Polychrome C,Year-Bearer symbol, L-17-123; 2. Polychrome C,YearBearer symbol, L-17-73; 3. Polychrome C, checkerboard, L-28-26; 4. Red-on-Buff, L-16-323; 5. Red-on-Orange, dot-and-diamond, L-28-72; 6. Polychrome C, L-28-10; 7. Red-on-Orange, braid, L-28-85; 8. Polychrome E, braid, L-28-10; 9. Polychrome C, L-28-76; 10. Polychrome C, pyramid, L-28-106; 11. Polychrome C, stepped pyramid, L-16-28; 12. Polychrome C, stepped fret, L-16-404; 13.

Polychrome D, stepped fret, L-17-126

Paste:Tempered with calcite-and-quartz. Onion-Skin Pink [5YR7.0/6.0].
Shape: Plate: 41; Jar: narrow-necked, 4; Lids: 53 (Fig. 4.3.9).

Decoration: On the red exterior is a yellow or white band parallel to the rim, on which broken-down glyph blocks are painted in black, each block being subsequently painted red. The inside has an indecipherable design painted in black on yellow with red overpainting of masses.

Sherds of this kind occur most frequently in the southeast section of the city.

## Polychrome D

Color: Background, Mars Orange [10R4.5/10.0]; design, Morocco Red [7.5R 3.4/6.0], Black.
Paste: Tempered with calcite. Onion-Skin Pink [5YR7.0/6.0].
Shape: Bowls: 53; Dishes: 33-57, 39, 62; Jar: 11.
Decoration: Line painting in red and black in a bold and vigorous style which lacks the finish and delicacy of workmanship found in Group C. Negative painting is used for detail on two sherds only. The orange slip is sometimes laid directly on the vessel, sometimes over a primary white slip. In the first case, the paste seems to be more finely mixed, and the tempering material is less evident. This distinction cannot be correlated with differences in styles or shapes, and has at present no apparent significance.
Design: Geometric designs are relatively simple. There is a stepped fret (Fig. 4.2.13) similar to one in the Polychrome C group (Fig. 4.2.12), an imitation of the negativepainted oval design characteristic of Polychrome A (Fig. 4.1.4, 1), a repeated curved line (Fig. 4.3.4) and brokendown glyph forms (Figs. 4.3.6, 4.3.7, 4.3.10). There is the use of dark orange vertical bars in pairs on an orange background around the outside of a flat-based tripod dish with slightly flaring walls decorated inside in polychrome (63); Naturalistic: parrot wings (Fig. 4.1.10), snake head (Fig. 4.1.17).

The parrot-wing fragment recalls, in simplicity of treatment and shape of rim, the parrot bowls with basal flange from Holmul I and from the highlands, where, at Chihuatal (UM), they occur in the early level. The bar decoration in dark-on-light orange is found on polychrome tripod dishes from British Honduras (MA) similar in shape to the Piedras Negras dish (63), and on polychrome pottery drums from Yalloch (PM). It occurs on the outside of a dish (54, rim 38) with mottled interior from under the floor of the throne room of J6. The walls of this room are dated approximately by the throne, 9.17.15.0.0 ${ }^{4}$ but the floor may be one or even two building-periods earlier (see Piedras Negras

Preliminary Report, Number 3); the decoration was therefore in use well before that date. It occurs on dark-on-light Orange Ware, found in the earlier part of O-13, a building on which the latest date yet found is that of Lintel 3.9.16.10.0.0.

## Polychrome D-1

Color: Background, Mars Orange [10R 4.5/10.0]; design, Bay [10R 2.6/6.0].
Paste: Tempered with calcite. Ochraceous Salmon [5YR7.4/7.0].
Shape: Dishes: 35, 39.
Decoration: Outline painting, on inner wall of dish.
Design: Broken-down glyphs. Dot surrounded by an elongated circle with projections at the ends (Fig. 4.1.16), which may have naturalistic derivation.

This small group is found in the Southeast section of the city. The brown may be overfired red.

## Polychrome E

Color: Background, Mars Orange [10R4.5/10.0]; design, Maroon Red [7.5R 2.4/4.0], Black.
Paste: Tempered with calcite. Light Ochraceous Salmon [8YR8/0/5.5].
Shape: Bowls: 53; Dishes: 35, 39; Plates: 34.
Decoration: Usually outline painting in maroon, with the design elements sometimes filled with an orange wash slightly deeper than that of the background. One bowl has an all-over mat design done in false negative painting (Fig. 4.6.1). interior decoration predominates.
Design: Geometric: scroll (Fig. 4.3.1), broken-down glyphs (Fig. 4.3.12-14), mat design (Fig. 4.2.8).

Most of the sherds of this small group come from the Southeast section of the city. Maroon red decoration on orange, with the occasional addition of black, is characteristic of early Copán pottery. Two of the Piedras Negras sherds (Figs. 4.3.1, 4.3.14) have design elements that are identical with those on vessels from Copán I (Vaillant 1927), dated by a deposit under Stela I at that site as being earlier than 9.12.5.0.0. One of these sherds comes from the lowest level of a pit in front of Pyramid K-5.

The most interesting pieces of this ware are the only two that have come from the South Group. These are two bowls, with disk indentations in the exterior base (Fig. 4.6.1,2). The shape is a frequent one at Piedras Negras; the bowls, thin-walled, are of fine buff paste, and light in weight. They were found as lid and vessel containing a cache of flint and obsidian, in the South Ball Court. One has an all-over mat design (Fig. 4.2.8), where the braid element is shown in orange with two fine maroon lines in it, on a maroon background. This design is a characteristic


Figure 4.3 Polychrome sherds showing geometric designs: variations of scroll and glyph forms; 1. Polychrome E, L-16-456; 2. Polychrome C, L-16-401; 3. Polychrome C, L-28-3; 4. Polychrome D, L-28-78; 5. Polychrome C, L-28-10; 6. Polychrome D, L-17-149; 7. Polychrome D, L-16-441; 8. Polychrome C, L-17-295; 9. Polychrome C-1, L-17-32; 10. Polychrome D, L-28-94; 11. Polychrome B, L-17-21; 12. Polychrome E, L-27-85; 13. Polychrome E, L-27-85; 14. Polychrome E, L-17-203
element of the polychrome pottery of Salvador and the Ulúa Valley, and occurs at Copán. A braid with two inner lines does not seem to occur north of Salvador, and the Piedras Negras design is done with more delicacy than in any of the specimens to the south. The companion bowl has a glyph-derived decoration (Fig. 4.3.12, 13) that suggests a development from the glyph bands of Copán I. Neither shape, ware, nor style of decoration of these two bowls, however, fits into the pottery scheme of Copán, Salvador, or the Ulúa Valley, though design elements and colors seem to come from Copán. A possible explanation is a Piedras Negras copy of Copán work. The two sherds similar to Copán I, on the other hand, are probably trade pieces; the remaining sherds of this group are either trade pieces or Piedras Negras copies. Though the scarcity of the ware, apparently introduced early, implies the former, the two South Group bowls point to at least one local potter influenced by Copán. A possible extension of this-influence may be shown in a bowl with an all-over braid decoration in Morocco Red [7.5R 3.4/6.0] on orange (Fig. 4.2.7).

## Miscellaneous Polychrome

A. Of several sherds with white background, one had a design in red, black, and blue, another had a stylized red line design, with edge and vertical panel lines of black (Fig. 4.6.5) and the third, from J-6, had lost its stylized flower design and been redecorated by a brown line. One sherd had a yellow design on a brown background, with a band of blue at the rim. An effigy owl-head lid, from a South Group test pit, was originally painted with a polychrome design (Fig. 4.4.9).
B. Post-fired Painting. There is one example of postfired polychrome painting in black, red, and orange, on a coarse, unslipped bottle-necked jar with a band of circular reed or bone marks on the neck. This is the only occurrence of either technique on Piedras Negras pottery (Fig. 4.5.1).
C. Stucco. There are two polychrome sherds of uncertain provenience that have been covered with stucco painted pink and green. (see Linné 1934, Appendix 2).

## Dark on Light Orange

Color: Mars Orange [10R4.5/10.0].
Paste:Tempered with calcite or calcite-and-quartz. Light Ochraceous Salmon [8YR8/0/5.5].
Shape: Dishes: tripod 61, 63 (Fig. 4.6.10); Jars: cylinder, 16 (Fig. 4.6.3); narrow-necked, 2.9 (Fig. 4.6.9); Feet: 67a; Censer handle or spout.
Decoration: Painted in wide lines in a heavier, darker coat of the orange background slip.
Design: Crude geometric on jars; pairs of vertical bars on dishes.

With the exception of dish and cylinder jar sherds from the earlier part of O-13, which can be dated as before 9.16.10.0.0(?) recognizable pieces of this ware have appeared only in the South section, in the debris associated with Pyramid R-3. There is reason for thinking that R-3 was not abandoned while the city was occupied, (Piedras Negras Preliminary Report on R-3, Appendix 1), which would suggest that vessels found in the debris fallen from the temple were made late in the occupation of the city. The shape of the tripod dish illustrated recalls the tripod dish form characteristic of Holmul V (Merwin and Vaillant 1932, Pl. 29a), the latest pottery period at that Old Empire site. From the stylistic point of view, the type of decoration and the careless workmanship in both modeling and painting suggest a degeneration of better executed ware, possibly standard polychrome.

## Dark on Light Red

Color: Morocco Red [7.5R3.4/6.0].
Paste: Tempered with calcite-and-quartz. Salmon [5YR7.5/6.0].
Shape: Bowls: 53 (Pl.VI, 11); Jars: 2.
Decoration: Painted in wide lines in a darker, heavier coat of the red background slip.
Design: Crude geometric.
There are only a few examples of this ware, from the South Group. Stylistically, it is similar to Dark on Light Orange, and is probably contemporaneous with it.

## Monochrome Wares

## Orange Ware, Miscellaneous

Color: Mars Orange [10R 4.5/10.0] to Xanthine Orange [5YR5.2/12.0].
Paste:Tempered with calcite. Color ranges from Salmon [5YR7.5/6.0], with low-polished slip closely related in color and texture, to Apricot Buff [5YR7.0/7.5] with a basic white slip under a secondary well-polished orange one (see Polychrome D). There is no correlation of this with shape or supplementary decoration.
Shape: Bowls: 51, 55; Dishes: 36, 37, 39, tripod, 35, 59; Plates: 34, 41; Jars: 14; narrow-necked, 3-5; with rightangle shoulder, 7; tripod, 9; Lids: 65; Flanges: medial 35-37; Feet: round rattle, on bowls, 82 ; teat, on plates, 67, 16.
Decoration: Incising (Fig. 4.4.11-13; Fig. 4.6.6); vertical fluting, concave, 52, applied band at rim, 51; smoothing the outer unslipped rim of plates in a band 2 cm wide around the edge, and roughening the surface below.


Figure 4.4 Sherds showing incised, carved, and modeled decoration; 1. incised WhiteWare, L-17-79; 2. champ-levé MottledWare, L-16-440; 3. champ-levé Orange 3Ware, L-28-70; 4. carved Orange 3Ware, L-28-73; 5. incised Buff, L-17-77; 6. modeled and incised, MottledWare, L-26-50; 7. punctate Unslipped Ware, L-28-70; 8. champ-levé Orange 3Ware, L-28-70; 9. modelled Polychrome Ware, L-28-76; 10. applied head UnslippedWare, L-28-163; 11. incised OrangeWare, L-17-286; 12. incised Orange Ware, L-17-354a;
13. incised OrangeWare, L-17-78


Figure 4.5 Sherds and miniature vessels; sherds illustrating ways in which applied indented fillet is used for decoration; 1 . ost-fired Polychrome sherd, L-28-107; 2. possible handle, UnslippedWare, L-28-161; 3. BlackWare rim sherd cut in stepped design, L-28-78; 4. miniature vessel, UnslippedWare, L-28-159; 5. "scent bottle," Mottled Ware, L-17-116; 6. sherd with nicked flange, Polychrome(?) Ware, L-17-387,f; 7. sherd showing textile imprint, Orange 2 Ware, L-27-82; sherds illustrating ways in which indented fillet is used for decoration: 8, 9, and 12 as medial flanges; 10, 11 as basal flanges; 13 as labial flange; 8. L-28-106 (31); 9. L-28-81 (22); 10. L-17-83; 11. L-28-106; 12. L-28-58; 13. L-17-375

Fluted and banded bowls occur also in yellow and mottled wares. Orange ware is one of those most frequent at Piedras Negras and is most plentiful in the West Group. An incised bowl (Fig. 4.6.6) was found on the floor of J -12. It is one of the few pieces of pottery recovered intact, and implies that incised Orange Ware was in use at the end of the city's occupation, if the buildings on the Acropolis were not abandoned before that time. The variation in slip application referred to above cannot at present be considered as significant, but there are four small sub-groups of Orange Ware that stand out from the mass, and may have historical significance. These will be referred to as Orange 1, 2, 2a, and 3.

## Orange 1

Color: Mars Orange [10R 4.5/10.0].
Paste: Thick, coarse, tempered with calcite. Light Ochraceous Buff [8.5YR7.2/8.0].
Shape: Bowls: 21, 28-31.
Jars: narrow-necked, 3.
Decoration: Occasional lines and triangles in black.

This corresponds to a type of ware often called Lacquer from the combination of a coarse, thick paste with a fine, polished slip. Examples are infrequent, and in poor condition.

## Orange 2

Color: Mars Orange [10R 4.5/10.0]; slip apparently stick-polished; occasionally shows imprint, left by lime deposit, of a loosely-ware plain-cloth textile (Fig. 4.5.7). Paste:Tempered with calcite; firm, well-fired. Onion-Skin Pink [5YR7.0/6.0]. Shape: Bowls with lids: 43-45 (Fig. 4.6.7, 8); Plates, 41.

This might be called Votive Orange Ware, since almost all the vessels made of it are associated with caches in Temple O-13, K-5 and in the South Ball Court playing field. It does not occur in association with the Ball Court structures R11. Three of the four sets of vessels from K-5 were found one under each of the three column altars, These altars were found in each of three superimposed buildings of which the latest is given a tentative date of 9.12 .5 .0 .0 . Though we do
not know the length of time covered by the three buildings, we can consider the ware to have been in use at least two K-5 building periods earlier than 9.12.5.0.0. A plate was found with Burial 5 , which probably belongs to the second half of Cycle Nine. Bowl 45 has a similar bowl inverted as its lid.The textile imprints imply that these vessels when deposited, had been wrapped in a piece of cloth, probably to hold vessels and lids together, and keep intact the offering of jade, shell, sting-ray spines, eccentric flints and obsidians. Similar bowls, tied with a strip of cloth, are shown on a polychrome cylinder jar from Uaxactún (A. Smith 1932, Pl. 5). Red-orange bowls of shape 45 occur in pairs also at Uaxactún (O. Ricketson 1928:308-309) and at Holmul in the Petén (Merwin and Vaillant 1932, Pl. 19, f; 27,h), at Mountain Cow in British Honduras (Thompson 1932, Fig. 10.o) and at Quen Santo
in the Guatemalan highlands (Seler 1901:99, 107). Bowl 43, and its lid, appear in polychrome among "Mayoid" material in Ecuador (Uhle 1922-23, Fig. 30.38).

## Orange 2a

Color: Ferruginous to Kaiser Brown [2.5YR3.8/6.0]. Slip seems to have very low polish.
Paste: Tempered with calcite. Light Ochraceous Salmon [8YR8/0/5.5].
Shape: Lidded Bowl: 43; Plates: 41; Dishes: 35 .
This is characterized as a separate sub-group by the color and quality of its slip. The examples are few in number, and may be due to the individual treatment of Orange 2 by one craftsman. An argument against this


Figure 4.6 Vessels; 1. Polychrome E bowl, L-27-85; 2. Polychrome E bowl, L-27-85; 3. Dark-on-Light Orange cylinder jar, L-16-261; 4. Polychrome cylinder jar, L-16-261; 5.White Polychrome bowl, L-16-191; 6. Orange Bowl with incised parallel lines, L-28-1; 7. Orange 2 bowl and lid, L-27-121; 8. Orange 2 bowl with second bowl used as lid, L-16-334; 9. Dark-on-Light Orange jar, L-27121; 10. Dark-on-Light Orange tripod dish, L-28-67; 11. Dark-on-Light Red bowl, L-28-64; 12. Black jar, L-16-224; 13. Black 2 tripod dish, L-28-68; 14. Brown cylinder jar, L-16-124; 15. Brown 2 tripod bowl, L-28-170; 16. Brown 2 tripod bowl, L-28-57; 17. Lacandon censer, L-16-818; 18. spiked censer and lid, L-16-857; 19. nail-marked unslipped jar, L-28-3; 20. unslipped cache vessel, L-16-155; 21. unslipped cache vessel, L-16-104; 22. unslipped cache vessel with lid, L-16-93, 95.


Figure 4.7 Vessel shapes, actual and reconstructed, in their relation to wares; 1-5. narrow-necked jars; 6-7. narrow-necked jars with bevelled shoulders; 8. miniature narrow-necked jar, "perfume bottle"; 9. narrow-necked jar; 10-12. wide-necked jar; 13-14. pearshaped jars; 15-17. cylinder jars; 18-20. jars with flaring lips. Symbols: $P=$ polychrome wares; $B=$ brown wares; $O=$ orange wares; Bk = black wares $; Y=$ yellow wares; $M=$ mottled wares; $R=$ red wares; $U=$ unslipped wares.
is the varied shapes and scattered locations of the sherds that we have. A fragment of a plate was found beneath a stone 3 m under the floor of K-5-3d, beneath two vaulted and one non-vaulted structures, and is therefore presumably of quite early date at the city. Another plate was found as part of a cache beneath the floor of one of the front rooms of $\mathrm{O}-13$, a building approximately dated by "Lintel" 3 as 9.16.10.0.0(?). The lidded bowl held a cache beneath Altar 1 to which Dr. Morley assigns tentatively the latest date at the city 10.0.0.0.0(?). While the distribution of these specimens suggests that Orange 2a, like Orange 2, was used over a long period of time, it must be remembered that the later vessels could have been preserved from an earlier period. There are not yet enough vessels of this ware to warrant definite conclusions on this point.

## Orange 3

Color: Mars Orange [10R 4.5/10.0].
Paste: Tempered with quartz. Fine. Apricot Buff [5YR7.0/7.5].
Shape: Bowls: 46, 49, 50.
Decoration: Low-relief carving (Fig. 4.4.4); champ-levé
(8) through white slip on jar necks and bowls (Fig. 4.4.3, 8 ); gadrooning, 50 ; incising on bowl interiors.
Design: Carving: human figures; champ-levé, incising: geometric.

This ware corresponds to that sometimes described as Fine Orange. It occurs only in the debris around R-3, and R-11 in the South Ball Court. One Maroon Red sherd from P-7 has the some distinctive paste. The pottery from R-11 corresponds to that from R-3 which, from its position, has been considered contemporary with the end of the city's occupation. There are various outside associations for Piedras Negras vessels of this ware most of which tend to support the suggestion of a relatively late date for it. A broad, low bowl with disk indentation in the base (51) has the outside surface completely carved with scenes showing human figures below a border of debased glyphs. Another such bowl comes from Yaxchilan (PM) and a third from Kixpek in the highlands (UM). Carving on bowl sides in a similar style comes from Mound 36 at Copán (PM), but the ware is different. A gadrooned, or convexly-fluted, bowl (52) is duplicated in the Ulúa Valley (PM).

The most interesting shape is a bowl with short, bulging sides, tripod feet, and an incised design on the floor (46). Vessels similar to this came from Jonuta (UM) on the Usumacinta between Piedras Negras and the Gulf, and one such comes from Kixpek in the highlands (UM). At Piedras Negras, this type of bowl is found only in the South Group. It occurs only in this Orange Ware, and in a brownish low-fired ware (Brown 2), of which two
similar bowls are almost the only examples (Fig. 4.6.15, 16). In Orange Ware, the incised decoration is in groups of parallel lines, as in Mexican-grater bowls. The Jonuta sherds are of fine, well-fired, light orange paste, unslipped, polished, and with two lines incised around the outside of the rim, parallel to the edge, cutting through a simple, geometrical border painted in thin black. One sherd of characteristic Piedras Negras Orange Ware shows an imitation of this Jonuta rim, with a single incised line.

Several rim sherds from Piedras Negras that may have been parts of such bowls have a variation in shape in a recurved side (49), that recalls bawls from the Chiriquí region of Panama; a similar sherd, of similar paste, comes from mounds in the Vera Cruz district (FM). One of those from Piedras Negras has a champ-levé design on the outside of the rim, which is covered with a thick, white slip (Fig. 4.4.8). Such a cutting of a design through a white slip to an orange background characterized a type of ware from the Isla de Sacrificios, near Vera Cruz. Another sherd from Piedras Negras shows this treatment applied to the bottle neck of a jar. Similar sherds come from Yaxchilan, and from Copán (PM).

## Yellow Ware

Color: Capucine [6YR7.0/8.5], to Mikado Orange [5YR7.0/12.0].
Paste: Tempered with calcite. Salmon Buff [7.5YR7.8/6.0].
Shape: Bowls: 52-53; Jars: Narrow-necked, 4; Feet: High, roughly cylindrical, 69
Decoration: Fluting; banded rim.
This ware is infrequent at Piedras Negras.

## Mottled Ware

Color: Usually mottled, ranging from Mars Orange [10R.5/10.0], through Chestnut [10R3.0/5.0] to Black. Paste: Tempered with calcite or calcite-and-quartz. Ochraceous Salmon [5YR7.4/7.0], Light Ochraceous Salmon [8YR8.0/5.5].
Shape: Bowls: 471, 52, 56, 59; Dishes: 36; Jars: wide necked, 10; cylindrical with slab feet, 17; small, flat (Fig. 4.5.5), 8; Feet: round, 72-73; slab, with cylinder jars, 77; Flanges: medial, 36; basal, 59
Decoration: Champ-levé (Pl. IV, 2); modeling and incising (Pl. IV, 6); fluting, (52); incising.
Design: Geometric for champ-levé and incising; naturalistic, an owl head, for the modeled and incised sherd.

This ware is frequent at Piedras Negras. It may very well be orange ware so fired by a reducing technique as to produce the dark surface, Mottled from orange to brown or black. This cannot definitely be determined


Figure 4.8 Vessel shapes, actual and reconstructed, in their relation to wares; 21-22. bowls with constructed mouths; 23-28. bowls; 29. Bowl with ring base; 30. bowl; 31-32. bowls with encircling indented fillets; 33. bowl with bevelled side; 34. plate with ring base; 35-38. flanged dish; 39. dish; 40. tripod plate; 41. plate; 42. bowl, with disk indentation in base exterior. Symbols: $P=$ polychrome wares; $B=$ brown wares; $O=$ orange wares; $B k=$ black wares $; Y=$ yellow wares; $M=$ mottled wares; $R=$ red wares; $U=$ unslipped wares.
without chemical tests. The one small perfume bottle with flattened sides comes from the Southeast Group. There are several examples of a low cylindrical jar with slab feet from the trench in the West Group Plaza. This Is a type of vessel that is often thought of as Toltec; the Piedras Negras specimens, however, do not bear any more direct resemblance to Toltec jars than they do to footed cylinder jars from the Ulúa Valley, and their early occurrence at Piedras Negras does not suggest a Mexican derivation.

## Red Ware, Miscellaneous

Color: Morocco Red [7.5R3.4/6.0].
Paste: Tempered with calcite-and-quartz. Apricot Buff [5YR7.0/7.5].
Shape: Bowls: 53, 54; Dishes: 39; Jars: 15; Plates: 34, 40; Lid: 53; Feet: with plate, 78.

Red ware is uncommon at this site. A unique sherd, from P-7, painted maroon red, has the hard-fired orange paste and quartz tempering characteristic of Orange 3, and a short ring foot. This is the only example of a ring foot in Piedras Negras pottery aside from censers (Pl. VI, 17-19).

## Red 1

Color: Morocco Red [7.5R3.4/6.0].
Paste: as Orange 1, but quartz-tempered.
Shape: Bowls: 21.

## Brown-Ware, Miscellaneous

Color: Bay [10R2.6/6.0].
Paste: Tempered with calcite. Ochraceous Salmon [5YR7.4/7.0], Light Ochraceous Salmon [8YR8/0/5.5]. Occasional use of hard-fired, gray or gray-brown pastes, (Drab Gray [10YR6.6/2.0]).
Shape: Dishes: 31, 35; Jars: cylinder, 15; with wide necks, 11; Plates: 40; Feet. With plates, 78.

This ware is infrequent. One large cylinder jar shows a surface of stripes alternately painted brown and gray (Pl.VI, 14).

## Brown 1

Color: Bay [10R2.6/6.0].
Paste: as Orange 1.
Shapes: Bowls: 53; Dishes: 35; Jars with beveled shoulder: 6 Decoration: Occasional crude black lines and triangles painted on the rims of dishes.

## Brown 2

Colors: Benzo Brown [5YR4.5/2.0].
Paste: Tempered with calcite. Light Ochraceous Buff [8.5YR7.2/8.0].
Shape: Bowl: 48 (Fig. 4.6.15, 16).

Decoration: Interior incising.
Design: Leaf-like pattern, enclosed in a circle, placed askew in the floor of the bowl.

Almost the only examples are two bowls from R11, in the South Ball Court, presumably late. The surface finish is applied thinly and sketchily enough to be called a wash rather than a slip. A similar bowl, lacking only the incised design, comes from Kixpek in the highlands (UM). The shape of the bowl, resembling that of so-called grater bowls, which have functional Incised patterns on the inside of the bowls, suggests that this is a type developed from the grater bowl in which the functional incising has degenerated into meaningless decoration.

## Black Ware, Miscellaneous

Color: Black [N2.2].
Paste: Tempered with calcite.
Shapes: Jars, wide-necked, 10-12 (Fig. 4.6.12); Bowls: 42, 53.
Decoration: Incising, stopped rim (Fig. 4.5.9, 5).
Design: Geometric.
The color of this ware is apparently due to carbonization of the vegetal matter in the slip. Black Ware is rare at Piedras Negras.

## Black 1

Color. Black [N2.2]
Paste: Fine, hard, thin. Tempered with quartz. Congo Pink [1YR7.0/7.0], Onion-Skin Pink [5YR7.0/6.0]. Occasional use of Drab Gray [10YR6.6/2.0] paste, hardfired and thin.
Shape: Bowls: 42, 53; Lids: 53.
Decoration: Punctate lines; incising.
Infrequent. The color is probably due to carbonization of vegetal matter in the slip. A decorated bowl comes from the altar niche of the superstructure of K-5.

## Black 2

Color: Black [N2.2].
Paste: Tempered with calcite-and-quartz. Thick, coarse. Vinaceous Tawny [2.5YR5.6/6.0].
Shape: Bowls: 55; Dishes: 66 (Fig. 4.6.13); Jar with beveled shoulder: 6 .

The color is due to the smudging technique, carbonizing the vessel itself, which is low-polished, and may or may not have a slip. The vessels are all thick and heavy and occur chiefly in the debris around R-3 and R-11 in the South Group, which would suggest that they are late. One bowl sherd from R-11 has a curved scratched line on it that suggests the top of a human profile. This is more apt to be graffito than intentional contemporary decoration.


Figure 4.9 Vessel shapes, actual and reconstructed, in their relation to wares; 43-44. bowls; 45. bowl with flaring straight sides; 46. tripod bowl; 47. bowl with bevelled side and constricted mouth; 48. tripod bowl with bevelled side and constricted mouth; 49. bowl with bevelled side, convex above bevel; 50. gadrooned bowl; 51. bowl with banded rim and disk indentation in base exterior; 52.fluted bowl; 53. bowl, lid with inner rim; 54-56. straight-sided bowls; 57. spiked censer with ringed foot; 58. tripod spiked bowl; 59. tripod straight-sided bowl with basal flange; 60. tripod straight-sided bowl; 61-63. tripod dishes with flaring sides; 64. ladle censer; 65. lid; 66. tripod bowl with basal flange and flaring sides; 67-75. rattle feet; 76-82. solid feet. Symbols: $P=$ polychrome wares; $B=$ brown wares; $O=$ orange wares; $B k=$ black wares; $Y=$ yellow wares; $M=$ mottled wares; $R=$ red wares; $U=$ unslipped wares.

## Unslipped Ware

Color: Japan Rose [5YR6.6/4.5] to Light Quaker Drab [5RP 5.4/1.0].
Paste: Tempered with calcite. Rufous [10R510.0] to Light [8.5YR7.2/8.0] and Pale Ochraceous-Buff [1YR8.2/5.0].

Almost all unslipped vessels from Piedras Negras fall under one of three headings determined by function.

## I. Household or Storage Vessels

Shape: Bowls: 21-28, 32; Dishes: 45, 54; Jars: 18, 20 : with narrow neck, 1. Decoration: Striation; slashed applied knobs at the base of a Jar neck (1); indented fillets (22, 31, 32; Fig. 4.5.8-13); bowls often painted black, brown, red or orange inside; all-over nail-marking (Fig. 4.6.19). Design: Striation sometimes done in diamondshape pattern.

## II. Cache Vessels

Shape: Jars: 10, 13, 19, (Fig. 4.6.20-22). Decoration: Pear-shaped jars often have a blue edge painted around the rim of the jar and the edge of the lid. Such vessels, holding offerings of jade, eccentric flints and obsidians, have been found in quantity in the rear-room of Pyramid O-13; one came from F-7, one from J-2, and the single lidded jar with constricted neck (10) was found in J-6.

## III. Censers

## a. Ladle

Three rather crude handles of ladle censers (64) were recovered, two coming from Structure R-1, the other from near Stela 8. One of those from R-1 had a very crude snake and a man or monkey applied at the end of the tubular handle, and had originally been painted blue. Gamio (1927:133) illustrates a similar censer from the highlands.

## b. Effigy

There are some sherds from Structure O-13 which seem to have been pieces of effigy censers, but none is complete enough to warrant an attempt at identification.
c. Spiked

Oaxaca. The only complete lid has a vent through the center of the flattened knob on top, There are fragments of whitewashed spiked censers (Fig. 4.6.18; 57), recalling those found in the highlands of Guatemala, in Vera Cruz and with cruciform grooves in the rounded top of the handle. All but three of these sherds come from the rear room in O-13; the exceptions are from the West Group, two of them from $\mathrm{J}-2$, one from in front of the base of Stela 9, 9.15.5.0.0. Fragments of two small jars,
apparently tripod (58), have a row of spikes down the side, ending in a pointed foot.

## d. Lacandon

In Structures J-2 and J-4 of the Acropolis were found several relatively recent Lacandon incense burners in the form of dishes, each with a crude human head, presumably a god, applied at the edge (Fig. 4.6.17). One of these was decorated with a bird head instead of a human one.

## IV. Miniature Vessels

Besides the mottled "scent bottle" from the Southeast Group (Fig. 4.5.5), there are two tiny unslipped jars with perforated lugs on the shoulders (Fig. 4.5.4), one from the East Groups, the other from the south. These may have been children's toys.

A large proportion of the pottery recovered is in sherds that were probably once slipped but are now so badly weathered that they cannot be identified. Interesting specimens of these include a straight-sided bowl, carved with human figures, and three small round lids with crooked projecting handles, two, with traces of blue paint, from Burial 5 in the West Group, the other also from the West Group, with a cruciform design incised on top. There are two objects, bearing molded on the front what seems to be the standing figure of a jaguar-headed man with a long necklace. These are so rounded on the ends, and project at such an angle from the fragments of vessel side to which they are attached that they cannot have been intended as legs; they most resemble the handle-vents on the side of Toltec bowls discussed by Linné (1934:114-15). The Piedras Negras specimens, however, have no vents; they may have served as handles, or merely as ornaments on the rim of a vessel. These are referred to and illustrated in the Miscellaneous Pottery Section of this report (Fig. 4.13.24).

## Conclusions

## The Characteristics of Piedras Negras Pottery

Piedras Negras pottery is a definite ceramic unit, of which the outstanding feature at present is the prevalence of negative painting (Table 4.1). One third of the Polychrome Group is decorated entirely by negative painting, presenting designs of dots, circles and wavy lines in varying combinations, in orange-yellow and white on a red background (Polychrome A). A similar class uses this technique with the addition of black outlining to emphasize or elaborate the design (Polychrome B). A third style uses negative painting as a subordinate element in elaborate four-color designs, usually in yellow, white and black on a red background (Polychrome C). The

Table 4.1 Relationship of Decoration to Wares

"true" negative painting technique is usually employed in Polychrome A and B, although even there it is sometimes used together with the false. Vessels decorated by negative painting alone were limited to simple designs that could be done in silhouette (Fig. 4.1.1, 2, 6, 7). The additional line painting that, in adding finer details, produced elaborate designs may have suggested the direct painting, in of the dark background that we call false negative painting. Perhaps, then, we have this technique as a direct development from true negative painting, as well as an imitation of it, as suggested by Lothrop (1926a:145).

Piedras Negras pottery definitely establishes true negative painting as a technique used during the Maya Old Empire. True negative painting occurs sporadically from Jalisco, Mexico, to Peru, (Lothrop 1926a; Noguera 1936; Jijon y Caamaño 1923), and presumably has northern South America as its center of diffusion. The only places in the Maya area where it may at present be considered as a characteristic of pottery decoration are at Piedras Negras on the Usumacinta, and in the Chamá district of the Guatemala highlands (UM). The Highland examples range from crude geometric designs in red-on-black to elaborate geometric and naturalistic patterns in white-on-black. There is no connection in design or coloring between this style of negative-painted decoration and that characteristic of Piedras Negras. Two unusual jars from Holmul bear negative painting in white-on-black designs that resemble those from the Chamá district (Merwin and Vaillant 1932, Pl. 28, a, c-f). In shape they resemble another group of jars from the same district (Hirtzel 1925: Fig. 27-33). on the other hand, negative-painted disks on a sherd from Hochob, and on the outside of a tripod vessel from Copán, belong to a class of polychrome of which a few examples have been
found at Piedras Negras (Polychrome, A-2). It seems, then, as though there-might have been two centers of diffusion for this technique in the Old Empire, one on the Usumacinta, the other in the Chamá district. Since comparatively little is known about Maya Old Empire pottery, it seems better not to attempt any historical conclusions from the scanty data that we have at present. It is, however, interesting to note that negative painting is not a characteristic of Yucatecan pottery.

Another characteristic of Piedras Negras polychrome pottery, on the decorative side, is the frequency of a red background. Two-thirds of the polychrome sherds have a red background, one-third on orange background. Negative painting is associated almost entirely with the red polychrome group, only two orange polychrome sherds showing any trace of it. There is a certain correlation of shape with background color; lids (53), narrow-necked jars (3-5), heavy, flat-bottomed dishes (60) and bowls with sides that are almost straight (54) are confined to red shallow, flat-bottomed tripod dishes with flaring sides (61, 62), and broad, shallow dishes (35-37) with occasional central designs are confined to orange polychrome.

In the matter of shape, a distinctive feature at Piedras Negras is the appearance of beveled shoulders on jars with narrow necks, in orange and black wares $(6,7)$. Another is the appearance of polychrome lids for fine polychrome bowls (53). Orange, yellow, and mottled wares show a certain affinity in shape, which bears out the suggestion that they are fundamentally the same ware, differing only in their manner or degree of firing.

The predominance of calcite in the tempering material of Piedras Negras pottery is a characteristic feature of pottery from this site. A summary comparison
with petrographic analyses of other Maya pottery suggests that pottery tempering does not vary so much from one site to another as it does from one area to another, in variations that are determined by the geological formation of the surrounding country. Piedras Negras lies in a region where calcite was evidently the most satisfactory material. It is distinct from the two adjacent regions: Jonuta, where finely graded quartz was used for tempering material; and the highlands, from which almost all the pottery tested is tempered by quartz or quartz and feldspar.

On the negative side, the following items should be noted: the apparent absence of effigy feet, of handles, of tetrapods, of spouted and shoe vessels; the almost complete lack of effigy vessels, modeled decoration, and ring feet, and the relative scarcity of incised and carved decoration, and of life forms in decoration.

## The Historical Value of Pottery in the City: Stratigraphy

What can pottery tell us of history in the city? We shall take the city by sections to see what chronological evidence there is in building stratigraphy and association of potsherds with monuments.

## West

In the West Group we have on K-5 three superimposed buildings of which the latest has been assigned a tentative date of $9.12 \cdot 5.0 .0$. We find Orange 2 cache vessels under the column altar of each level, a fourth vessel half-way down the terrace in front, and fragments of an Orange 2a bowl under a stone in the fill below the third floor. There was little other pottery associated with this pyramid. Of nine sherds found in 1931 in and around the latest building, four are Orange Ware, three Unslipped, and two incised Black 1 ware. In 1932, twenty-four Fine Polychrome sherds, one mottled, and one red sherd were found in the fill between the second and third floors; four Polychrome, one Fine Brown, one Orange, and five unslipped sherds under the third floor, and an Orange 2a plate under a slab in the fill assembled for the third floor. While the evidence is incomplete, ${ }^{5}$ it suggests that by the time the last building was erected, Polycrome was not as popular as it had been when the earlier structures were built. We can say that Incised-and-Punctate Black 1 was in use at about 9.12.5.0.0 and that Orange 2, and Orange 2a appear two K-5 building periods before that date. The use of Orange 2 cache vessels already described suggests their association with certain temples and rites rather than with any given period. This is borne out by their absence in other temples, such as R-3, and their use through several periods at Holmul.

The incised orange bowl found in J-12 (Fig. 4.6.6) suggests that such ware was used at the end of the city's
occupation. Under the floor of the J-6 throne room were a few sherds, one Polychrome C, one Brown-White, one Brown, and several of Fine Unslipped ware, and a dish with a mottled slip inside and double-bar orange decoration outside. We can say, then, that this type of decoration came into use here no later than 9.17.15.0.0, the date of the throne.

The only contemporary pottery vessels found with Vault Burial 5 were an Orange 2 plate, the base of a Polychrome C bowl, and two small round lids with crooked handles and traces of blue paint. This burial may eventually be dated late in Cycle Nine by inscribed shell plates.

Taking possible stela caches, we have Orange 2 vessels from the cist of Stela 6 ( 9.12 .15 .0 .0 ), and spiked censer (Fig. 4.6.18) against the base of Stela 9, (9.15.5.0.0), and an Orange 2a bowl under Altar 1, (10.0.0.0.0?). Stela 8 and 40 have only unslipped household vessel sherds in the fill around them.

East
In the East Group, we have in O-13 another building with a date. While an early building level has been uncovered, it as yet unexcavated, so that the nearest approach we have to a sequence at present is the fact that the middle and rear rooms of the upper level seem to have been built earlier than the front of the building. All the unslipped cache vessels (Fig. 4.6.13, 19, 20) that were found on and under the floor of the building come from the rear room [5]. There was very little pottery in the front of the building, although Orange 2 bowls were found under the front stairway as well as in the rear room. From what data we have now the date of the last phase of the building is more apt to conform to the 9.16.10.0.0(?) date of "Lintel" 3 than to the 9.11.15.0.0 date of "Lintel" 2 , since there is some reason for thinking the latter to have been reused. Presumably, then, the pottery was in use before this date.

## South

In the South Group, the pottery found in the debris on the steps and around the base of R-3, and R-2, much of it whole vessels in fragments, is considered to belong near the end of the city's occupation. It consists of Black (10), Dark-on-Light-Orange (Fig. 4.6.9, 10), Dark-on-Light Red (Fig. 4.6.11), and Black 2 (Fig. 4.6.13) vessels and sherds; and sherds of polychrome, Orange, Orange 1, Orange 3, Yellow, Mottled, Red, Brown 2, and unslipped wares.

In the South Ball Court, we have in the playing-field four sets of cache vessels, two of Orange 2 ware, one composed of two Polychrome E bowls (Fig. 4.7.1,2), and one of one Polychrome D bowl and one carelessly done Polychrome C bowl with debased scroll design in red and
black on an orange-yellow background. This pottery is different in character from that found in the debris from the Ball Court structures R-11. The latter consists of the Brown 2 vessels (48) and a small spiked tripod dish (58); and sherds of Polychrome, Dark-on-Light Orange (including a possible spout or handle), Orange 1, Orange 3, Mottled, Red 1, Brown, Black 2, and Unslipped wares. It resembles the material from R-2 and R-3. The presence of Orange 2 and Polychrome E cache vessels in the field and their absence in the buildings may perhaps show a difference in time level.

The pottery from R-3 and R-11 stands out from the rest of the Piedras Negras material. Only here do we find Orange 3, Brown 2, Dark-on-Light Red; three sherds that recall Yucatecan Slate Ware; and Dark-onLight Orange and Black 2 vessels in the shape mentioned above. This material shows two tendencies: on one hand, there is almost no polychrome, but fine workmanship shown in the carved and out decoration of Orange 3; on the other hand, there is the crudity and carelessness of treatment shown in Black 2 and Dark-on-Light Orange and Red wares, and the unslipped dishes (45) and ladle censers (64) found on the floor inside R-3. The outside associations of both Orange 3 and Dark-on-Light Orange support the tentative late date suggested by position.

## Southeast

In the Southeast Group, excavation of a house-mound group, V-1, established four levels in which pottery was found. The few sherds we have from them [5] show polychrome ware in the second and fourth levels from the top, Orange Ware in the third, and Mottled and Unslipped wares in the first three.

The specialized polychrome groups C-1 and D-1 are almost entirely confined to this part of the city; the only sherds of D-1 found elsewhere are two from the lower layers of pottery test pit 29.

Turning to stratigraphy apart from architecture, we find that a trench dug in 1931 in the north half of the West Plaza showed definite soil stratification in seven brown, black, and white layers. While these contained pottery, the deposits were irregular, since entire vessels, in fragments, came out of a black earth layer at one place, (Pit 7, 1932), while at another a meter away, the black layer was almost sterile, (1931), with a thick deposit of sherds lying on top of it, and a test at a third point (Pit 8, 1932), showed the loss of a stratum, and an almost complete lack of sherds. However, both of the cuts first mentioned showed no polychrome in the lower levels, and the greatest quantity of sherds in the middle levels. One-third of them were mottled ware, much of it tripod dishes, with some tripod cylinder bowls with slab feet. The 1931 sherds show banded bowls at the bottom, basal flanges and feet in the bottom and middle levels, fluted bowls and disk indentations in
the middle levels, and ring bases and incising in the upper levels. The 1932 sherds from these pits were destroyed by fire before a detailed study could be made of them. It has been impossible as yet to correlate this trench stratification with building periods on the Acropolis above, and nothing else similar has been found.

A stratigraphical study of the ceramic material from Piedras Negras was made in 1932 by digging forty-two test-pits, each 1 m square, to bedrock. These pits were so placed as to give as complete an idea as possible of the stratification and deposits in all parts of the city, while testing any place that might hold a refuse heap (Fig. 4.11). No large heap has as yet been found, and one wonders whether the river may not have been used to a certain extent for dumping. Three small heaps were located, however, one at the ravine between the East and West Groups (Pits 19-21), another beside Pyramid K-5 (Pit 2) and a third in a small ravine between Pyramids O-12 and R-11 (Pits 29, 30). The first of these had a dense deposit of sherds alone, the other included other types of debris such as fragments of figurines, human and animal bones, and stone mortars. While the nature and quantity of the material deposited proves it to be refuse, the deposits are small in area and unstratified. While they can be excavated more completely than has yet been possible, they cannot serve as the basis of a stratigraphical study. Two pits were sunk in the sides of the West Plaza trench (Pits 7, 8) as already described, three others were dug by strata where these were apparent in the soil (Pits 24, 34, 40), but the majority were dug in arbitrary levels of 40 cm .

With the exception of the pit dug in the transverse valley leading to the expedition camp, (Pit 1, too far north to be shown in Figure 4.10) there was nowhere more than 2 m between bedrock and soil surface. This held true not only with the horizontal surfaces of artificially constructed plazas, but with the sloping surfaces formed by debris in ravines. The latter, probed for refuse heaps, yielded no stratification; the former, almost none. In the South Group Plaza, there was less than a meter of unstratified fill above bedrock; in the East Plaza a paved floor was found at a depth of 75 cm , with a red clay below it that appears again in a pit sunk in the depression between the East and the Southeast Groups. In the southern half of the West Group Plaza there was less than a meter unstratified fill above bedrock; in the northern half, there was the clearly stratified deposit of 2 m in depth referred to above. Pits sunk in the sides of the large ravine behind R-5 showed that its sides, hitherto considered natural rock, had been terraced in some places down to the bottom of the gully.

A relatively small number of pits of the forty-two dug had the quantity of sherds or depth of deposit to justify any statistical conclusions. The seven which did are listed in Table 4.2.


Figure 4.10 Part of the plan of the city of Piedras Negras, showing locations of pottery test pits.

Table 4.2 Frequency of Sherds by Stratigraphic Unit

| Pit | N <br> Levels | N <br> Sherds |
| ---: | ---: | ---: |
| 2 | 4 | $604(107 \mathrm{rims})$ |
| 19 | 4 | $71(12 \mathrm{rims})$ |
| 21 | 4 | $224(30 \mathrm{rims})$ |
| 27 | 4 | $113(25 \mathrm{rims})$ |
| 28 | 3 | $313(36 \mathrm{rims})$ |
| 29 | 5 | $1,223(182 \mathrm{rims})$ |
| 30 | 4 | $247(51 \mathrm{rims})$ |

The fact that identical, unique rim forms and the rough-and-smooth decoration on the exterior of orange vessels occur only in level 2 of pits 2, 29, 30, (pit levels are numbered from the top one down) is taken as apparent proof of these levels being contemporary, and four levels are tentatively considered to cover the period of occupation of the city. For level 1, in studying rim form, material was also considered from pits 5 and 25; for level 2, from pits 33 and 41. Material from pit W-5, dug in 1931, in front of Pyramid K-5, in three levels, approximately $40-50 \mathrm{~cm}$ each, was included where relevant.

Considering the evidence from these pits, counting by rim sherds we find the stratigraphy to indicate that polychrome pottery is most plentiful in the earliest strata, where orange polychrome and negative painted red polychrome wares are equally prevalent. It is impossible to work out from these pits any theories as to the development of the technique used in painted decoration on Piedras Negras pottery, since negative painting, mass painting, and the combination of the two represented by Polychrome B occur in the lowest levels. Pottery decoration, like figurine-making, seems to have been already well-developed by the people who settled Piedras Negras.

If these pits be considered as covering approximately the period of the city's occupation, we can say that Polychrome Ware is most prevalent at the beginning, Orange Ware in the next period; Fine Brown ware appears at the beginning, Red not until Orange had become more popular than polychrome; but on the whole, we have the same range of wares from the beginning to the end, Polychrome, Orange, Yellow, Mottled, Red Brown, Black, and Unslipped.

There is, however, a certain amount of variation in shape and in rim from one period to the next. Conclusions as to possible sequence have been reached by finding, where possible, the ratio of each type to the whole number of rims from each level, and are merely tentative. They mean, not that a shape or rim form appears in only one period, but that the period to which it is assigned is that of its, greatest frequency.

The ring base is first found in the fourth level, or earliest period, tripod bowls and dishes not until the third. This bears out Blom's find at Yoxihá, Chiapas (Blom and LaFarge 1926-27:227-233) where tripods were confined to an upper burial, ring bases to a lower. A tripod cylindrical jar with slab feet belongs to the third level (17). Flanges (36-37) begin also in this period, when disk indentations on the exterior bases of bowls (42), and bowls with fluted sides (52), are most prevalent. Indented fillets begin in this period, and the use of one in place of a basal flange is confined to it (Fig. 4.5.11).

In the second level, we have cylinder jars $(15,16)$, flanges with the flattened edge like a ring base (Z7), and the beginning of sharp angles to tile shoulders of jars (6). Peculiar to this period is a method of finishing the unslipped exterior of orange vessels by smoothing a band 1 to 2 cm wide along the edge, and roughening the rest of the surface.

The first level, or last period, has no outstanding characteristics.

Taking variations in rim form, we find V-shaped rims for storage vessels (26) most prevalent in the fourth level, R-shaped ones (21), in the first. A rim with a slanting edge (23) is most prevalent in storage ware in the fourth level, but a thin variety, painted orange inside, belongs to the second (30). Lids occur in the second and third levels. Bowl rims, slightly incurved (53) are most frequent in the third level. A bowl or dish with a flaring concave side (62) is most frequent in the second level, a modified form of it (54) in the third; a rim where the everted rim makes a sharp angle with the side (38) is most common in the third level, a modification of it (39) in the first. A plate rim where the side curves slightly out below a slanting edge (41) is characteristic of the fourth level and disappears by the second, when it is replaced by a straight-sided plate with similar edge (34).

Several features, such as the early plate rim referred to, and flanges, which are early in the main part of the city, are in the top level in the Southeast Group. This suggests that this section of the city was used early in the period of occupation.

The wares found, then, suggest a comparatively short occupation of the city, perhaps little more than the four hundred years of Cycle Nine celebrated on the monuments. There is nothing to indicate such length of occupation as is shown at Uaxactún or any marked shift of population. This agrees with the evidence of the figurine types from this site.

There are suggestions of sequence in shape, but the fact, already referred to, that the shapes assigned to one period are never confined to it alone, keeps us from using the shape or rim form of an undated vessel as a definite criterion of its age. They may serve to give it a tentative position that can be checked by other criteria.

Table 4.3 Pottery Associated With Dated Monuments

| Orange 2 | Stela 6 | 9.12 .15 .0 .0 |
| :--- | :--- | :--- |
| Spiked Censer | Stela 9 | 9.15 .5 .0 .0 |
| Orange 2a | Altar 1 | $10.0 .0 .0 .0(?)$ |

There is definite though limited significance to the pottery from stele caches, where pottery is associated with a date (Table 4.3); from K-5, where a building sequence culminates in a tentative date; and from $\mathrm{O}-13$, a building with a tentative date (Table 4.4). While the dating associations of R-3 are early, the vessels recovered from there are, from their position, taken as representing the last phase of Piedras Negras pottery.

What data we have from building-period and datedmonument associations suggest that polychrome wares were early, and were supplanted toward the end of the city's occupation by incised and carved decoration and degenerate forms such as dark-on-light orange and red (Table 4.5). As regards a decreasing use of polychrome from early to late times, such evidence as is afforded by this material agrees with the evidence from the test pits.

## Relations to Pottery from Other Parts of the Maya Area

Considering this phase of Piedras Negras pottery, we can say that the material stands, alone at the present stage of Maya ceramic studies. This is due primarily to the scarcity of pottery from the Usumacinta drainage, which, judging from the Piedras Negras material, a few sherds from Yaxchilan, and others from Jonuta, seems to constitute a distinct ceramic area, with related but individual units. There are indications of contact with other areas, but none strong enough to warrant an attempt at definite correlation.

Table 4.5 Pottery Considered Late From Position as Final Deposit

| Dark on Light Orange, Red | R-3, R-11 |
| :--- | :--- |
| Orange 3: grater bowls |  |
| Orange 3: carved bowls |  |
| Brown 2 |  |
| Slate? |  |
| Incised Orange | $\mathrm{J}-12$ |

## Archaic

The pottery from Piedras Negras shows no specific connections with Maya material known as coming from definitely early or Archaic levels. Early pottery from the Petén-British Honduras region (Merwin and Vaillant 1932, Pl. 18-20; Thompson 1931, Pl. V-VII, XLIV) has certain characteristics, such as tetrapod supports for bowls and tapering cylindrical jars, bowls with flaring ring feet, and narrow-necked jars with spouts rising from the side, parallel to the neck. It does not have negative painting or red polychrome ware. None of these shapes has appeared at Piedras Negras, where, so far as we know, negative painting and red polychrome were abundant from the beginning. Archaic pottery from Arevalo-Miraflores, and Salcajá, Guatemala (Lothrop 1927, Fig. 8; Gamio 1926-27:17, 72, 131, 210-211, 216) and Santa Elena and Cerro Zapote, Salvador (Lothrop 1927, Fig. 4-6) consists of tetrapod vessels, vessels with effigy details, and angular jars different in character from anything found at Piedras Negras. In Salvador, we find in these levels Usulutan ware, bearing parallel-line decoration in a fugitive black paint that disappears, leaving a true "lost-color" design, light against a dark background (Lothrop 1933, Fig. 3034). These traits have not as yet occurred at Piedras Negras.

Table 4.4 Pottery Associated with Tentatively Dated Building Levels

| Polychrome A, C | K-5-3 | Two K-5 building periods before 9.12.5.0.0, tentative date for |
| :--- | :--- | :--- |
| Miscellaneous Orange |  | K-5-1, established from Stela 39 [6] |
| Orange 2, 2a |  |  |
| Brown |  |  |
| Miscellaneous Orange <br> Incised-and-Punctate Black 1 | K-5-1 | 9.12 .5 .0 .0 , date of Stela 39 |
| Polychrome | O-13 | Part of an O-13 building period before 9.16.10.0.0(?) date of |
| Dark on Light Orange | "Lintel" 3 |  |
| Miscellaneous Orange |  |  |
| Orange 2 <br> Mottled <br> Brown <br> Unslipped cache vessels $(13,19,20)$ |  |  |

This evidence coincides with the lack of "Archaic" figurines at this site, and it seems safe to say that Piedras Negras was not settled until after what may be called the Maya Archaic period.

## Old Empire

In considering the relation of Piedras Negras pottery to the Old Empire level, we can at the present time divide the latter into six ceramic groups: Middle Usumacinta; Petén and British Honduras; Atlantic Highland (Chamá and Quiché); Copán, Honduras, and Salvador, Pacific Highland (Lake Atitlán); and early Peninsular (Campeche and Yucatan).

As far as we can judge, the ceramic development at Piedras Negras was distinct from that of the Petén cities of Holmul and Uaxactún, and the associated British Honduras site of Tzimin Kax, where the pottery develops consistently from a beginning marked by early characteristics, and which apparently have no pottery figurines other than Archaic ones. There are however, definite traces of contact. The orange votive bowl with flaring sides ( 45 ; Fig. 4.6.8) is common to all these sites and is probably relatively early; the straight-sided, flatbased bowl is frequent, and probably early at Piedras Negras and Uaxactún (A. Smith 1932, Fig. 3, 4a-e; E. B. Ricketson 1934, Fig. 25a-h; Pl. 8, a-d), although the one instance of it at Holmul occurs in Period V (Merwin and Vaillant 1932, Pl. 31a); it also occurs at Nakúm (Tozzer 1913, Fig. 84-85). The flanged bowl, with and without tripod support, found in Holmul I to IV in orange polychrome and black lacquer wares (Merwin and Vaillant 1932, Pl. 18b; 20e; 21-25; 26b, a) occurs at Piedras Negras in orange polychrome, orange, and mottled wares (35-33), and with greater variety in types of flange than is apparent at Holmul. Flanged bowls in some of these variations occur at Uaxactún (E. Ricketson 1934, Fig. 28a-c; Pl. 8, i-j). A dish with nicked flange (33; Fig. 4.5.6) occurs at Piedras Negras, and in tripod form at Yalloch (PM), Uaxactún (E. Ricketson 1934, Fig. 28c) and Tzimin Kax; at this last site, Thompson (1931) assigns the type to the local phase of the Holmul V period (Pl. XLV, 1, 3). The tripod dish shape that appears at Holmul in period V (Merwin and Vaillant 1932, Pl. 29a) seems to be late also at Piedras Negras (Fig. 4.6.10). The same shape, with the same orange bar exterior decoration as is found on it at Piedras Negras, comes from British Honduras (MU). Orange polychrome jars with wide mouths (11) occur at Piedras Negras, at Uaxactún (Smith, Fig. 6, b, a), and in British Honduras (Gann, 1918, Fig. 63; G. Mason 1928, Fig. 2, 6, 7, 8b). A large bowl, red-orange inside, with incurved rim, painted red down to an indented fillet on the outside (22), occurs at Piedras Negras and in British Honduras (MAI). At Tzimin Kax there is a narrow-necked Jar with
sharply bent shoulder, associated with vessels of the local Holmul I phase (Thompson, 1931 Pl. XLIV), that recalls jars from Piedras Negras (6-7).

There are also resemblances in decorative elements used at Piedras Negras and in the Petén: the vertical orange bars which occur on dish exteriors at Piedras Negras are found around the rim of a pottery drum from Yalloch (PM); negative-painted rings, a characteristic of Piedras Negras Polychrome A, appear in white against a vertical strip of red, as a subordinate element in the decoration of a straight-sided polychrome bowl from Nakúm (Tozzer 1913: Fig. 85); a Piedras Negras rim sherd with painted three-feather parrot wings (Fig. 4.1.10) recalls bowls from Holmul I (PM) and the highlands.

The resemblances between the two areas do not seem to be the result of trade so much as of local expressions of common ideas. The straight-sided bowl is the same, but the decoration differs from one site to the next; the orange votive bowls vary in consistency of slip and composition of paste; negative-painted rings are the same, but the decorative use to which they are put is different. A suggestion of direct influence is shown by a bowl from Uaxactún apparently decorated in the Piedras Negras negative-painted style (A. Smith 1932, Fig. 4e).

The resemblances between the Alta Verapaz-Quiché region and Piedras Negras carry out this suggestion of certain common denominators of pottery throughout the central section of the Old Empire, since we find in this Atlantic highland region, as well as in the Petén and Middle Usumacinta, the orange votive bowl (p. 9), the straight-sided bowl (Termer 1930-31, Fig. 11), the flanged bowl (UM; Termer 1930-31, Fig. 3-7), and bowl with nicked flange (Termer 1930-31, Fig. 3), the orange polychrome wide-mouthed jar (Termer1930-31, Fig. 9-10), and the three-feather parrot motif (UM). Carved Orange 3 ware, in what might be called the Usumacinta style, occurs only at Piedras Negras, Yaxchilan, and Kixpek in the Chamá district.

There is, as well, definite evidence of trade between these two areas, such as the Chamá polychrome found in a few sherds at Piedras Negras, and the grater bowl found at Kixpek, which seems to have been a trade piece carried there from Jonuta, probably by way of Piedras Negras. These grater bowls present an interesting problem. One Orange 3 grater bowl comes from Kixpek, one or two from Piedras Negras, and several from Jonuta, on the Usumacinta, half-way between Piedras Negras and the coast of the Gulf of Mexico. Two Piedras Negras Brown 2 bowls are similar to the grater bowls, except that a decorative design instead of utilitarian parallel lines is incised on the floor of the vessel. A single vessel, from Kixpek is, in shape and color, like the Piedras Negras Brown 2 bowls, but lacks the incised design.

Tripod bowls with incised designs on the floor of the bowl occur from South America to Mexico (Jijón y Caamaño 1923, Pl. CXXVIII; Lothrop 1926a:214, 216-17, 221-22; Boas 1921-22) where they are most frequent on the Aztec level, although a fragment from Gualupita (Vaillant 1934, p. 88) shows that such vessels were made by at least one Mexican Archaic people who may, however, not have been particularly early (Linné 1934:76; Vaillant 1932a:489). The specimens from Central and South America, and an occasional Aztec one, have decorative designs; most of the Mexican ones have, like those from Jonuta, Piedras Negras, and Kixpek, parallel lines out deep in the clay while it was wet, presumably utilitarian, and responsible for the term "pepper-grater bowl". Such a feature is unusual enough so that one would expect some link between bowls showing varying forms of it in the same general geographic area. If such were the case, one would expect the non-functional, decorative form to be a development from the functional form, and therefore later in time. This would imply, in the case under consideration, that the Nicaraguan and South American bowls were derived from the Mexican, and were therefore on a later time-level.

Be that as it may, a petrographic analysis implies, from the quality and quantity of the quartz tempering used, that the Kixpek grater bowl is a trade piece from Jonuta, and that the Piedras Negras ones are local copies of the Jonuta ware. Jonuta grater bowls are stylistically as well as geographically closer to Aztec grater bowls to the north than to Nandaime and Managua grater bowls, their nearest neighbors to the south. While the grater bowl sherds at Piedras Negras are presumably late there, they belong with pottery that is definitely that of the Maya Old Empire. If they are copies of a Jonuta ware, that must belong to the same early time level. It cannot be a derivation from Aztec grater bowls, which it resembles in color, general form, and function. A suggested line of development is that we have at Jonuta a Tabascan prototype of the Aztec grater bowl, or a contemporary of its Mexican prototype.

We cannot tell the time relationship of the highlands to the lowland areas. The hill country has been considered peripheral temporally as well as geographically to the Old Empire. However, the distribution of Chamá polychrome, prevalent in that district, appearing sporadically in Old Empire sites, and the apparent trade with Jonuta by way of Piedras Negras, suggested by grater bowls, imply a fairly early flowering of culture on the Atlantic slope of the cordillera.

Piedras Negras shares with Copán the following pottery traits: Copán I polychrome potsherds, negativepainted disk decoration, low relief and champ-levé carved decoration. The Copán I sherds at Piedras Negras may be considered as trade pieces, and there is evidence of influence from them on Piedras Negras local polychrome
ware. Relief carving on pottery is apparently late at Piedras Negras; at Copán it is associated with anomalous Mound 36. There is no other evidence of contact between Piedras Negras and the southeastern part of the Maya area.

There is little evidence of connection between Piedras Negras and the Pacific Highland region as represented by the pottery from Lake Atitlán. Since nothing has been published on early Yucatecan and Campeche material it is impossible to compare it with that from Piedras Negras.

## Late Maya

The negative-painted disks, referred to as occurring at Piedras Negras and Copán, appear on a sherd from Hochob in the Río Bec region, in a form identical with that found at Piedras Negras. Hochob has been considered, because of its architecture, to belong to a transitional period between the Old Empire and the Late Maya period. This single potsherd suggests a ceramic connection between Hochob and the Old Empire.

Piedras Negras pottery is definitely different in character from that of the Late Maya occupation of Chichén Itzá. What Yucatecan pottery is a available in publications shows some polychrome and more carved decoration, both distinct in style from those found at Piedras Negras. The development, suggested in Piedras Negras pottery, of a decreasing use of polychrome supplanted by the introduction of relief carving on pottery seems to have its logical sequel in Yucatecan pottery.

As mentioned before, what deductions can be drawn from a comparison of qualitative petrographic analyses of a small number of sherds from the Maya area point to variations from one region to another, rather than from one site to another. This is not as discouraging as it seems at first. The plan in Figure 4.10 shows the distribution of the eighty-two sherds examined. It will be noted that Piedras Negras is the only site where pure calcite tempering appears, and the only place where, in mixed tempering material, calcite is predominant over quartz. Except for one sherd from Kixpek, in which calcite is predominant, all the other sherds in which calcite is present show an equal quantity or a predominating quantity of quartz. Therefore, although the substances used for pottery tempering are few in number, the relative proportions employed may turn out to be as significant as a greater diversity of materials The fineness, regularity, and quantity of the quartz tempering at Jonuta, for instance, distinguish it from any of the other quartz tampering examined.

We know that Piedras Negras was a major city of the Maya Old Empire. Its pottery, representative of the ceramically distinct Middle Usumacinta region, clearly belongs to the same stock as the other groups of Maya Old Empire pottery. It shares certain traits with the Petén, Salvador, nor the Pacific Highland region as now


Figure 4.11 Map of the Maya area, showing distribution of tempering materials and number of sherds tested from each site. Symbols: $c=$ calcite $; q=$ quartz $; f=$ feldspar; $>=$ greater than $;=$ equal to.
known. Piedras Negras also in touch with Copán, the eastern most great Maya city that must have provided the link between the Maya country to the east of it, and the central great city area to its west. Stela H at Copán shows a man in a striking costume characteristic of Palenque, the only costume of the sort on Copán stela (Butler 1931). This may be another instance of contact between the Middle Usumacinta and Copán.

It is almost too obvious to mention that the position of Piedras Negras on the bank of the Usumacinta undoubtedly determined many of its contacts. It would be almost inevitable that it trade with the Alta Verapaz region around the head-waters of the Usumacinta; it would be very likely that trade would follow along the Usumacinta, the Chixoy, and the Motagua, from Piedras Negras to Copán and Quiriguá. Just as inevitable would be trade, down the river, with Jonuta, and, one would think, with Mexico, although there is no trace of direct contact, with any region outside the Maya area.

## Note on Pottery From the 1933 Excavations

It is not possible to include in this paper an account of the pottery from the 1933 excavations, which will be published in a later paper. The material was well-preserved with interesting developments along the lines already indicated. Some features are outstanding.

One is the identification of a white ware. While shards had been found before this showing the remains of a white slip, they were always so badly weathered that it was impossible to tell whether they were, originally white or polychrome, since much of the polychrome, painted over a basic white slip, weathered in the same way. Among the wellpreserved sherds from 1933 were some that proved beyond question the existence of a white ware at Piedras Negras. In addition to the ordinary white ware, in which the interiors of vessels are sometimes painted black, there are two white sherds, one a dish, one a bowl, which have a broad red line painted around the rim, and one small narrow-necked white jar with a crude orange geometric design on the side.

Large single scrolls occur on the sides of Polychrome A bowls, and a vigorous conventionalized bird on a Polychrome D dish is done in a manner that recalls the Petén style (A. Smith 1932, Pl. 2, 3e). An animal effigy vessel foot was found in the West Group; present evidence suggests that this is a trade piece from the Chamá district.

Possible indication of contact with the Chukumuk district on Lake Atitlán in the highlands of Guatemala is shown by two Piedras Negras gray-black sherds with incised-and-punctate and incised-and-hatched renderings of a stepped fret design (Lothrop 1933, Fig. 16a, 17, 27a). A mottled rare Piedras Negras sherd has the same fragment of incised-and-crosshatched design that is shown by Lothrop (1933, Fig. 27g) on a black ware Chukumuk sherd. There is also a red ware sherd from Piedras Negras
grooved in the horizontal lines that occur at Chukumuk on orange, brown and red wares (Lothrop 1933, Fig. 12h, 21b, 27a).

# Appendix 

## Qualitative Petrographic Analysis of Potsherds, A.William Postal

The following tempering materials have been identified in the potsherds examined: calcite, quartz and feldspar.

## Calcite

Source: Crushed limestone. Calcite is identified by physical structure, by the usual optical tests, which show it to be distinct in physical structure from other types of calcium carbonate such as shell, and by its brisk effervescence when tested with cold dilute hydrochloric acid. This test provides definite means of distinguishing calcite from dolomite. A few typical dolomite rhombs were observed in some of the larger calcite aggregations, but they are comparatively rare; their presence would tend to bear out the opinion that the material was obtained by crushing limestone.

## Quartz

Source: sand, probably from the river bad. Because of its extreme stability, quartz is the commonest of the detrital minerals, and as such forms the greatest part of the bulk of all sands. Many of the sherds subjected to petrographic analysis were tempered with both calcite and quartz. Quartz is often a minor constituent of limestone, being deposited contemporaneously with the calcium carbonate, or developing later as a secondary mineral. If tempering material is obtained by crushing such a limestone a certain amount of quartz would naturally be present. Of course the possibility of intentional mixture on the part of the potter must also be borne in mind.

## Feldspar

Source: crushed igneous rock, or sand derived from such rock. The feldspar is associated with mica (biotite) and quartz in the sherds in which it is found. Such a mineral association plus the fact that a few of the feldspar show good crystal outline might be taken to support the tentative suggestion that the rock furnishing the tempering material was an acid porphyry.

The petrographic technique as used above is capable of refinement and a more quantitative application; this could be achieved by carrying out actua 1 counts under the microscope on the relative proportions and sizes of tempering materials present, the counts then
being converted into percentages. By these means two different types of pottery having the same kind of tempering could be statistically differentiated. One source of error might arise unless the people making the pottery had a well standardized procedure, the normal variation in proportion and size of tempering materials would be sufficient to invalidate the results obtained by precise analysis, this making it impossible to make any comparison on the similarity alone of the relative proportion of grade sizes and angularity of the tempering substance.

Many of the samples examined had spherical nodules of hematite sufficiently large enough to be seen by the naked eye (the diameters ranging approximate 1 y from 0.5 mm to 0.2 mm ). The hematite was proven by blow piping, the nodules giving a strongly magnetic residue after being fused with sodium carbonate.

A preliminary investigation was also carried out to ascertain the possible heavy mineral content of these samples. To achieve this two of the specimens were crushed and passed through a 65-mesh sieve, and retained on a 200 -mesh sieve; the separation was carried out with acetylone tetrabromide. The samples so treated were L-16-645 and L-16-707.

The minerals obtained from L-16-645 were: magnetite and hematite in abundance, four zircons, and one grain each of hornblonde and epidote were also noted. L-16-707 showed only magnetite and hematite.

The above results show a possibility of arranging a classification on the basis of heavy mineral content. The drawback to this method lies in the bulk of material that would have to be crushed to obtain a sufficient quantity of diagnostic heavy minerals.

Temperature of firing of ceramic material as ascertained from their mineralogical components is largely negative, i.e., a maximum temperature may be determined above which the material could not have been fired, although the actual firing temperature may have occurred at any point through a long range below this maximum. The following information is listed in order to fix the temperature above which the pottery covered in this report could not have been fired.

Calcite dissociates at atmosphere pressure at a temperature of about 900 degrees Centigrade.

Hematite melts at 1350-1400 degrees Centigrade.
Magnetite melts at 1190-1225 degrees Centigrade.
Quartz melts about 1780 degrees Centigrade; strictly speaking this melting point should refer to silica; true quartz converts to tridymite at about 870 degrees Centigrade, and tridymite converts to cristobalite at 1470 degrees Centigrade. Cristobalite may melt at 1710 degrees centrigrade.

Applying this information to the samples covered in this report, some idea may be obtained as to the firing temperatures to which they were subjected.

## Piedras Negras

Polychrome A-1.L-39-21 (1)
This sample is tempered with a medium well-graded angular to subangular calcite; cleavage was observed on some of the fragments. Quartz and hematite are rare. Color banding in cross-section is orange-black-orange.

## Polychrome A-2. L-17-67

Tempering material is calcite, fairly evenly graded subangular fragments with a few large rounded grains. A few angular quartz grains were noted. Many small hematite nodules are present.

## Polychrome B. L-39-89 (14)

Tempering material is unevenly graded sub-angular calcite; some cleavage and a few granular aggregates were noted. Angular unevenly graded quartz is present (calcite forming the greater part of the tempering material). Both large and small hematite nodules were noted. Color banding: red-black-red.

## Polychrome C. L-39-53 (2)

Calcite is the chief tempering material in this sample; it is divided into small and large grade sizes, the fragments being angular to sub-angular; some cleavage and a few large granular aggregations were noted. Quartz is rare. A few good hematite nodules were observed. Color banding is present, the fragment in cross-section being divided into equal portions of yellow and orange.

## Polychrome C-1.L-17-164

This sample is tempered with large spheroidal grains of calcite, the grains being composed of aggregates of finer particles. Medium sized angular quartz fragments are present. Calcite is present in larger quantities than the quartz. Small to very large hematite nodules were observed.

Polychrome D. L-39-73 (2)
This pottery is tempered with calcite, the bulk of it being a medium-sized evenly graded sub-angular material though some large fragments are present. Quartz is very rare.

## Polychrome D-1.L-17-203

The tempering material of this pottery is a fairly wellsorted angular to sub-angular medium-sized calcite. Quartz, though present, is rare. Some good hematite nodules were encountered.

Polychrome D-1.L-17-297
Unevenly graded sub-angular calcite; some cleavage noted. Quartz is rare. Hematite was observed in both
large and small angular fragments and nodules. Color banding: Buff-gray-buff.

## Polychrome E. L-27-85

This sample is tempered entirely with calcite, the fragments being angular to sub-angular and fairly well graded; no cleavage was observed. No quartz was noted, and hematite nodules are very rare.

Polychrome E. L-17-203
The tempering material of this pottery is a fairly wellsorted angular to sub-angular medium-sized calcite. Quartz though present is rare. Some good hematite nodules were noticed.

## Polychrome E. L-17-178

Medium-sized unevenly graded sub-angular calcite tempers this pottery, some cleavage being noted in the calcite. Fairly frequent angular to sub-angular quartz was observed (calcite is present in by far the greater quantity). Large and small hematite nodules are present.

Dark-on-light Orange. L-39-27 (1)
The tempering of this pottery is fairly diverse and is composed of a fair quantity of fine angular quartz, small angular and spherical calcite fragments, and few hematite nodules. Color banding is represented by equal portions, in cross-section, of light yellow and gray. This pottery is so similar to L-28-55 that in classification they can undoubtedly be put together.

## Dark-on-Light Orange. L-28-58

This pottery has a fine texture and is tempered, with a fine evenly graded angular to sub-angular calcite. Quartz is present though rare. The section is bordered by a more highly granular than the interior. Fine angular fragments and nodules of hematite were noted.

Dark-on-Light Orange. L-28-55
As in L-28-54a the tempering of this sample is composed of both calcite and quartz. The calcite is present in the greater proportions; the former mineral is present in unevenly graded angular fragments, some of which show good cleavage. The quartz is unevenly graded and ranges from angular to sub-angular fragments. Hematite patches were noted and good brown biotite, strongly pleachroic; some well bleached; also some vermiculite. This sample is gray in section save for a thin white coating.

Dark-on-Light Red. L-28-72 (1)
The tempering material in this sample is rounded to sub-angular, medium-sized, unevenly-graded calcite; some cleavage and large rounded calcite aggregates were observed. Unevenly graded angular quartz was
noted (the calcite is present in larger quantities than the quartz). Abundant biotite or vermiculite fragments are present, and a few small hematite nodules. The structure is somewhat fibrous. Color banding: buff-orange.

Orange, Miscellaneous. L-28-10
The tempering material used in this pottery is chiefly calcite; it is of a well-sorted grade-size, though occasional large aggregate grains are encountered; some of the calcite exhibits good cleavage. A few angular quartz fragments are present, though these are rare.

Orange, Miscellaneous. L-16-673
This sample is tempered with angular to subangular calcite which is fairly well sorted as to grade-size; some of the calcite shows good cleavage. Quartz is extremely rare.

## Orange 1.L-28-72

Calcite is the principal tempering agent in this sample, both large and small grade-sizes being observed. Some good cleavage was noted in the calcite.

## Orange 2

This pottery is tempered with an unevenly graded, fine to large, angular to sub-angular calcite; some of the larger fragments show very good cleavage and twinning. Quartz is very rare.

## Orange 2a. L-28-6

This material is tempered with a fairly well graded medium angular to sub-angular calcite, though a few isolated large particles observed. Quartz is present as unevenly graded angular fragments (calcite is present in larger quantities than the quartz). Hematite nodules were noted.

## Orange 2a. L-39-X

Tempering material is a fine evenly graded calcite. Quartz is present though rare. Some small hematite nodules were noted.

Orange 3. L-28-58a
The tempering material of this sample is composed of fine, evenly graded quartz. The fragments are mostly angular in shape. No calcite was observed though a slight acid reaction was noted in the matrix. There is a greater quantity of tempering material here than in the other sherds tested.

Orange 3. L-28-58b
The tempering of this sample is similar to the above sample in quantity and quality save that the grade size of the quartz is slightly larger. A few hematite patches were noted.

Yellow. L-16-468
The tempering material here is a well-sorted angular to sub-angular calcite, some of which exhibits cleavage. Quartz, though present, is exceedingly rare.

## Mottled. L-39-73

Tempered with unevenly graded angular to sub-angular calcite; good cleavage was noted in the calcite; a few spheroidal grains were also observed. Quartz though present is rare. Hematite nodules are present.

## Mottled. L-16-707

Calcite is the main tempering material encountered in this pottery. As in sample L-16-714, it can be divided into two definite grade-size groups, large and small. Quartz was noted but is very rare.

## Mottled. L-16-626

This sample is tempered with fairly evenly sorted calcite and quartz. The calcite merges well into the matrix in such a way as to suggest a higher temperature of firing than that to which the other specimens were subjected. The quartz, though not as frequent as the calcite, is quite numerous and is scattered through the matrix as irregular particles of finer grading than the calcite. No structure is observable in the calcite.

## Mottled. L-16-714

The tempering of this sample is calcite, which is divided into two definite grade-size groups, large and small; both these groups show good sorting. The larger grade-size suggests dolomitic aggregates. Cleavage in the calcite is not common, but some was observed. Quartz is rare, but is commoner than in samples L-16-468 and L-16-673.

## Red Miscellaneous. L-17-167

This pottery is tempered with a fine evenly graded subangular calcite and many large spheroidal aggregates of calcite. Frequent large to small, angular to sub-angular quartz grains were noted (the calcite is present in greater proportion than the quartz). Many small hematite nodules were observed.

Red Miscellaneous, Maroon, on Orange Paste. L-16-426
This pottery has a very fine texture; it is tempered with very fine well-graded angular quartz. Silica needles and many small hematite nodules were noted. No calcite was observed. This type may be compared with the Orange 3 (L-28-58a) type from size and abundance of tempering material.

## Red 1. L-28-72

No calcite was observed in this pottery; the tempering material is unevenly graded angular to sub-angular quartz. Hematite nodules were noted.

Brown, Miscellaneous. L-28-33
The tempering in this sample is an unevenly graded subangular calcite with very good cleavage. Quartz and hematite are very rare, though quartz is present in greater quantities than the hematite.

## Brown 2. L-28-52b

This sample is tempered with large, spheroidal grains of calcite, and unevenly graded angular quartz. Traces of organic material were noted. Clear patches of an isotropic substance (vitrified material?) are occasionally encountered. Small hematite nodules are present. Structure had a matted appearance. Color Banding. Black-gray-thin black.

## Brown 2. L-28-54b

This pottery is tempered with a fairly well sorted fine angular calcite. Quartz though present is exceedingly rare. Some good hematite nodules were noted. Color banding in cross-section was noted, namely thin black-orange-thin black.

## Black. S-2-23

This Sample is tempered with an unevenly graded angular to sub-angular calcite; some of the fragments show good cleavage. Several large spheroidal grains of calcite showing concentric ring structure were observed. Fine angular quartz is present. Biotite was noted; large hematite nodules were also seen. In view of the above, the designation Black would seem very doubtful; this specimen seems more closely allied to the Dark-on-light Orange type (samples L-28-55 and L-39-27 (1).

Black 1. L-28-24
The tempering material of this specimen is composed of poorly graded quartz, the fragments ranging from small flecks to large particles. No calcite was observed.

Black 1. L-16-209
An unevenly graded angular to sub-angular quartz forms the main tempering material of this sample, though a few fragments of calcite were, noted and a slight acid reaction was observed in the matrix.

Black 1. L-39-50
Fine and medium quartz particles made up the tempering of this sample, the fine grade size being in the majority. The fragments range from angular to sub-angular. No calcite was observed.

Black 2. L-28-54a
The bulk of the tempering material in this sample is an unevenly graded angular calcite; a few of the fragments show fair cleavage. Frequent fine well-graded quartz in
angular form was also noted in the tempering. A few well-formed hematite nodules are present. This pottery in cross-section has a definite color banding, namely, orange-black-orange.

Black 2. L-28-72 (2)
Tempered with large evenly-graded angular to subangular calcite; some cleavage was seen; fine angular quartz was observed to be disseminated through the matrix of the pottery. Many fine hematite nodules are present.

Unslipped. L-16-645
This pottery is tempered with calcite, the fragments being angular to sub-angular and evenly graded. Practically no cleavage structure was seen. Quartz was encountered, but is quite rare.

## Jonuta

Jonuta, Orange. 31-25-30
This pottery is a very fine grained distinctive type and has not been encountered heretofore. It is tempered with very fine evenly graded quartz, the fragments being mostly angular. Color banding in cross-section is dark red-light red-dark red.

Jonuta, Orange. 31-25-5a
This pottery has a very fine texture, and is tempered with very fine, fairly well graded angular quartz. Many small hematite nodules were observed.

## Jonuta, Gray. 31-25-14

This pottery has a very fine texture; it is tempered with very fine evenly graded angular quartz and a few fine silica needles. No calcite was observed.

Jonuta, Black. 31-25-X
This sample is tempered with an unevenly graded angular to sub-angular quartz; a few silica needles were observed. A few calcite grains were noted, but quartz is far more abundant than calcite. Hematite nodules are present. Color banding: Brown-black-brown.

Jonuta, Black. 31-25-16
This type is tempered with roughly equal portions of fairly well graded fine angular quartz and calcite. Silica needles were noticed. Color banding in cross-section was shown by a very thin outside band of light gray.

Jonuta, Unslipped
A fairly well graded medium angular quartz tempers this sample. Some hematite nodules were noted.

## Highlands of Guatemala

Chamá, NA 11302
An unevenly graded angular to sub-angular quartz constitutes the tempering material of this sample. Many silica needles and a few plates of mica were noted.

Chamá, Red. NA 11239
Angular to sub-angular quartz is the main tempering material of this sample. Many silica needles were noted. Mica though present is rare. Some hematite nodules were observed.

Chamá, NA 11121
This sample is tempered with fairly evenly graded fine sub-angular quartz. Abundant plates of mica (biotite) and silica needles were also noted. Some small hematite nodules were also observed.

Chamá, NA 11124
A fairly graded, medium, angular to sub-angular quartz is the main tempering material of this pottery. Abundant silica needles and biotite were also noted.

Chamá, NA 11103
This sample is tempered with a fairly well graded fine subangular quartz. Some silica needles, hematite nodules, and biotite were also observed.

## Chipal, Red-on-Buff Effigy. NA 11377

The tempering material of this pottery is an unevenly graded angular to subangular quartz. A few hematite nodules are present. Biotite though present is rare.

## Chipal, NA 11563

This sample is tempered with an unevenly graded angular to sub-angular quartz. A few hematite patches were observed.

## Kixpek,White-and-Black. NA 11597

The tempering material of this pottery is an unevenly graded mixture of feldspar and quartz; one perfect crystal of orthoclase showing Carlsbad twinning was observed. Rare biotite or vermiculite is noted.

## Kixpek, Black. NA 11608

The chief tempering material of this sample is an evenly graded angular to sub-angular quartz. Some hematite patches ware also noted, and a little biotite and vermiculite are present.

Kixpek, Plumbate. NA 11603
This sample is tempered with a fairly evenly graded angular quartz.

Kixpek, Orange 3 Grater Bowl. NA 11622
This pottery has a very fine texture, and is tempered with a very fine, fairly well graded angular quartz and many silica needles. Some small hematite nodules were observed. This pottery is similar to Jonuta Orange (31-25-5a, and 31-25-30).

## Kixpek, Orange 3 Carved Bowl. NA 11606

This pottery has a very fine texture; it is tempered with a fine angular quartz. Some small hematite nodules were noted.

Kixpek, Black. NA 11599
The tempering material of this pottery is an unevenly graded angular to sub-angular quartz. Some hematite nodules were present. A few rare silica needles and plates of biotite were also noted.

## Kixpek, NA 11633

This pottery is tempered with an unevenly graded angular to sub-angular quartz. A few silica needles were observed. Color banding. brown-black-brown.

Kixpek, Buff. NA 11634
The tempering material of this sample is an unevenly graded sub-angular quartz. Biotite though rare was noted. Color banding: brown-black-brown.

## Chuitinamit, Polychrome. 33-24-10

The tempering material of this sample is composed of an unevenly graded angular quartz. Some feldspar was also noted, though it is fairly rare. Hematite nodules are present. No calcite was encountered. Color banding: red-black-red.

Chuitinamit, Red-on-Buff. 33-24-12
Quartz forms the tempering of this sample, the particles being angular and unevenly graded. No calcite was observed; a few magnetite nodules were noted. Color banding in crosssection was brick red-dark gray-brick red.

Chuitinamit,White-on-Red. 33-24-7
Same as 33-23-10, only some of the quartz shows undulose extinction, and the feldspar is perhaps a little rarer.

## Other Maya Sites

## Baking Pot, Red-Orange. T-67

This sample is tempered by an unevenly graded fine angular quartz and calcite, some of the calcite showing good cleavage. Quartz and calcite are present in about equal proportions. A few hematite patches were noted.

Labná, Buff. T-167
The tempering material of this pottery is an unevenly graded angular to sub-angular quartz. Hematite is abundant and some calcite is present. An unidentifiable yellow mineral, showing no extinction is to be recorded.

Labná, Slate. T-13 ${ }^{7}$
This sample is similar to T - 16 but a slightly larger volume of calcite was observed, some of the fragments being fairly large and showing good cleavage.

Holmul, Red-Orange. C-5707-(1) ${ }^{7}$
The tempering material in this sample is an unevenly graded sub-angular calcite; a few large aggregate and spheroidal particles were observed. Quartz is very rare.

## Holmul, RedWash. C-5707-(2)7

This pottery is tempered with an unevenly graded subangular calcite and a fairly well graded angular quartz. Quartz is present in greater quantity than the calcite; some good cleavage was noted in the calcite. Some feldspar and mica (biotite) were also noted.

Nakúm, Red-Orange. C-5131-(1) ${ }^{7}$
Fine fairly well graded angular quartz is the main tempering agent in this sample. A few spheroidal calcite particles were noted. Some biotite was observed. Hematite nodules are present.

Nakúm, Red-Orange-on-White. C-5122 ${ }^{7}$
This pottery has a smooth fine texture and is tempered with a medium unevenly graded angular quartz. Both large and small hematite nodules were noted.

Copán, Orange Polychrome. C-980-(3) ${ }^{7}$
An unevenly graded angular quartz is the main tempering agent in this pottery, though some feldspar and mica were noted. Some hematite nodules were observed.

Copán, Polychrome (Copán 1; cf. Piedras Negras, Polychrome E). C-980-(2) ${ }^{7}$
This sample is tempered with an unevenly graded quartz. Hematite though present is rare.

Quiriguá, Polychrome. C-85647
Unevenly graded angular to sub-angular quartz forms the tempering material in this pottery. A few rare biotite wisps were noted.

Ulúa Valley, Polychrome. NA 5635
This pottery is tempered with fairly evenly graded angular quartz. Calcite though present is rare. Numerous hematite nodules were observed.

## Central American and Mexican Sites

Rivas, Nicaragua. 21907
The tempering material of this sample is composed of an unevenly graded feldspar and quartz; a little mica was noted.

Panama, Chiriquí, Black Incised. 29-52-954
Tempering composed of unevenly graded quartz and feldspar. The feldspar often shows good crystal outline; some Carlsbad twinning was also observed. Some of the quartz exhibits undulose extinction. Occasional plates of biotite were noted.

Panama, Chiriquí, Negative-Painted. 29-53-1256
The main tempering material of this sample is an unevenly graded angular to sub-angular quartz. The following
minerals though rare were noted; rutile, biotite, pyroxene (hypersthene?), feldspar and hematite.

Panama, Chiriquí, Armadillo. 29-52-778
An unevenly graded angular quartz and feldspar composes the main tempering material of this sample. A few hematite nodules and a little biotite were also noted.

## Mexico Valley, San Juan Teotihuacan 394

This sample is tempered with an unevenly graded quartz and feldspar, the latter often showing good crystal outline and twinning. A few rare mica flakes were observed.

Mexico Valley, San Juan Teotihuacan 447
This pottery shows, with the exception of some very rare mica, the some tempering materials as San JuanTeotihuacan 394. Color banding is as follows: brown-black-brown.

## 2. Ornaments, and Miscellaneous Objects, Mary Butler

## Introduction

The excavations of 1931-32 at Piedras Negras uncovered ninety-five human figurines made of baked clay. All but three of these conform to mold-made technique. Eightynine belong to a realistic finely executed style designated as X (Butler 1935b); three to a style that can at present be called a local phase of Style Y, conventionalized, crude, and vigorous. One of the remaining three figurines has a crudely modeled body below a head that was probably mold-made. Of the other two, modeled heads, one is very badly weathered, and the other is grotesque, archaistic, rather than archaic. There is no indication of figurines that can be considered as "Archaic".

Piedras Negras figurines occur sporadically as deep as a meter from the surface in deposits whose depth, to bedrock, seldom exceeds 1.6 to 2 m . The only evidence of human presence at the site later than the Old Empire is in a few Lacandon incense-burners. There is no reason to believe the Lacandones capable of producing work as fine as these figurines. It seems safe then, stratigraphically as well as stylistically, to assign them to the main occupation of the city, during the best years of the Maya Old Empire.

The Piedras Negras figurines come from all parts of the city, being found usually in dump-heaps or the debris around buildings. In the latter case, traces of stucco on several suggest that, like potsherds, they are used in the armature for decorative stucco relief. This implies that most of them are discards, and would account for their
fragmentary condition. Of seventy-nine human heads, only five have bodies attached to them. Headless torsos number sixteen. Many figurines have the form of whistles, due to vents in the hollow body and a mouthpiece, attached usually at the lower back of the figure. While this may mean merely that whistles were made in the form of clay figurines, there is the possibility that the idea of using a clay figurine as a whistle developed incidentally from the technique of making figurines in a mold, which required a hollow body with vents in it for any figure reproduced in the round. There are specialized figurine forms in the Ulúa Valley, the highlands, and Yucatan, where the function has conditioned the shape of the piece, but nothing of this sort has as yet been found at Piedras Negras. A few Piedras Negras figurines are pierced from side to side through head or shoulder, probably for suspension as an offering or amulet, or for carrying around the neck in the case of whistles. Clay figurines do not occur in burials or votive caches, although in caches tiny jade and shell figurines are frequent, enough.

In describing the Piedras Negras figurines, we shall take first the human effigies, then the animal. There is technical variation in those figurines, which show more than the head. Some have head and body cast in one mold; others have head and body molded separately and then joined; some have modeled bodies; all, with one exception, are finely done. Bodies, with the one exception just mentioned, are hollow; heads may be hollow or solid. The clay is fine, tempered with calcite
and quartz. It is seldom fired high, and the colors range from brown, through orange to buff, the most frequent shade being a light red-orange; the heads are small, the face averaging 2-3 cm in height.

References to specimens in other collections are indicated by the symbols:

PM Peabody Museum of American Archaeology and Ethnology, Harvard University, Cambridge, MA.

AM American Museum of Natural History, New York, NY.

FM Field Museum of Natural History, Chicago, IL.
UM University Museum, University of Pennsylvania, Philadelphia, PA.

JC Private collection of Mrs. William James of Merida, now scattered.

MAI Museum of the American Indian, Heye Foundation, New York, NY.

## Figurines

## Human Figurines, Mold-Made

Style X
The bodiless state of most of the specimens in Style X makes it difficult to classify them. Falling back on a grouping by head-form, we find that the bulk of the material comes under Forms A, B, or C.

## Headform $A$

Oval face, narrowing from jaw to flattened forehead, which slopes back from eyebrows at a sharp angle. Receding chin.

One type is established at Piedras Negras of which variants are found as far south as Costa Rica and as far north as Chihuahua. This is the hunchback (Fl-3-3. He appears at Piedras Negras as a seated man, nude except for a loincloth and neck ornament, (Fig. 4.12.15); his left hand rests at his waist, his right hand by his side. Another Maya example, differing in treatment, comes from Jonuta (PM).

Seventeen heads, (F4-20), or almost one quarter of the total number so far found, have a high headdress, ending squarely at the top, that is cut straight across the forehead and falls away in steps, usually two on each side, to hang behind large round earplugs (Fig. 4.12.1, 2). It is bisected in front by an incised vertical line; in back it comes down in one fold to cover the neck.

This stepped type of headdress occurs, with any number of additions and variations, throughout the Old Empire, but the plain, unadorned variety so far appears on figurines only at Piedras Negras and on a figurine
from near Palenque (Blom and LaFarge 1926-27, Fig. 166, Gann 1926:242). This shows a standing woman, wearing a long skirt, carrying a dog, and leading a small male figure with an adult face. The implication, borne out by other figurines (FM, PM Blom and LaFarge 192627:200) and stucco relief (Spinden 1913:51) is that of goddess and devotee. It is inadvisable, however, to try to associate this headdress with any one type of figurine, since, although there seems to be a regional distribution of some headdresses, they are seldom a constant element in any one type.

In considering the Form A heads with more elaborate headdresses, we find that they fall into sub-groups determined by technique. And in almost every sub-group we find a specimen that is duplicated in Tabasco to the northwest or the highlands to the south.

Of four heads with applied fillets of clay added at the top (F21-24), two have the stepped hairdressing just described (Fig. 4.12.4, 5). One of these with two fillets so intertwined as to represent coils of hair on top of the head (Fig. 4.12.4) is reproduced at Jonuta, in the local style, on a woman standing with raised hands (Spinden 1913, Pl. 17, 7).

Then there are three heads (F25-27) with a perfectly plain, hood-like headdress that gives a sugar-loaf shape to the high, flattened head, and fits in a curve around the face (Fig. 4.12.7). This is found again in the highlands (Spinden 1913, Pl, 17, 5).

Of four heads molded in one piece with their elaborate spreading headdresses (Figs. 4.12-4.14), two wear a puff-ball type of textile turban (Fig. 4.12.3) that appears again in stone carving on "Lintel" 4 at Piedras Negras (Maler 1901, Pl. XXXII), on painted pottery from the highlands (Gordon 1928, Pl. II, VIII; Dieseldorff 1926, Fig. 138), and in clay on a figurine head from Lubaantun (Joyce 1926, Pl. XXV, XXVI). The other two heads referred to have as the main element in their headdresses an owl mask, found in varying forms in the costume of Maya figurines (Fig. 4.12.12).

There are eight Form A heads with elaborate applied headdresses, (F32-39). The upper part of the head is usually more cylindrical than in those heads which have a stepped headdress; this may be to give a surer grip to the applied encircling fillets. Some specimens show the cloth foundation on which the headdress is constructed fitting to a smooth curve around face and high, flat forehead. Some have insignia applied to the forehead or the bridge of the nose.

A finely modeled head, with cruller-twist nose ornament, has around the face a crest that may represent feathers (Fig. 4.12.11). Similar crests are on two heads from the lower Usumacinta (AM; Spinden 1913, Fig. 209). Another head, badly broken, has at the top three


Figure 4.12 Human figurines with Form A heads; 1. F5, Form A head, stepped headdress; 2. F9, Form A head, stepped headdress; 3. F29, Form A head, turban; 4. F22, Form A head, coiled hairdressing; 5. F24, Form A head, applied hairdressing; 6. F43, Form A head, miniature; 7. F26, Form A head, hood headdress; 8. F39, Form A head, plume headdress; 9. F47, effigy lid, Form A head; 10. F40, Form A head; 11.33, Form A head, applied headdress; 12. F30, Form A head, owl headdress; 13. F45, Form A head; 14. F42, Form A head, Mam, the Old God; 15. F1, hunchback, seated, Form A head, back broken off; 16. F41, Form A head.
short plumes (Fig. 4.12.8); a similar head comes from Jonuta (PM). Another (F38) shows the remains of a hat with flaring brim and high conical crown that is found again at Yaxchilan (PM) and Chamá (Dieseldorff 1926, Fig. 39).

There are also nine Form A heads that do not fall into any special grouping (F40-48). Among these are a tiny head with no traces of hair or headdress (Fig. 4.12.6); a broken one with a frill fitting squarely about the face (Fig. 4.12.16); and one with very flattened forehead and holes where the ears should be, and a socket and groove at the top to fasten on a headdress of some other material (Fig. 4.12.10). There are two heads that probably represent gods. One, in poor condition (Fig. 4.12.13) recalls God D of the carvings; the mouth with broken teeth is set in a grimace the eyes in hollows and a shallow depression across the forehead below the high cap-like headdress holds an applied symbol. A Chajcar figurine of a standing man has a similar head, with the addition of jaguar ears. The device in the forehead cartouche of the latter cannot be deciphered from the photograph. (Dieseldorff 1926, Fig. 174). The other head is a finely modeled portrait of Mam, the Old God, with projecting chin and cheekbones Roman nose, and two snag teeth (Fig. 4.12.14). The cylinder rising above the headdress is a socket; an examination of the very long neck suggests that the head fitted originally into the body that belonged with it, then later, after the body was broken, was set into plaster.

A head, which is not strictly that of a figurine, belongs here by virtue of its technique (Fig. 4.12.9). It is hollow, and smoothly finished inside and around the bottom, probably having served as the lid to a miniature jar representing a man's body. Such a combination is found in Plumbate ware (UM), and in the pottery of the highlands of Guatemala (UM). It is the only head from Piedras Negras of fine light brown paste. The man wears very large crescent-shaped labrets at either side of his mouth and a headdress that rises from a pleated fold around the face to a smooth crest at the top.

## Headform B

Square, chubby face with spreading, flattish nose, beneath a normal, even bulging, forehead.

Neither of the two fairly complete figurines with Form B heads belongs to the varying types of fat old men with which this headform is almost always associated in the Maya area (F49-50). The more interesting of the two shows a standing man, between whose hands is a large, circular hollow, presumably for an inlaid disk (Fig. 4.13.30). This suggests a possible link between the late Chacmool figures on the one hand, and the Archaic stone sculptures of Copán and Miraflores (Lothrop 1926b) on the other. The figure is small, rather columnar, and apparently was made in the form of a whistle, with
mouthpiece, now broken off, projecting behind the feet. A hole for suspension perforates the head from side to side. Apparently the broken and useless whistle was discarded and used with sherds as foundation for stucco building decoration. The other figurine shows the head and bust of a man whose hands rest at his girdle (Fig. 4.13.19).

Four heads seem to show a close hood, fitting smoothly around the face, like the hood-like headdress found with Form A heads (F51-54). Two of them (Fig. 4.13.18, 21) have heavy-lidded eyes under high-arched brows, and fat cheeks that suggest the Toltec Fat God (Beyer 1930).

There are three hooded heads that have the sugarloaf head pressed back to form almost a right angle with the face (F55-57). The large round eye sockets show the under lid as well as the upper, giving the face a surprised look that pushes forward a fold of flesh over the cheekbones (Fig. 4.13.20). The hood comes down on the forehead in a point where some projection seems to have broken off; two of the three have at the base of the neck, just below the crown of the head, a round broken projection that may have served some functional purpose.

There are two heads of old men which may be included under the Headform B group (F58-62). One is a toothless old man with a high sloping head (Fig. 4.13.9), the other is a bald, round-headed old man with sunken upper lip (Fig. 4.13.7). A head with the startled eyes and pronounced cheekbones described above has the fold of the upper lip so prolonged as to give the effect of a sweeping mustache, (Fig. 4.13.16). A cap-like headdress completes a picture of rather ferocious vigor.

## Headform C

Broad, flat face, widest at the cheekbones, and pronounced, almost prognathous chin.

The only comparatively complete figurine in this group is a very fine specimen, of buff-brown clay (Fig. 4.14.7). Head and body were made separately, and the solid neck inserted in a hole in the trunk. The figure is that of a man, wearing a long-skirted loincloth, and a cape with applied textile decoration. The short head ends in a socket, presumably for a separate headdress. A similar figurine, with slightly altered costume, comes from near Roknimá in the highlands (UM).

Three heads have hair parted in the middle and drawn down behind the ears (F66-68). This hairdressing occurs in Style X in Tabasco (PM) and British Honduras (Joyce 1926, Pl. XXV), and in a local style in Campeche (JC); it is always associated with Form C heads. Wherever a head so dressed is attached to a body, the body is a woman's. Tabascan and British Honduran examples have coils of hair piled on top of the head in a manner that Landa


Figure 4.13 Human and animal figurines, personal ornaments, and mis-cellaneous objects; 1. M1, flower (?); 2. L-17-227, polychrome disk; 3. M15, jaguar claw; 4. M14, carved tubular earplug (?); 5. M4, spindle-whorl; 6. M2, earplug; 7. 62, Form B head, old man; 8. 74, figurine, modelled with molded head; 9. F58, Form B head, old man; 10. F106, bird head, modelled; 11. F107, bird head, modelled; 12. M6, pendant; 13. F66, Form C head; 14.F96, dog head; 15. F105, double-headed bird whistle, modelled; 16. F63, Form B head; 17. F101, owl; 18. F53, Form B head; 19.F 50, figurine with Form B head; 20. F55, Form B head, "right-angled," broken face on left; 21. F51, Form B head; 22. F69, Form C head; 23. F83, woman's torso, perforated from shoulder to shoulder; 24. F103, pottery object showing jaguar-headed man; 25. F75, grotesque head; 26. F90, woman's torso clothed in long-sleeved robe; 27.

F87, man's torso; 28. F92, StyleY head; 29. F91, StyleY head; 30. F49, figurine with form B head.


Figure 4.14 Human and animal figurines, personal ornaments, and miscellaneous objects; 1. M18, bead (?); 2. M17, shell; 3. M7, gaming disk; 4. M8, conical stand; 5. F97, agouti (?) figurine; 6. F98, owl figurine; 7. F64, figurine with Form C head; 8. 94, grotesque head, modeled, archaistic; 9. cast from mold M3, seated woman; 10. M10, mask; 11. M3, mold of seated woman figurine.
described as a characteristic woman's hairdressing; it is assumed, therefore, that the heads described are those of women. One (Fig. 4.13.13) has a notch in the top of the head, and an undercut at the back similar to those noted by Saville as characteristic of the jades that he tentatively assigns to the Olmecs (Saville 1929). This is relatively flat and resembles similarly cleft heads from Teotihuacan (Gamio 1922:1, Pl. 94).

Of five other Form C heads, only one is all well preserved (F69-73). This has a closely bound headdress wrapped in two broad horizontal folds (Fig. 4.13.22). A square medallion has a badly worn Form C head in the center (F71).

## Miscellaneous

Among those figurines which cannot be assigned to one of the three headforms described as $\mathrm{A}, \mathrm{B}$, and C , are one complete figurine and two heads. The figurine (Fig. 4.13.8) is stylistically probably the earliest one we have from Piedras Negras. Since, although the badly weathered face seems to have been mold-made, the body is very crude and made by hand. It came from the fourth level of a test pit in the South Group and is the only figurine to be found so far below the surface, so according to test pit stratigraphy also, it is early. The body is pinched together hurriedly and apparently shows a woman holding a blanket across her chest with her right arm. A crude modeled figurine from British Honduras shows a seated person holding with his right arm a blanket across his face (Gann 1900, Pl. XXXVII).

One head (Fig. 4.13.25) is grotesque, with the back smoothed vertically into a concavity that might have fitted over a finger or a stick; the other, merely the top of a head (F76), is interesting only for the fact that it is the only head that is perforated for suspension from front to back, instead of from side to side.

Of the headless torsos (F77-90), some very fragmentary, the most interesting are two (F89-90) that show a woman in a low-necked gown, the sleeves of which fall from her wrists into long points (Fig. 4.13.26). Another such torso comes from Yaxchilan (PM). There is one complete figurine with such a body, probably from Campeche (JC). This has a wrinkled, bald head, too large for the body, set squarely on its shoulders. The garment is probably another version of the wide huipil seen on figurines executed in local styles in Tabasco and Campeche, but the figurines under discussion are distinctive, small, and finely made. Two other torsos (F8283) one a woman's, are pierced for suspension from side to side through the arms just below the shoulder (Fig. 4.13.23). Another shows a man, probably old, judging by his heavy sagging body, and very thin arms, with hands clasped at his right shoulder, (Fig. 4.13.27). Others show variation in men's neckwear and in technique.

Style Y
Three broad flat, solid heads (F91-93), molded entire, head, headdress and earplugs, in red clay, are a conventionalized product quite different from any other figurines at Piedras Negras (Fig. 4.13.28, 29). Superficially they much resemble flat figurine heads from the Valley of Mexico. The face is the same as that described under Headform C. Two of the three have, as main element in the wide squared headdress that frames the face, a twisted roll of textile that appears elsewhere only with Form C heads in local styles of the highlands (MAI), Campeche (JC), and the Ulúa Valley (PM). The head of the figurine from the highlands on which this headdress element occurs bears a distinct resemblance to the two specimens from Piedras Negras, although cruder and probably modeled. A figurine with a similar head comes from the upper level, presumably Aztec, at Texcoco (Peñafiel 1890, Pl. 105).

## Human Figurines, Modeled

The two heads (F94-95) conforming to modeled technique seem archaistic rather than archaic; the only well preserved one is a grotesque, whose raised eyebrows, staring eyes, and open mouth register shock and surprise (Fig. 4.14.8) The face is framed in a short, rounded beard and a crescent headdress. Two other such heads are known: one, mold-made, in orange clay, from the Ulúa Valley (PM), the other, crudely modeled and smokeblackened, from the highlands (UM). On the latter, the face is framed by animal jaws, and it is possible that these jaws have in the other two heads become beard and headdress by the process of substitution. We know that the human head in animal jaws was an important motif in Central American art.

## Animal Figurines, Mold-Made, Style X

The few complete animal figurines that we have are all whistles, with mouthpieces projecting horizontally from the back of the effigy. There are two portly standing owls (Fig. 4.14.6; F99) of a type found again at Naranjo (Gann 1925:88), and Nakúm (PM). There are also two small owl heads (Fig. 4.13.17; F102). There is an association of the Moan bird with death, and frequent appearances of the bird in codices, but no more definite clue to his exact place in Maya theology. Among Maya figurines in Style X there is a type of standing man in owl mask and costume (MAI), and also a conventionalized owl headdress. These extend from the lower Usumacinta north into Mexico, but so far neither has appeared at Piedras Negras. The bird itself, however, occurs among figurines; as the motif in the only two pieces of modeled pottery so far found, a polychrome effigy lid, and a black bowl with a bird face on the side; and, conventionalized, in stone carvings. It is evident, then, that the owl was a bird of distinct importance in the Old Empire.

There was also a complete, smiling, raccoon (Fl00), a complete creature that may be an agouti (Fig. 4.14.5), and a dog's head and collar (Fig. 4.13.14) all finely made.

A jaguar-headed human figure with bent arms and a long necklace is molded on the face of two smoother objects (Fig. 4.13.24; F104) that recall the effigy "handles" that stick up from the rim of a certain type of Toltec bowl (Linné 1934:114-15). These lack the opening that runs up through the Mexican handles; they are of very coarsely-tempered clay.

## Animal Figurines, Modeled

A very interesting small modeled whistle shows a bird with two heads, a motif of which representations are found as far south as Peru. These heads are in the full round and are set one behind the other, instead of side by side; legs and beaks are broken off, but large pellets form the eyes, the mouthpiece serves as a tail, and projecting folds of clay suggest the wings (Fig. 4.13.15). Two bird heads (Fig. 4.13.10, 11) and one possible duck head (F108) conclude the list of animals.

## Personal Ornaments

Apparently, rich as well as poor persons made use of baked clay as material for personal ornaments; it is not necessarily a poor man's substitute for richer materials, since clay ornaments were found with Vault Burial 5, that of a personage who had the finest jade ornaments yet found in the city.

The clay ornaments in the vault consisted of a chain of round beads, of well-fired gray-brown clay, more or less perfectly shaped, varying in diameter from 1.7 to 2.5 cm (M16). Two especially large beads have a diameter of 3.5 cm . With the same burial were several clay imitations of the Spondylus limbatus shell (Fig. 4.14.2), of which natural shell quantities, worked to a greater or lesser extent, were found with this burial. Each clay shell has two holes at the narrow end, presumably for suspension from a garment. A fragment of a similar clay shell was above the burial among the sherds, presumably building debris, washed in when the vault collapsed.

Two cylindrical objects from the same burial (Fig. 4.14.1) suggest pottery imitations of the jade beads that project in threes from the ends of neck-bars and sides and bottom of amulet plaques. A perforation runs through the 6.6 cm length of the object but is blocked at the wider end, depressed in the center, by stucco that has been painted blue.

From the South Group comes a pendant made from a disk of polychrome pottery with a groove around the edge and graffiti on one side (Fig. 4.13.12).

Ear ornaments include two fragments from possible earplugs (M 13,14) of a roughly tubular type common
in Mexico (Vaillant 1930, Pl. XL, XLI). They are of fine light brown clay, well polished; one has an elaborate incised design on the outside (Fig. 4.13.4). Both of these were found in the excavations on Pyramid O-13.

An object shaped like a tiny flat-bottomed, flatrimmed dish with a hole in the center was probably the back part of an earplug (Fig. 4.13.6). It was found in excavations of structures in the South Group. It is of a shape often found in jadeite, and such an earplug is often illustrated on hieroglyph heads, as for instance, one form of the head-variant for the number one, where a round oval bead projects from just such a dish-shaped frame. This ear ornament would seem to be a conventionalization of a flower.

These pottery ornaments were, with the exception of the pendant and, possibly, the tubular earplugs, undoubtedly painted, probably to imitate jade, shell or metal.

## Miscellany

Miscellaneous objects of baked clay include the lower part of a human mask, practically life size (Fig. 4.14.10); a figurine mold of a seated woman, wearing a necklace and bracelets of long links, her head missing above the chin (Fig. 4.14.9, 11); and a fragment of a mold for feather decorations for a figurine or a vessel (M 11). There are spindle-whorls, three small and hemispherical (Fig. 4.13.5), one flat, and a number of disks cut from pottery (Fig. 4.13.2), that may have been used as counters for games. They range from polychrome to coarse unslipped ware, most of them with a diameter 3-4 cm . One of them has a small circular depression in the center and eight others in a ring around it (Fig. 4.14.3). Another disk, crudely modeled, is convex on one side, with a concavity on the other just large enough to hold a small disk, convex on the side, flat on the other, that was found with it (Fig. 4.13.1). They show signs of having been fastened together, and may have been another type of conventionalized flower used in decoration. A probable pot-smoothing tool, now broken, was made from a potsherd (M 19). There is a crude, roughly conical stand, with a socket in the smaller end, that has no clear purpose (Fig. 4.14.4). There are fragments of modeled, incised decoration from vessels or idols, a small molded fruit that may be a pineapple, and a small curving Jaguar paw, with a hole in the palm, that may have been part of a censer (Fig. 4.13.5). A fragment of a tortilla griddle ( $M$ 20) found with Burial 5 had stucco on it and probably belonged to the debris washed into the vault.

## Conclusions

We have seen that the figurines and pottery objects from, Piedras Negras show a developed artistic sense and a high degree of skill. These figurines are found throughout the

Table 4.6 Distribution Heads and Complete Figurines

|  | West <br> Group | East <br> Group | South <br> Group | Southeast <br> Group | Misc. <br> Group | Total | Approximate <br> Percentage By Types |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Headform A | 12 | 1 | 19 | 6 | 8 | 46 | 60 |
| Headform B | 2 | 2 | 5 | 1 | 5 | 15 | 20 |
| Headform C | 4 | 1 | 1 | 1 | 3 | 10 | 13 |
| Style X | $18(23 \%)$ | $4(6 \%)$ | $25(35 \%)$ | $8(11 \%)$ | $16(25 \%)$ | 71 | 93 |
| Style Y | 3 |  |  |  |  | 3 | 4 |
| Modeled |  |  | 2 |  |  | 2 | 3 |
|  | 21 | 4 | 27 | 8 | 16 | 76 | 100 |

strata of excavation, and there is no evidence of early occupation nor the early stage of craftsmanship such as is indicated at Uaxactún by crude, modeled figurines.

Style X andY are wide-spread in the Maya area (Butler 1935b). Their occurrence at Piedras Negras stamps them as Old Empire, since there is no indication of occupation of that city during any other period. This accords with Thompson's findings at Lubaantun (Joyce, Clark, and Thompson 1927:312), and with the resemblances of Style X to Usumacinta stone carving, which belongs to a tradition of art that was swallowed up in the architectural emphasis of the Later Maya period. While Style X seems to be that characteristic of the Old Empire, and Style Y has some suggestions of outside influence, we cannot at present determine their interrelationship.

Headform A may be taken as typically Maya, and is represented in other forms of art; headforms B and C can be recognized also in stone reliefs, and may have historical significance, as yet undetermined.

## Distribution of Human Figurines

Table 4.6 provides the distribution of heads and complete figurines by architectural group. ${ }^{9}$

Although less work has been done in the South Group than in the West or the East, it is this section that has the most figurines, since in adding torsos to the specimens tabulated, we have thirty-five for the South Group, eighteen for the West, nine for the Southeast, and seven for the East. The number of figurines from the Southeast Group is relatively large in view of the slight amount of work done there; their scarcity in the East Group and prevalence in the South is surprising. This could be due to a correspondence of the period of occupation of the East Group with a time when figurines were little used, or it could be due to the association of figurines, with certain temples and not with others. We cannot apply specific dates to these figurines since they are not associated with dated monuments. Association with buildings and into Burial 5 gives us tentative datings, shown below.

Taking the city by sections, we find that in the East Group four figurines come from O-13, one from P-7, and two from a test pit.

Figurine Types and Ornaments in Use Before 9.16.0.0.0 (?)

Form A head of man. Fig. 4.12.14.
Torso fragments, F78, 80.
Agouti (?) Fig. 4.14.5.
Tubular earplugs(?). Fig. 4.13.4; M13.
Found in debris under floor of O-13, dated approximately by "Lintel" 3, 9.16.10.0.0 (?)

In the West Group there are examples of all types, with the exception of the Form B type with the rightangle head. Only in the West Group do we find the hooded Form A type, near the surface, and washed into the burial vault; and the flat red heads in Style Y, also near the surface. Six figurines are associated with J-3, four with J-23, one with J-6, and four come from test pits.

Objects Probably in Use at 9.15.0.0.0 (?)
Pottery beads, M16.
Pottery shells. Fig. 4.14.2.
Pottery cylinder. Fig. 4.14.1.
Found with Burial 5, which contains shell plates
bearing the date 9.15.0.0.0. (?)
Figurine Types in Use After 9.15.0.0.0(?)
Hunchback with Form A head. Fig.4.12.
Hooded A head, F25.
Dog Head. Fig. 4.13.14.
Modeled bird head. Fig. 4.13.10.
In debris washed in above Burial 5.
Modeled and molded grotesque and right-angle Form B heads are confined to the South Group. Here, fourteen figurines come from the debris on the steps of R-3 and R-2, sixteen from the Ball Court and the Ball

Court Structures, R-11, and ten from test pits. The pottery found in connection with these structures is distinct in character, and is, probably late.

Figurine Types, Ornaments, and Objects Probably in Use Near the End of the City's Occupation
Form A heads with stepped headdress, F8, 9, 12.
Form A head with hooded headdress, F44.
Form A heads with applied headdress. Fig. 4.12.11; F34-37.
Miniature Form A head. Fig. 4.12.6.
Form A head of God D (?). Fig. 4.12.13.
Miniature effigy lid of Form A head. Fig. 4.12.9.
Form B head and bust. Fig. 4.13.19.
Form B head, partially perforated. Fig. 4.13.21
Right-angle B head. Fig. 4.13.20; F56.
Grotesque head. Fig. 4.13.25.
Torso fragments. Fig. 4.13.27, F81, 84, 35.
Torso fragments, perforated through the shoulders. Fig. 4.13.23; F82.
Modeled bearded head. Fig. 4.14.8.
Modeled round head, F95.
Owls. Fig. 4.14.6; F99.
Raccoon, F100
Modeled duck (?) head. F108.
Modeled bird head. Fig. 4.13.11.
Disk earplug. Fig. 4.13.6.
Pottery pendant. Fig. 4.13.12.
Pottery ornament (?). Fig. 4.13.1.
Figurine mold. Fig. 4.14.11.
The above figurines were in debris from R-2 and R3, which, from its position, is judged to be late. Those in the debris from R-11, Ball Court structures, are included here since the pottery from R-11 was similar to, that from R-5.

Forms A and C have been found in the Southeast Section, in the excavation of probable residences, six figurines coming from the mounds of the V-1 group, three from a small mound to the north of $\mathrm{V}-1$.

A series of test pits was dug throughout the city, most of then in arbitrary levels of 40 cm each. These levels were counted from the top down, one, two, three, etc. As stated above, certain features suggested contemporaneity of the same levels in different pits. All of the small number of figurines found in test pits are shown below according to levels. No individual pit contained more than four figurines and none showed any sequential development of figurine types worthy of consideration.

Level IV
Figurine with apparently mold-made head, and crude, modeled body. Fig. 4.13.8.

Level III
Form A head with turban, F29.
Right-angle B head, F57.
Torsos: old woman, F77, man with neckbar, F88, animal(?), F86.

## Level II

Hunchback with Form A head, F2.
Form A head with stepped headdress, F10.
Form B head, F52.
Medallion with C head, F71.

## Level I

Form A head with stepped headdress, F11.
Hooded A head. Fig. 4.12.7.
Form B heads. Fig. 4.13.9; F60.
Style Y head. Fig. 4.13.29.
While these tables, showing different types of tentative dating, are interesting, and complementary to each other they are not particularly significant, partially because of the small quantity of material represented by them, partially because of the nature of that material. Almost all the figurines from Piedras Negras are in one style of mold-made figurines that shows artistic and technical skill. The important factors from the chronological point of view are whether the city was settled by people who already possessed this kind of figurine; if not, when did they achieve it; how long did they make it; and are deviations from it historically important. The interrelation of various types contained in the prevailing Style X , is of little importance compared to these problems; the probability is that these types were all more or less contemporary.

So far as we know there was no slow development of figurine making at Piedras Negras. The people who settled the city had developed the art of making figurines in a mold to a fine point before they came, or received the knowledge full bloom from the outside source at some time during their life there. The first alternative seems the more probable. The evidence just examined suggests that Style X figurines were used up to the end of the occupation of the city. The archaistic grotesque head and the modeled animal heads, none of which seems to have Archaic earmarks, are deviations that may have occurred at anytime. The only exotic idea is the Style Y heads; one would hope for a consistency in time levels in their appearances; as yet we have only one Style Y head that can be given even a tentative date.

In relation to the figurine problem, Piedras Negras figurines are important, establishing fine mold-made figurines as a feature of Old Empire culture. Although such figurines occur all over the Maya area, at no other site except Lubaantun, do they come from authentic excavations of a
purely Old Empire site. The use of pottery jewelry is an interesting sidelight on the sophistication of the people.

In relation to the city, Piedras Negras figurines imply by their homogeneity of style a relatively short occupation of the site, when compared to Uaxactún, the only other Old Empire site in that general region where intensive digging has been done, and suggest that it was not settled until after the Maya Archaic period. This evidence agrees with that of the pottery.

In relation to other Maya sites, Piedras Negras figurines provide examples of types found along the Usumacinta from the highlands to Tabasco.

The prevalence of mold-made figurines and the absence of Archaic ones at Piedras Negras and along the Usumacinta, and the scarcity of mold-made figurines and the appearance of Archaic ones in the Petén, added to traits like distinction in pottery types and distribution of stone relief carving, suggest that there may have been peoples in these districts whose cultures varied in their forms of expression, though fundamentally the same (Thompson 1932:198-203). For while the Archaic figurines at Uaxactún might mean merely an earlier settlement there than at Piedras Negras, the fact that the lack of mold-made figurines at the former city persisted through Cycle Nine, the period when Piedras Negras was producing mold-made figurines, points to a definite difference in taste or technical knowledge. One could say that the Petén people, with fine architecture and pottery, lacked the type of art interest that the Usumacinta people expressed so excellently by their figurines and stone reliefs.

Note on Figurines Recovered in 1933
Outstanding figurines from 1933 include a small figure of the Diving God, with arms and legs broken off, a miniature Form B head, the same size as the tiny A head from 1932, and a figurine with molded A head with stepped headdress. The body of this figurine is crudely modeled, showing a standing person with outstretched arms. It is the second such figurine, combining fine, mold-made head with crude, modeled body, to be found at Piedras Negras. Similar Toltec figurines come from the Valley of Mexico (UM).

## Appendix

## Detailed Description of Figurines and Objects ${ }^{10}$

## Figurines

F1, L-28-111
Hunchback figurine. Form A head. A cap lying in a straight line across the forehead, earplugs and the oblong
neckbar hanging from a thong, are applied. The back of the whistle or figurine, originally painted blue, was broken away, probably the cause of its being discarded and used in foundation for stucco work. $7 \times 3.9 \times 3$. Fig. 4.12.15. West Group. In debris fallen through into Vault Burial 5.

F2, L-23-147
Hunchback torso, breast, left hand, and neck ornament, a bar with beads at each end and hanging from it. $2.1 \times 1.9$ $x$ 1.4. South Group. From ravine between Ball Court and O-12; 40-80 cm from surface.
F3 (26)
Hunchback torso, breast, left arm, and lower half of torso. $4.5 \times 4 \times 2.5$. Location Uncertain. Number lost in the fire.

## F4, L-16-892

Complete A head, stepped headdress, very flattened forehead. $2.8 \times 2.4 \times 3.3$. West Group. Main terrace of $\mathrm{J}-3$.

F5, L-16-968
Complete A head, stepped headdress and ear plugs possibly applied, medial line incised, and not too straight. $4.3 \times 5 \times 3.3$. Fig. 4.12.1. West Group. In debris around $\mathrm{J}-23$.

F6, W-6-2
Complete A head, stepped headdress, earplugs missing. West Group. In debris around J-23.

F7, L-17-379
Form A head, broken off above lower line of stepped headdress. Left applied ear plug missing. $3.2 \times 2.6 \times 3.7$. West Group. From edge of first bench west of the West Plaza, near surface.

F8, S-1-11
Complete A head, stepped headdress, applied earplugs projecting at side. $4.4 \times 3 \times 3.9$. South Group. Ball court at end of R-11.

## F9, L-28-114

Complete A head, stepped headdress, medial line molded, earplugs broken off. $4.5 \times 3.2 \times 3.1$. Fig. 4.12.2. South Group. Between R-3 and R-2.

F10, S-7-2
Form A head lacking upper left corner and left earplug. Stepped headdress. Corners slightly rounded. 3.7 x 2.5 x 3. South Group. In wash between Ball Court and O-12, $40-80 \mathrm{~cm}$ below surface.

F11, S-7-6
Form A head missing above lower edge of stepped headdress. $2 \times 2.1 \times 2.7$. South Group. As above within 40 cm of surface.

## F12, S-11-2

Form A head, missing above lower edge of stepped headdress, the lowest corner of which covers the ears. South Group. In debris around R-2.

F13, L-17-260
Complete A head, stepped headdress, very flattened forehead, and right shoulder with traces of blue paint. Medial line incised, and flaring side pieces applied to the headdress. Earplugs missing. $4.3 \times 2.7 \times 3.5$. Southeast Group. In humus near V-1 group.

## F14, SE-1-4

Complete A head, stepped headdress, similar to L-17260. Southeast Group. From rubble of step at north face of V - 1 .

F15,(1)
Complete A head, stepped headdress, very flat. 3.7 x 2.6 x 4.1. Provenience uncertain. Number lost in fire.

F16,(3)
Form A head, broken off below lower line of stepped headdress. 2.6 x 2.2. Provenience uncertain. Number lost in fire.

F17,(4)
Form A head, upper and left lower section of stepped headdress broken off. $2.7 \times 2.1 \times 2.6$. Provenience uncertain. Number lost in fire.

F18, L-28-115
Complete A head, medial line molded. Stepped headdress. Applied earplugs. $3 \times 2.6 \times 3$. Provenience uncertain. Number lost in fire.

F19, L-17-348
Form A head, broken off above lower line of stepped headdress. Right earplug missing; left, and head above it show turquoise blue paint. Two applied fillets across the back of the neck, the upper one incised vertically with a blunt tool. From river bank.

F20, M-15-1
Complete A head. Lower line of stepped headdress worn away. West Group. Found in clearing the road to Tenosique.

F21, M-12-1
Badly weathered A head. Face gone. East Group. From edge of first bench west of West Plaza, near surface.

F22, L-28-120
Form A head with face broken off below the eyebrows. Stepped headdress. Applied bands at the top implying elaborate dressing of woman's hair or wig. $4.2 \times 2.8$ $x$ 3.5. Fig. 4.12.4. East Group. In wash from East Plaza.

F23, S-7-2
Badly weathered A head. The thick fold just below the top of the headdress may have been molded in one with the head. $3.3 \times 2.3 \times 2.1$. From East Group. the wash between the Southern Ball Court and O-12, 40-80 cm below the surface.

F24, L-17-290
Form A head; two parallel rolls form a turban perched on top of stepped headdress. $4 \times 3 \times 3$. Fig. 4.12.5. Southeast Group, near surface. Operation 2.

F25,W-17-1
Form A head with the face badly worn. Hood headdress. Top of head slopes down slightly from left to right, perhaps the result of exposure. $3.2 \times 2.2 \times 2.5$. West Group. In first 2 m below surface of Burial Vault 5 .

F26, L-28-117
Form A head with rounded top. Badly worn face and earplugs. Hood headdress. $2 \times 3 \times 3$. Fig. 4.12.7. West Group. East side of K-5 within 40 cm of surface.

F27
Form A head broken off above lower line of hood headdress. $3.4 \times 2.1 \times 3.2$. Provenience uncertain. Number lost in fire.

F28,W-6-2
Form A head. Headdress a puff-ball type of textile turban, resembling that of "Lintel" 2. West Group. In debris around J-23.

## F29, L-28-132. Form A head

Broken off below the nose level. Buff clay. Headdress a turban like W-6-2. $3.4 \times 3.3 \times 2.8$. Fig. 4.12.3. South Group. In the wash between the Ball Court and O-12, from $80-120 \mathrm{~cm}$ below surface.

F30, L-17-259
Form A head, with earplugs and owl mask head dress. 3.5 x 3.7 x 2.7. Fig. 4.12.12. Southeast Group. Under stone fill of terrace in plaza, $\mathrm{V}-1$, group.

F31, L-17-284
Form A head, similar to L-17-269; another tier above owl mask. $5.5 \times 4 \times 3$. Southeast Group. Near surface, Operation 2.

## F32, M-12-1

Form A head, broken below forehead. West Group. In wash from west plaza.

F33, L-28-118
Finely modeled A head., in sandy red clay. Applied nose crest, probable earplugs, and an applied stepped headdress that begins with a crest, possibly of feathers, above the face, and rises, through encircling applied fillets, to a broken top. $6.5 \times 3.6 \times 4.9$. Fig. 4.12.11. South Group. In debris beside R-2.

## F34, S-11-2

Form A head with face worn away, upper half of much flattened head gone, and the headdress, except down left side. Solid neck 1.3 cm long, presumably fitting into separate body. $4.3 \times 3.3 \times 6$. South Group. In debris around R-3.

F35, L-28-119
Form A head with left earplug and most of headdress gone, nose and forehead crest badly worn. $4.8 \times 2.7 \times$ 3.9. South Group. In debris beside stairway of R-11.

F36, S-1-11(a)
Form A head with face missing below forehead; line of headdress foundation, decoration at sides and top remain. $3 \times 3 \times 2.1$. South Group. In debris at end of R-11.

F37, S-1-11(b)
Form A head. The top of the headdress is all that remains on this fragment, broken at the same point as S-1-11 (a). $4.8 \times 2.2 \times 2.3$. South Group. In debris at end of R-11.

## F38, M-18-7

A very flat A head, of sandy red clay; lacks the 1 eft eye and left earplug and left half of the hat-brim that flares out above the face. Applied bar and dots on the forehead. 4.3 x $2.6 \times 6$. South Group. Exact location unknown.

F39, L-17-17
A Form A head with face broken away; left earplug, three plumes at top of head and part of headdress remain. 4 x $2.6 \times 2$. Fig. 4.12.8. Southeast Group. In rubble of step at north face of $\mathrm{V}-1$.

F40, L-16-895
Form A head, with face finely modeled in buff clay, the half-opened mouth set slightly to one side below the nose.

Two holes about 0.5 cm deep, where the ears should be. The very much flattened head, ending in a socket about 1 cm deep, had a deep groove around it about 0.7 cm from the top, probably to fasten on a headdress of some other material. $3.6 \times 2.3 \times 4.3$. Fig. 4.12.10. West Group. From debris near Stela 40, J-3.

## F41, L-16-970

Form A head with nose broken off, and head, above the lower line of the headdress. An applied band showing a frill fitting squarely about the face, low over the eyebrows. Solid neck. $3.5 \times 2.5 \times 3.2$. Fig. 4.12.16. West Group. From debris around J-23.

## F42, L-16-97

Fine A head showing an old man, probably Mam, the Old God, with projecting chin and Roman nose, his smile revealing his last two teeth in the corners of his mouth. He wears the remains of an elaborate applied headdress and large earplugs. The head is prolonged above the headdress into a socket 2.5 cm long, broken at the top; the solid neck is 3 cm long, the last 1 cm with remains of stucco. The original smoke-blackened, painted surface ends 1 cm higher, about the length of an average neck below the chin, suggesting that the head fitted originally into the body that belonged with it, then later, perhaps after the body was broken, was set alone into plaster. 9 (entire length) $\mathrm{x} 4 \times 6$. Fig. 4.12.14. East Group. From rear room, O-13.

## F43, L-28-116

Miniature A head; no traces of hair or headdress. $2 \times 1.3$ x 1.8. Fig. 4.12.6. South Group. Top of R-11a.

F44, S-2-15
Form A head, with a hood-like headdress falling in folds over a close-fitting; cap, which shows in front, where both rise away from the face to a point over the right eyebrow. $5.4 \times 3.2 \times 2.9$. South Group. From debris between R-3 and R-2.

## F45, L-28-131

This weathered A head recalls God D of the carvings. The mouth is set in a grimace, the eyes in roughly square hollows, and a shallow depression the length of the forehead below the high cap-like headdress holds a symbol, in relief. This, however, is not the kin sign one would expect for God D but seems to be a crescent holding two dots. $4.5 \times 2.8 \times 4.5$. Fig. 4.12.13. South Group. From debris between R-3 and R-2.

F46, S-2-24
Form A head, broken off below the nose, with the stepped headdress lacking the vertical line. It does not extend to the
usual height; it is flattened, but very short, ending at the top in a straight line with a slight dip in the middle. 2 x 2.2 x 2.8. South Group. From debris between R-3 and R-2.

## F47, L-28-134

Hollow A head smoothly finished inside and around the bottom; probably the lid to a miniature jar representing a man's body. Of fine clay fired to a high brown. Finely molded face with applied ears and earplugs, large crescent-shaped labrets at either side of his mouth, and a headdress that has a pleated fold around the face and rises to a crest behind. $4.7 \times 5.7 \times 4.2$. Fig. 4.12.9. South Group. From debris on top of R-11a, Ball Court.

F48, SE-1-38
Form A head broken off above lower line of headdress which runs straight across the forehead. Below it a square and two circles applied to forehead. Southeast Group. Under stone fill of plaza near V-1 group.

## F49, L-16-894

Figurine with B head. A standing man wears large, applied earplugs, an oblong neck-bar, a loincloth, and has a circular depression 6 mm in depth, probably for inlay, between the hands resting at his waist. The figurine was originally painted blue, then stuccoed in such a way as to suggest its having been discarded and used with sherds as foundation for stucco building decoration. There is an old break where the whistle mouthpiece projected at the rear base. There is a perforation through the head from side to side, and part of the back of the head has been broken away on the left where the hole comes through. The stucco covered this break also. $6.8 \times 3 \times 2.6$. Fig. 4.13.30. West Group. From debris on J-3, near Stela 40.

## F50, L-28-112

Form B head and bust. Head perforated; decoration at top and applied earplugs broken off. Hands resting above girdle. Two large beads held at throat by thong. 4.5 (to waist) x 3.3 (at shoulders) x 3. Fig. 4.13.19. East Group. From surface debris on R-11a.

## F51, L-28-121

Form B, head of buff clay, badly weathered. Perforation not complete. $3.3 \times 2.3 \times 3$. Fig. 4.13.21. South Group. From debris between Structures R-3 and R-2.

F52, S-10-2
Form B head, not perforated. Earplugs missing. South Group. From ravine between Ball Court and O-12. 4080 cm deep.

## F53, L-28-122

Form B head with shallow holes, apparently an incomplete
perforation, at side; heavy lidded eyes under high arched brows; fat cheeks. Perhaps a version of the Toltec Fat God. $3 \times 2.2 \times 2.7$. Fig. 4.13.18. Provenience certain. Number lost in fire.

## F54, L-17-383

Badly weathered B head modeled from crudely tempered brown clay. Eyes and bulging cheeks. $3 \times 2.5 \times 3$. From road to Tenosique.

F55, L-28-123
Right angle B head with face broken off at the nose. Projection at the back. Traces of blue paint on the face. $3.5 \times 2.5 \times 3.3$.

F56, S-2-24
Right angle B head with face broken off below the nose. Projection at the back. $2.7 \times 2.5 \times 3.3$. South Group. From debris in front of R-3.

## F57, S-7-3

Right angle B head. Chubby lower face. Traces of blue paint. $2 \times 2.6 \times 2.6$. South Group. From ravine between Ball Court and O-12, 80-120 cm below surface.

F58, L-28-128
High, sloping B head of a toothless old man. Badly weathered, was painted blue. $3 \times 2.2 \times 2.7$. Fig. 4.13.9. West Group. From within 40 cm of the surface of Court 3, Acropolis.

F59, E-7-6
Perforated B head, no headdress. $3.5 \times 2.1 \times 2.5$. East Group. Top of O-5.

F60, L-28-124
Badly worn buff B head, flat at back as though it had been attached to something. Southeast Group. Within 40 cm of surface, main terrace.

F61, (22)
Short B head, $2.3 \times 1.7 \times 1.8$. Provenience uncertain. Number lost in fire.

F62, L-17-381
Form B head of bald, round-headed old man, with sunken upper lip. Buff clay. Recalls heads from Teotihuacan. 2.3 x $1.6 \times 1.9$. Fig. 4.13.7. From river bank.

F63, L-28-130
Form B head with eye-sockets showing upper and lower lids; protruding cheekbones. Fold of upper lip so prolonged as to give effect of sweeping mustache. Cap-
like headdress or hair creased by vertical parallel lines and encircled near top by applied fillet. $4.5 \times 2.5 \times 3.5$. Fig. 4.13.16. Provenience uncertain. Number lost in fire.

## F64, L-17-196-7

Figurine torso and C head, molded separately in fine buff-brown clay, the solid neck inserted in a hole in the trunk. The right arm is missing, the left in full round outstretched, bent at the elbow, and broken off shortly below it. These were applied to the body, as was the longskirted loincloth, the upper edge of which rises on the sides almost to the armpits, and the elaborate textile cape. This was in strips or of a striped material, indicated by incised lines. A braided border edges it around the bottom, and is in turn edged by a further textile strip, marked off in squares. On the shoulders and in the middle of the back were medallions, the centers roughened for inlay. The head ends abruptly and squarely with a socket 1 cm deep in the top, and has a ridge with a slight groove beneath it across the back from ear to ear. The original surface had a low polish. Head, $2.6 \times 2.6 \times 2.5$; whole 14 $x 9 x 5.3$. Fig. 4.14.7. Southeast Group. Found about 1 m below the surface near Burial 1 .

F65, L-28-127
Form C head like that of F64, lacking socket. Top of head apparently rounded from front to back. Stepped headdress very short. Ridge across back of neck slightly fluted. $3 \times 2.6 \times 2.5$. Exact provenience unknown.

F66, L-1 6-671
Form C head, reddish brown, badly weathered, hair parted in the middle; a notch in the middle of the top of the head which is undercut, in back, 1.3 cm from the top of the head, to a depth of 0.7 cm . Though the notch may have served to help fasten the head wherever it was attached, it recalls the similarly cleft heads from Teotihuacan. $3.4 \times 3.2 \times 2.4$. Fig. 4.13.13. West Group. Near plaza surface.

F67, L-28-133
Large heavy C head with flat surface, at back, of clay with which head and neck were fastened to some object. Face worn away; decoration gone from right side of head; hair parted in the middle. $4 \times 5 \times 4.1$. South Group. Ball Court

F68, (25)
Square C head. Hair parted in middle and drawn down to the ears. Badly burnt. $3 \times 2 \times 2.4$. Provenience uncertain. Number lost in fire.

F69, L-28-126
Form C head with close headdress wrapped in two broad,
overlapping folds. Traces of blue paint on headdress. 4.3 x $2.7 \times 2.7$. Fig. 4.13.22. West Group. Plat form north of J-3.

## F70, L-16-890

Form C head broken off above forehead; features worn down; applied right earplug, left missing. $3.3 \times 3.6 \times 2.8$. West Group. In debris on J-3.

## F71

Square medallion with badly worn C head in center. 2.9 x 2.4 x 1.6. West Group. From the West Plaza. $40-80 \mathrm{~cm}$ below the surface.

## F72, L-28-125

Form C head, with two applied bands meeting above the center of the forehead. $4 \times 3.3 \times 2$. East Group. Southeast corner of the plaza.

## F73, L-17-376

Badly weathered C head. $4.4 \times 3.8 \times 3.2$. Provenience unknown.

## F74, L-28-113

Complete figurine of reddish clay, The badly weathered head may have been mold-made, with fine features; the very crude, hand-made body shows a woman holding a blanket across her chest. 4.8 (entire height) $\times 2.4 \times 1.3$. Fig. 4.13.8. South Group. From ravine between Ball Court and O-12; 120-160 cm below surface.

F75, L-28-129
Grotesque face with conventionalized wrinkles on forehead and cheeks, open mouth and-protruding tongue. Back smoothed vertically into a concavity that might have fitted over a finger or stick. $4 \times 2.6 \times 2.9$. Fig. 4.13.25. South Group. From debris beside stair way of R-11a, 30 cm above floor.

## F76 (24)

Top of a head with ring-forming hole for suspension from front to back. $4 \times 1.8 \times 2$. Provenience uncertain. Number lost in fire.

## F77, L-28-145

Torso fragment showing the pendent breasts of an old woman. $5.6 \times 4.3$. East Group. About 1 m below the surface of the plaza at the east side of K-5.

F78, L-16-34
Torso fragment, showing shoulders below a tight necklace of large beads, and a very short flaring cape tied with a flourish in front. This fragment is interesting technically, as the solid core of the neck continues down to project
0.7 cm below the under surface of the shoulders, showing that the figurine was built up by modeling the body onto the head. 9 cm wide at the shoulders. East Group. Rear room, O-13.

## F79, L-16-448

Man's torso, with traces of blue paint, and a necklace, fastening in front, that looks like a thong with one end looped over and hanging down. $3.5 \times 4.2$. East Group. North west rear room, P-7

F80, E-1-42
Man's torso, wearing cape and cuffs of large beads, right arm standing out from body. East Group. Rear room, O13.

F81, L-23-148
Torso fragment, showing a man grasping his left elbow with his right hand. $3 \times 2.8$. South Group. From debris at end of R-11.

F82, S-2-11
Man's torso, right arm missing; pierced for suspension from side to side through shoulders. $4.6 \times 2.6$. South Group. From second terrace of R-3.

F83, L-28-144
Woman's torso, with perforations similar to F82. 4 x 4.2. Fig. 4.13.23. South Group. From base of R-5.

## F84, L-16-976

Man's torso, wearing a loincloth and a short plain necklace from which hangs a celt-shaped pendant. Projecting whistle mouthpiece at lower back. $12.5 \times 11 \times 9.4$. South Group. Ball Court.

F85, S-1-13
Torso of seated man with thong-like necklace looped about his throat. Whistle mouthpiece at back is not perforated. South Group. Ball Court. At end of R-11.

F86, L-28-108
Small, plump torso, presumably human, though it may have had an animal head; perforated whistle mouthpiece at lower back. 5.6 x 3.6 x 3.3. South Group. In wash between Ball Court and O-12; 30-120 cm deep.

F87, L-28-142
Torso, cleverly modeled in buff clay, of a man with hands clasped at his right shoulder. The heavy, sagging body and very thin arms probably depict age. $7.8 \times 4.3$. Fig. 4.13.27. South Group. From debris between R-3 and R-2.

F88, S-7-3
Man's torso with oblong bar neck ornament. $4.5 \times 2.7$. South Group. From ravine between Ball Court and O-12; $80-120 \mathrm{~cm}$ below surface.

F89, SE-1-4
Woman's torso in long, flowing, low-necked gown. Southeast Group. Operation 1.

F90, L-28-143
Woman's torso in long, flowing, low-necked gown, with sleeves falling from the wrists into long points. $4.7 \times 4$. Fig. 4.13.26. Provenience uncertain. Number lost in the fire.

F91, L-28-137
Head with right side of elaborate headdress broken off. $4.2 \times 4.7 \times 1.7$. Fig. 4.13.29. West Group. At east side of $\mathrm{K}-5$, within 40 cm of surface.

F92, L-17-380
Head with a headdress of which the main element is a twisted textile strip. $5.6 \times 7.1 \times 2.1$. Fig. 4.13.28. West Group. In western wash from plaza.

F93, M-12-1
Head with a headdress of which the main element is a twisted textile strip. $5.6 \times 7.1 \times 2.1$. West Group. In western wash from plaza.

## F94, L-28-135

A grotesque, bearded head, rising from a solid, bulllike neck. Headdress a crescent crest behind the raised eyebrows, which, with popping eyes and open mouth, register shock and surprise. Eyes are pellets with hole punched in the center. Face was painted dark red. Partially smoke blackened. $4.2 \times 3.9 \times 4.5$. Fig. 4.14.8. South Group. From debris around stairway of R-11a, 30 cm above floor.

F95, L-28-136
Small round head, encircled above the forehead by an applied fillet. Features badly worn, left side broken away; eye apparently an applied pellet with incised horizontal line. $2.3 \times 2.3 \times 2.2$. South Group. From debris around stairway of R-11a, 30 cm above floor.

F96, L-28-138
Dog's head, broken, with collar that is molded in one with the head in front, and continued in back by an applied fillet. Traces of stucco. 3.5 x. $2.7 \times 3.8$. Fig. 4.13.14. West Group. In the debris above Vault Burial 5.

F97, L-17-249
Figurine of a possible agouti, seated with front paws on his knees. Ears and neck pendant are applied, toes indicated by parallel lines pushed in from the edge of his feet with a fairly sharp tool. $6.6 \times 3.4 \times 4.9$. Fig. 4.14.5. East Group. Rear room of O-13.

F98, L-28-109
Figurine of a plump standing owl; shows traces of blue paint. $7.5 \times 4.5 \times 6.1$. Fig. 4.14.6. South Group. Near R-3.

F99, S-1-13
As F98, lacking paint, $6.7 \times 4.5 \times 4.4$. South Group. At end of R-11.

F100, S-1-11
Figurine of a probable raccoon, standing, with front paws resting on his paunch. South Group. At end of R-11.

F101, L-17-269
Owl head, incomplete, of buff clay. $2.5 \times 2.9 \times 2.5$. Fig. 4.13.17. Southeast Group. From the upper level of V-1.

F102, (27)
As F101. Provenience uncertain. Number lost in fire.

F103, L-17-376
Standing jaguar-headed person, molded on the face of a rounded oblong piece of clay, very coarse, used perhaps as ornamental handle to vessel. $10.8 \times 3.6 \mathrm{x}$ 3. Fig. 4.13.24. Provenience unknown. Number lost in fire.

F104, M-11-1
As F103. Provenience unknown. Number lost in fire.

F105, L-28-110
A crudely modeled whistle showing a double-headed bird, the heads set one behind the other. Legs and beaks are broken off. Large pellets form the eyes, a projecting fold of clay the wings, and the mouthpiece serves as tail. $4.5 \times 3.9 \times 5$. Fig. 4.13.15. West Group. From floor in front of niche, J-6.

F106, L-28-139
Bird head modeled in fine clay, the eyes round applied pellets. $3.2 \times 2 \times 2.5$. Fig. 4.13.10. West Group. In the debris above Vault Burial 5 .

F107, L-28-140
Crudely modeled bird head, the eye an incised circle with a ring of dots punched around it. $2.6 \times 1.9 \times 2.9$. Fig. 4.13.11. South Group. From the debris beside the stairway of R-11a, 30 cm from surface.

F108, S-2-23
A crudely modeled fragment that may represent duck. It has a flat projecting bill, and an eye made of an applied pellet with a hole punched in it. South Group. From between R-3 and R-2.

## Personal Ornaments

M1, L-28-157a, b
A crudely modeled disk in brown clay, convex on one side with a concavity on the other just the size of a small disk, convex on one side, flat on the other, that was found with it, and shows signs of having been fastened to it. 4.5 x 7; $2.5 \times 0.6$. Fig. 4.13.1. South Group. North Step, R11a.

## M2, L-28-153

A tiny flat-rimmed "dish" with a hole in the flat base. Of brown clay with a "float" surface. Probably part of an earplug. $3.5 \times 1.3$. Fig. 4.13.6. South Group. From debris between R-3 and R-2.

M13, L-28-34
Polished, very fine light brown fragment of object which may be an earplug. Roughly tubular, flaring at end. Incised line parallel to edge outside. Incised lines at right angles to edge inside. $2.5 \times 2.4$ x.2. East Group. Beneath doorway pillar, O-13.

## M14, L-27-176

As M13; engraved, elaborate design outside. $3.2 \times 2.5 \times$ 0.2 . Fig. 4.13.4. East Group. In front of third terrace.

M6, L-28-154
Disk cut from polychrome vessel, with a hole near the edge at a point where this is slightly flattened, and a shallow groove, on the narrow surface of the edge, that deepens on the flattened side to cut into the biconical perforation. A possible amulet, it has on both sides rude graffiti, one of which could be taken to represent a person with his left arm stretched across his chest. 3.4 ? x 0.7. Fig. 4.13.12. South Group. From debris at end of R-11.

M16, L-27-16, 17
Beads, roughly spherical in form, of gray-brown clay. Tubular perforation 0.4 wide. Bead diameters varies from 1.7 to 2.5. Two have outer diameter of 3.5 , inner diameter of 2. West Group. With burial in Vault Burial 5.

M17, L-27-13, 14
Convex clay shells, roughly pear-shaped. Greatest width, 10; length, 12; thickness, 0.2. Two holes at the top, parallel to the edge, which have a concave depression between them. Lower edge is fluted. Traces of stucco
or whitewash inside and of red paint inside and out. Fig. 4.14.2. West Group. With burial in Vault Burial 5.

## M18, L-27-15

Cylindrical object, 6.6 long, with flaring cuff applied to the final 1 cm diameter 1.5 at the smaller end, 2.3 at the larger. A perforation seems to run the length of it, but is blocked at the wide end, which has a central depression, by stucco, which was painted blue. Fig. 4.14.1. West Group. With burial in Vault Burial 5.

## Miscellaneous Objects

M4, L-28-158
Spindle-whorl, flattened, hemispherical, undecorated. $3 \times 1$. Fig. 4.13.5. South Group. From the debris at the end of R-11.

M5, S-2-17
Spindle-whorl, perforated disk of unslipped, coarse ware. $5 \times 0.5$. South Group. From the debris between R-3 and R-2.

M9, L-17-219
Half of a flattened, hemispherical spindle whorl, undecorated. $2.5 \times 1.1$. Southeast Group. West part of Room A, V-1.

## M12, L-17-385

Spindle-whorl, hemispherical, undecorated. $2 \times 1.1$. East Group. From cache under floor of O-13.

M7, L-28-156
A large disk, cut from a coarse unslipped vessel, has on its inner surface, a central conical depression, 0.5 in diameter, 0.2 deep, with eight similar depressions in a ring around it. $6.8 \times 9$. Fig. 4.14.3. South Group. From top of R-11a, north.

M19, SE-1-19
Probable pottery-making tool of negative-painted polychrome ware. Broken above rounded, oval end. $3.5 \times 3.7 \times 0.5$. Southeast Group. From test pit near Burial 1.

M11 (28)
Fragment, bearing intaglio feather design. Seems to be the squared end of a mold for decoration to be applied to a figurine or a vessel. $5.2 \times 4.2 \times 1.3$. Provenience uncertain. Number lost in fire.

M15, L-28-151
Hand with incurved claws, presumably jaguar paw. Hollow, with hole in center of pad. Probably part
of censer. $4.2 \times 3.7 \times 2.7$. Fig. 4.13.3. East Group. From cache under floor of O-13.

## M3, L-28-152

Figurine mold, showing woman seated with her hands on her knees, wearing a necklace and bracelets of oblong links. The head is missing above the mouth. 8 x 7. Thickness of mold. 1.0-1.5. Fig. 4.14.11. South Group. On steps of R-2.

M10, L-16-866
Lower part of a mask of thick reddish clay that had once been painted red. Shows mouth, chin, and half the nose. $10.6 \times 2.5 \times 2.2$. Fig. 4.14.10. Southeast Group. Above terrace floor, near stair, V-1.

## M8, L-28-170

Crudely modeled stand, with flat base, of coarse brown clay. The shape is roughly that of a truncated cone, curving in slightly below the top, which has a socket 2 cm deep. $4.5 \times 3.6$. Fig. 4.14.4. South Group. From top of R-11a, northwest.

M20, L-28-8
Fragment of flat tortilla griddle. Traces of stucco. 16 x $10 \times 2$. West Group. With Vault Burial 5.

## Notes

1. The advice of Mr. Henry B. Roberts of the Carnegie Institution of Washington has been useful in laying out the plan of this report.
2. For full reports of petrological examinations, see Appendix.
3. Since this specimen was lost in a fire at the camp, it is impossible to give the exact shade.
4. Monument dates used are those worked out by Dr. S. G. Morley of the Carnegie Institution of Washington.
5. That part of the 1931 sherds which is in Guatemala was not available for study.
6. J. Alden Mason, unpublished Piedras Negras Preliminary Report on K-5.
7. Courtesy of Peabody Museum, Cambridge.
8. See Appendix for detailed description of all specimens and their proveniences.
9. It must be remembered that the Miscellaneous Group, Style X, consisting of one complete figurine, two heads, and fourteen torsos, is not included in this chart. Nor are the two headless hunchbacks included, although they presumably have the A Headform of the complete one.
10. Three numbers, refer, in order given, to height, width and thickness from front to back. All are maximum measurements, with the exception of figurine heads; with these
the height is measured from the top of the head to a backward projection of the chin line, the thickness from the chin to a downward projection of the top of the head. Two numbers
refer usually to height and width; in the case of the spindle whorls and disks, to diameter and thickness. It is assumed that effigies are cast in a mold, unless otherwise stated.

# A Pyramid Without Temple Ruins (Structure J-3) <br> Linton Satterthwaite 

The following report covers a superficial investigation rather than the proper excavation of one of the largest and most imposing of the thirteen major pyramids at Piedras Negras. Its chief claim on our interest is the fact that while apparently not early, but contemporary with pyramid temples, it did not support a masonry temple, and probably supported no building at all. In its final form it is to be thought of as a gigantic altar, not flattopped. It nevertheless was furnished with carved stela, elsewhere at this site found only on or before templebearing pyramids.

Three successive episodes of building have been distinguished, and others very likely lie below the shallow limits of our trenches. One of the three known periods, not the earliest, can be provisionally dated at about 9.15.0.0.0 in the Maya chronology. The danger of misinterpretation in this respect is very much reduced by the occurrence on the dated construction of four stela marking successive hotuns, and, on the same plaza, a single line of stela marking eight earlier successive hotuns, with a gap of only one hotun between the two series. It is unlikely that either group has been moved as whole. From this follows the improbability that any have been moved, the habit of building up a group of stela at one spot, then soon moving to our pyramid and repeating the process, being rather well established.

The structure provides opportunity to describe a monument found and numbered "Lintel" 5 by the discoverer of the city, Teobert Maler, but not illustrated by him; and to show that, while illegible, it contained a long inscription, in common with most other of the smaller monuments of the city. These have been in the past labeled "Lintels" on the theory that they once spanned doorways. However, they are usually very thin, always lack suitable plain ends to give bearing on the door-jambs, and some of them disagree in other ways from known stone lintels here and elsewhere. The occurrence of "Lintel" 5 where there was no masonry temple confirms our belief that stone panels were here carved for vertical placement; and in some cases at least were not set in building walls.

The yield of objects was meager, but includes items of great interest: flint knives in positions suggesting their use on the spot, though they may have been cached under floors; a pottery censer of unusual type, and stone portable altar cached at the base of a dated stela; and part of a pottery mask, besides figurines and potsherds.

Something has been learned of local methods of building up the fill or hearting, of stairway construction, and of preparing the terrace for reception of stela.

The work on this structure was done in 1931 by the writer under Dr. J. Alden Mason, Director of the First Eldridge R. Johnson Middle American Expedition of the University Museum. The contemporary dates of monuments mentioned are according to a manuscript list very kindly furnished us by Dr. Sylvanus G. Morley of the Carnegie Institution of Washington. Dr. Morley has referred to various Piedras Negras readings in various publications, but has not as yet published the full list, or his detailed discussions of particular inscriptions.

## General Description

Structure J-3 is a "false" pyramid built against the southwesterly corner of the Acropolis hill, facing the end of the long West Group Plaza where it gives place to lower levels between it and the river. It was ascended by exterior flights of stairs placed over the terraced front façade. The pyramid faces about nineteen degrees south of east. Looking to the front from the platform which surmounts it there is a commanding view over the West and South Groups with much of the Southeast Group plainly visible beyond. To the left most of the East Group is in view, with the pyramidal temple K-5 of the West Group at the extreme left. A little to the right the river curves out of sight beyond the Sacrificial Rock.

Looking out from the left side of the structure, Court 1 lies in full view almost immediately below, with the pyramidal temple, Structure J-4, rising beyond, the stone temple on its summit being at about eye level. Besides the three palaces associated with Court 1, (Structures J$2, \mathrm{~J}-6$ and J-8, ) the two on the easterly sides of Courts 2
and 3, (Structures J-9 and J-18,) are close at hand on the left, the first considerably below, the latter about on the eye level. The relations of all these buildings are shown on the general plan of the city. ${ }^{2}$

To the rear and to the right precipitous bedrock drops to the surface of the river, about 8 m below at low water. The location is an imposing one, except from the northwest, where the pyramid abuts upon a still higher portion of the Acropolis.

Considering the Acropolis as a whole, the mass and form of this pyramid balances that of J-4 at the other end of that group of buildings, and takes full advantage of the steeply rising hill to gain an imposing height with a minimum of labor. Its full height ( 30 m ) is seen only from the front. Seen from the rear it is only about 6 m high. Seen from the platform terrace J-5 on its left, its height is about 15.5 m . The greatest impression of height is to be had on its right (river) side, but practically all of this side is natural bedrock, carved to a steep slope by the river.

Maler (1901:55) discovered "Lintel" 5 on the slopes of this pyramid and reported the partial remains of a rear apartment still standing and we naturally expected to find a stone temple at the top. While excavation on the top was not complete, there is no doubt that the pyramid proper served to support only a solid platform which is more or less integral with it, indicated in plan and section in Figure 5.1, and in section again in Figure 5.2; with the possibility but hardly probability that there was a perishable building on this. This platform is approximately rectangular, measuring about 1 m in length and about 6.75 m in width. It is not flat-topped. Rows of roughly squared stones resting directly on the fill, each row parallel with the front and being a little higher than the row before it, suggest rather conclusively that the top of this platform consisted of a series of broad low steps rising to a final and rear level measuring only about 1.8 m from front to rear. All signs of concrete flooring had long since disappeared, doubtless because there was no temple debris to protect them.

The lines of stones could not be traced clear to the sides, or for equal distances. They were undoubtedly partially obliterated by tree roots and possibly there were others which were entirely so. The levels of those found, however, seem to rule out the hypothesis that the front part of the platform was really a stairway with very broad treads of approximately equal widths. The measurements indicate, from front to rear, four steps or levels having "treads" of about 80, 180, 140, and 90 cm depth, respectively, (front to rear measurements) and each about 30 cm high, leading to the rear level at the top, which as stated is only about 1.8 m in depth.

The height of this rear portion of the platform, 30.2 m , is the height used above for the pyramid as a whole.

The height reached by the main front stairway, which rises to the ninth terrace, is just short of 26 m , and this perhaps should be taken as the height of the pyramid proper, when comparing it with others which support temples on their summits.

The front and side walls of the surmounting platform, at least in its original form, were vertical. This was almost certainly true of the original rear wall but in the latest form the rear wall is battered, and a battered wall was placed against the right (southwest) wall. We failed to make this out on the left side but it may have been present.

The front wall is set 5.5 m back from the edge of the ninth terrace and its top is 2.9 m higher. Apparently a stairway, completely ruined and of uncertain-width, led from the ninth terrace up to the front and lowest level or step of the platform. The debris here included stones suitable for steps and underneath is a solid earth and stone fill (Fig. 5.2a). This stairway probably passed over a tenth terrace or subsidiary platform which we show in broken lines on the plan. (Fig. 5.1a). The evidence for this is the floor running under the fill and under the front platform wall, numbered (4), in the section Figure 5.2a, and the level of the terrace wall at the rear, which is marked (1) on the same section.

The pyramid proper, disregarding the platform at the top with its vertically walled tenth terrace, just described, consists of nine terraces, numbered from the bottom up. A glance at the plan shows that most of these, due to the location on a steep hillside, had to be built only at the front and to a varying extent at the sides. Only the ninth and the somewhat problematical tenth extend around the rear.

As found, the structure was a mere mound. We failed to find walls of the eighth, ninth or tenth terraces in position on the left (northeasterly) side though we penetrated to pure rock fill. Remnants of these three are in place on the other side. At the front the fourth to ninth terraces were in fair condition under the stairway, and for $2-3 \mathrm{~m}$ on either side, at which points they had completely fallen. While our excavations at these levels included only the stairway and strips $2-3 \mathrm{~m}$ wide on either side, further excavation would probably have yielded nothing more in position.

We cleared but little on the first terrace. The second, which carried Stela 9, 10, 11 and 40, was cleared from end to end, from the front to a line coinciding with that of the bottom step of the main stairway rising from it. We followed the side walls of this stairway back to the third terrace wall with trenches about 3 m wide. We could have followed this terrace wall farther to either side, but did not, and the debris covering the rear of this broad second terrace may still contain something of interest.
Figure 5.1 a. Plan Structure J-3. Excepting stela cists, broken lines indicate re-stored features, fallen or not excavated;

Terrace; c. section through Stela 9 cist, Second Terrace.




The first terrace is subsidiary to the second. The latter is longer and very much deeper than any of the others, and served to support the four stela mentioned. This second terrace appears to be not quite symmetrical with those above. Comparison with the stela-bearing terrace J-1 at the other and of the Acropolis lends additional evidence for disassociating it from the rest of the pyramid from the point of view of design. It is about 49 m long and 7.7 m deep, except where the stairway rising from it projects forward 3.7 m from the third terrace wall.

The length of the third terrace as restored is about 45 m , that of the ninth 25 m , the others being restored to correspond, These dimensions are consistent with the contours of the debris and bedrock, but are by no means accurate.

The terraces were not of uniform height, nor of uniform character. The first is decidedly higher than the second, but the fourth is about a meter higher than the third. Above this the differences are small, possibly within our margin of error. Measured heights from floor to floor, beginning with the first and lowest, were 3.7 $\mathrm{m}, 2.6 \mathrm{~m}, 3.0 \mathrm{~m}, 4.3 \mathrm{~m}, 2.5 \mathrm{~m}, 2.6 \mathrm{~m}, 2.3 \mathrm{~m}, 2.3 \mathrm{~m}$, and 2.7 m . At the front the floor of the supposed tenth terrace or subsidiary platform was 1.4 m above the floor of the ninth terrace. At the rear it is a little higher and was further increased by a secondary floor contemporary with the final battered rear-wall of the platform above (see section, Fig. 5.2a).

The height of the final platform above the front level of the perhaps hypothetical tenth terrace is 1.5 m at the front, 2.8 m at the rear. That is, the rear and highest level of the platform is about 1.3 m higher than the front.

The depths (front to rear dimensions) of all the terraces except the second and the ninth vary somewhat, but are all about 2 m . The depth of the ninth was perhaps greater, but could not be measured.

All our excavations on this building were made during the 1931 season, and measurements were with Brunton compass, a small tripod level, tape, meter stick and flexible leveling rod. They are subject to the error inherent in these types of instruments, but where we have checked similar measurements with the transit the error has seldom been more than $10-20 \mathrm{~cm}$ or, in the case of bearings, one degree. Figure 5.1 was drawn by Mr. Fred P. Parris, the excavated details being based on notes of the writer. The writer is entirely responsible for Figure 5.2.

The retaining walls of the first and second terraces are slightly battered at the top and were not excavated to their bottoms. That of the third is vertical at the bottom, battered at the top; that of the fourth is battered at the bottom and (where preserved under the stairway) continues at the same inclination to the top; that of the fifth is battered at the bottom and curves back still
further at the top; the walls of the sixth and seventh are vertical, probably to the full height, as indicated under the stairway; that of the eighth is battered, and that of the ninth battered with an extra in-curve at the top.

The lowest flight of the stairway rises from the West Group Plaza to the second terrace, passing over the first. Excavations here were slight, but the debris indicates its width as about 11.5 m , slightly less than that of the second and main flight. This lower flight rises about 6.3 m , receding about 9 m in the process, giving an angle of ascent of approximately 35 degrees above horizontal. It was in a badly ruined state.

The second flight was well preserved at the bottom, having the four lowest steps in position (Fig. 5.3a-c) and is here 13.5 m wide. It rises full width to the top of the sixth terrace. Although the steps above the fourth were completely fallen, this was definitely established by the positions of remnants of the vertical side retaining walls. These were found at the left (northeasterly side) on the second, third and fifth terraces; and at the right on the second, fourth and fifth terraces. The side retaining walls found on the fifth terrace obviously carried the stairway to the surface of the next or sixth terrace. On the sixth and higher terraces all traces of stairway side walls had disappeared. We could determine the approximate width of this higher portion by noting where the terrace retaining walls still rose to some height; they are always better preserved under the protecting debris of stairways, and especially by noting where the deposit on the terraces ceased to be obviously fallen debris and gave way to artificial rock fill. These two criteria gave consistent results on the sixth, seventh and eight terraces, on both sides, and indicate the restored width, about half that of the lower portion.

We have restored the lower and wider portion as continuous with the narrower upper portion. If it was in reality a separate flight the sixth terrace must have been made deeper at the center than at the sides, by a now fallen addition. But since the plane of ascent of the lower portion of the stairway, as indicated by the four steps in position at the bottom, just clears the front edge of the sixth terrace as found, we believe our restoration is correct. The angle of ascent for the whole flight, which we have sometimes called the main stairway, is about 45 degrees above horizontal, the flight rising about 19.7 m and receding toward the rear about 18 m . The risers of the lower four steps are about 22 cm in height, the width of the treads about the same.

There was no satisfactory evidence remaining to give the width or the size of the steps of the final flight leading to the top platform. Its angle of ascent was probably a little more gentle than that of the main flight below.

There were some uncertain hints of minor stairways leading down from the right (southwesterly) side of the
platform to a triangular projection of bedrock to the right and somewhat forward of the platform. The surface of this projection had been leveled off artificially at about the level of the fifth terrace.

At either end of the four preserved lower steps were stones in position which can hardly be anything else than the last vestiges of balustrades. Their width was definitely 50 cm , the outer sides being continuous with the side retaining walls of the stairway. Of their height we can say no more than that they were high enough to more than clear the front edges of the steps. We have no data showing their presence or absence on the upper part of this flight, nor on the other flights.

Against the right corner of this flight a small low rectangular platform or altar was placed on the second terrace, so that its front face was continuous with the front and lower end of the balustrade. This construction was 60 cm wide, 75 cm long, and not less than 40 cm high. We may have destroyed higher courses without realizing it.

The terraces and the main or second flight of the stairway were without doubt covered with plaster, remnants being found on the lower steps. In all probability there was considerable ornamental stucco work. Disintegrated mortar covered the entire second terrace, underlying stone debris everywhere, showing that it had washed down before the structure itself began to crumble. In the deposit were a few heavy sherds with stucco adhering. Sherds were extensively used in building up stucco designs on Structure J-2 (Satterthwaite 1935b), and the same use may be inferred here. The bulk of such stucco work would be expected on the terraces at the sides of the stairway, where our excavations on the rear of the terrace are incomplete.

The deposit of plaster or stucco debris rises from a few centimeters depth at the front to 50 cm in depth in the angle between the stairway and terrace walls, on the left (northeast) side. Here it was gray in color. In the corresponding corner at the other side the depth was 1.5 m and the color a light yellow. This latter deposit extends almost to the southwesterly end of the terrace, over 20 $m$ distant. Actual fragments of ornamental stucco work, of the same color, were found near the outer end of this deposit, and also in debris at levels corresponding to the seventh and eighth terraces. There was evidently much more stucco decoration on the right or southwesterly side than on the left, and possibly there was here a separate or subsidiary structure.

A puzzling feature of the rock fill below the surface of the rear and highest level of the platform at the top is that it is permeated by a fine yellow powder, presumably disintegrated plaster or stucco. The stones rest one on the other, as in pure rock fills, and we are not dealing with a mortar and rubble fill. Perhaps the plaster was washed
down from large stucco designs on the upper level with all traces washed away near the surface. More probably this mortar is debris from an earlier period and found its way into the fill for the latest.

## Periods of Building

Our excavations were too superficial to show whether or not the pyramid is placed over entirely buried earlier structures, but they were sufficient to show extensive remodeling.

The cross-section in Figure 5.2b, shows the situation revealed by trenching into the center of the stairway leading up from the second terrace. Behind the latest steps is a structural wall which is very crude with the exception of the lowest stones. These are well squared and laid, and form the bottom step of an earlier stairway, 1.3 m behind the later one. The second step of this early stairway had been torn out in building the structural wall, but the third, fourth and fifth though considerably displaced, were found in approximate position. These were set in a sloping surface of solid earth and stone fill, laid on pure rock fill, and there was no question about the existence of an earlier stairway.

An extremely hard concrete floor begins at this earlier lowest step and runs forward to a rather crude retaining wall marked (2) in the drawing, 4.2 m distant. The final and later terrace wall retains broken rock fill laid against this, with nothing but humus to represent its floor, which was completely disintegrated.

Although the earlier front wall is quite crude, its association with such a different type of floor which in turn connects with the earlier stairway, leaves little doubt that it was the front terrace wall when the earlier stairway was built, or else a fill wall just behind the exposed terrace wall of the earlier period, the latter being removed for its stone during alterations.

In following this very characteristic and easily identified early hard floor back to the third terrace wall, (at the sides of the latest main stairway) we expected it to pass under the latest to an earlier third terrace wall belonging with the earlier stairway and earlier second terrace wall. Instead, we found that it ran against the supposedly late third terrace wall and stopped. The third terrace wall therefore served with both the earlier and the later stairways, and we have no evidence that terraces, other than the second and probably the first, were modified by additions to the front.

Since the hard floor does not run under the earlier stairway at the front, but just meets it, it must be contemporary with it. We may assume that since it did not run under the early steps at the center, neither did it pass under the side walls of the earlier stairway. It does
pass under the side walls as well as under the steps of the later stairway. It is therefore highly probable that the earlier stairway was not so wide and that its side walls lie buried under the later. We did not realize this at the time, or we would have trenched laterally to examine their construction. Before the remodeling the second terrace was 6.6 m wide (front to rear dimension), and the earlier stairway, which was not so wide as the later, projected out upon it for a distance of 2.5 m .

Considering the fact that the angle of ascent of the latest stairway is close to the maximum observed elsewhere, and that the base of the earlier one is set 1.3 further to the rear, one would expect that an earlier series of terraces, placed a corresponding distance to the rear, had been buried by a later. But we have seen that this was not so, at least in the case of the third terrace, as proved by the associated floor. An alternative hypothesis is that the early terraces were all used with the later stairway, but each was then raised to a greater height. Possibly the variations in slope of the third, fifth and ninth terrace walls (Fig. 5.1c) result from such additions. We did not investigate this point as we should have done. The postulate requires buried earlier floors within each terrace. There was none in the sixth terrace, which we trenched to a depth of nearly 2 m .

The platform at the top was almost certainly twice enlarged, in each case by additions at the rear and not at the front; but each addition very probably extended around to the sides. The evidence for this is set out in Figure 5.2a. The wall at the left in this drawing, marked (1), is the upper part of the eighth, and that marked (2) is the wall of the ninth terrace of the pyramid. Those marked (3) and (5) are crude fill walls, exposed only during the period of construction. The wall marked (4) is the original as well as the final front wall of the platform. The buried wall to the rear marked (6) is of the same character as (4), and we suppose it to be a remnant of the original rear wall of the platform, which was thus 4.8 m deep (front to rear). The two remaining courses of the wall marked (7) are also of the same general character, apparently marking an increase in platform depth to 6 m . Both of these rear walls were partially removed before the platform was enlarged to its third and final form, when the depth was increased to about 6.7 m at the top, and, because of the batter of the final rear wall, to about 7.7 m at the bottom.

The upper surface arrangement as found bears no relation to these buried rear walls and we can say nothing regarding the surface in the earlier periods. It is quite possible that a suitable base for a temple was then present. It is difficult to imagine any building, even of perishable materials, on the stepped surface in the final period.

## Stela

Four stela, Nos. 9, 10, 11, and 40, were originally placed on the long and deep second terrace, far below the summit, but well above the West Group Plaza floor itself. Stela 10 and 11, now lie more or less over the first terrace, approximately below and in front of their original positions. Stela 9 lies on the second terrace, close to its base, from which it has been broken. Stela 40 was found by Drs. Morley and Ricketson close to plaza level and was removed to Philadelphia by Dr. Mason in 1932.

When erect, Stela 9 was placed before the second or main stairway, but somewhat to the right of its center axis, Stela 10 and 11 stood far to the left of the stairway. The cists of these monuments are shown on the plan, Figure 5.1a, in broken lines because below floor level, not because they were not found intact. Stela 40 lay a few meters to the right (southwest) of the lower stairway. It could not have been placed to the left of Stela 9, originally, unless very much farther forward, as the hard floor is there unbroken. We failed to find its cist to the right of Stela 9, but did find a disturbed area. There is little doubt that Stela 40 was placed $4-5 \mathrm{~m}$ to the right of Stela 9 , and about in line with it, a position consistent with the location in which it was found. The exact original position being unknown, it is not shown on the plan.

The arrangement of these four stela is decidedly asymmetrical with reference to the pyramid and its great stairway, but is in balancing groups of two. The dates as read by Morley indicate that the two stela of the left group were erected before the two of the right group, the lack of symmetry-being very marked at first, but corrected somewhat, later on. This is essentially the same sequence, so far as it goes, as in the series of eight monuments (Stela 1 to 8 ) on a similar terrace before Structure J-4, a pyramid temple at the other end of the same plaza. A clearer picture of the arrangement of monuments will result if we reverse our point of view and look at them from the plaza. Morley pointed out to the writer that, if we number the positions of these stela from left to right, the first four positions successively filled were $6,8,2$ and 4. These readings give first a pair to the right of the center of the final group (and near the end of the terrace, which is very long), than a pair to the left of the center of the group, in that case maintaining open positions between each stela, which were later filled. Here on J-3, numbering positions in the same manner, the sequence is $3,4,2$ and 1 .

The stela have been illustrated elsewhere, ${ }^{3}$ and will be further dealt with by Dr. Morley in his forthcoming Inscriptions of Petén. The hitherto unlocated base of Stela 9 was found in its cist. This adds the feet of two


A


B


C

Figure 5.3 a. Lower southwesterly corner of main stairway and masonry altar, Second Terrace, from southwest; b. lowest steps of main stairway at center, Second Terrace, from southeast; c. main stairway from northeast, Second Terrace.




$\nsim$

figures on the front, the lowest glyph-blocks of each side inscription and parts of two more of the left side inscription to the body of Piedras Negras stone art and inscriptions.

In Figure 5.4d is a rear view of this stela base, in position as found, but with the cist cleared out. Behind the monument the hard terrace floor was raised about 10 cm to form a small rectangular platform or dais running against its back. See also Figure 5.2c at the extreme left. This probably surrounded the stone, but front and sides were dug out before its presence was noted. The dais was of the same hard concrete as the older portion of the terrace floor, which we have connected with the buried stairway. But it cannot be said to be co-extensive with the floor, for the rear part, which overlaps the floor slightly, is a line of stone slabs (see cross section. Fig. $5.2 \mathrm{c})$. Certainly the dais was constructed after the stela had been placed and therefore after the front addition to the terrace, which was not hard surfaced, but into which the cist extends.

The stela base as found was twisted so as to face a little to the right of front. This could easily have occurred when it was broken. But the rear of the dais is correspondingly askew. There are one or two similar inconclusive hints of stela facing not quite to the front elsewhere in the city.

## Lintel 5

"Lintel" 5, discovered and briefly mentioned by Maler (1901:55), is shown in Figure 5.4c. Its width is 158 cm and its height 120 cm . Despite the large size, the thickness is only about 10 cm at the top; at the bottom the thickness is 13 to 15 cm The maximum relief is about 30 mm (on the body of the principal figure), the minimum about 5 mm (on the glyphs). The edges are nicely worked and curve in from front to back, giving one of the corners a carinated form. This cross-section of the edges is very much more marked on "Lintel" 12, as yet unpublished. The borders are only 5 to 7 cm wide, making its use as a lintel all but impossible.

The subject is similar to that of "Lintel" 4, as Maler observed. The principal figure wears a turbaned headdress with plumes curving above from the rear, and holds a staff or spear which without doubt rested on the ground before him. There is here also the remnant of a breech-cloth reaching nearly to the ankles. Maler reported captives before the principal figure, but there is space for only one at the most the pieces belonging here being missing. There is relief behind the figure, within the frame of the design, which may indicate another figure there, or perhaps the remains of a column of glyphs, as on "Lintel" 4.

There were columns of glyphs above and on both sides of the design. With few exceptions they are too much eroded to be read. The first five of the left column occupy four block spaces each, indicating an Initial Series to be read straight down as on "Lintels" 2, 3, and 7. The inscription then seems to run into small glyphs, but it is here badly eroded and it is safer to assume there were six large glyphs, thus allowing for an introducing glyph. Further on the size of the glyphs is clearly about 75 mm square. On the above assumption and considering only areas certainly devoted to glyphs, the inscription contained not less than one hundred and thirty glyphblocks, large and small. Ninety-eight of these can be individually made out. The hopelessly eroded area at the right lower corner (facing the stone) provides space for twelve more, giving a probable length for the principal inscription of one hundred and forty-two glyph-blocks. There are indications of two more blocks behind the head and almost certainly there were six additional ones in front of the staff or spear.

It may be of interest to compare the length of this inscription with those of others on supposed lintels, since on definitely known "lintels" of the Usumacinta region long inscriptions are absent, or are spread over a series of stones from the same building. ${ }^{4}$
"Lintel" 11 we believe was a true lintel, being thick, having a long plain butt on the known end, and being found in the doorway of a temple (Structure R-3). If a lintel, its inscription consisted of thirty-two large blocks. "Lintel" 6 we eliminate, since it has neither carved inscription nor design, but merely an incised abstract figure.

Of the remaining stones which we believe have been mistakenly labeled "Lintels", only five are complete. "Lintel" 2 has one hundred and six glyphs; "Lintel" 3 has one hundred and fifty-eight; "Lintel" 4 has seventy-nine; "Lintel" 12 has sixty-six.

We have many of the fragments of "Lintel" 7, which measured about 1.1 m by 1.4 m . Sixty-eight glyphs are present, and the total was probably over one hundred.

Two stones, Lintels 8 and 13 apparently had short inscriptions. Both are unusually small. Much of each has been lost.

Three "lintels" are known only by single small fragments, "Lintels" l, 9 and 10, the last two bearing small glyphs.

Miscellaneous Sculptured Stone no. 13 is very similar to "Lintels" 2, 4, and 5 in the arrangement of its design. Though much smaller than any of those, its inscription ran to at least eighty small blocks.

We do not have the ends of "Lintel" 13. The end borders on all the other stones considered above are very narrow, like our "Lintel" 5, except for "Lintel" 11, were thickness and position call for a true lintel function; they are also relatively thin, except for two, "Lintels" 7 and 12.
"Lintel" 5 thus belongs to a species of carved slab at Piedras Negras characterized in general by long inscriptions of small glyphs, and by the absence of plain ends suitable for mounting on doorjambs for use as lintels. Since true carved stone lintels seem to be all but absent at the city, the presence of this stone on a pyramid without a temple raises no presumption that it was moved here from elsewhere.

Maler (1901:89, Plate 35) reports and pictures a lintel with narrow borders and a 113-block inscription at the small and nearby site El Cayo. It seems not to have been reported from further afield.

If the positions in which we found the fragments are near or below those in which Maler found them, as seems likely, "Lintel" 5 was probably set in the wall of the seventh, eighth or ninth terrace, a little to the left (northeast) of the narrower upper portion of the main stairway. All but the lowest courses of these walls are fallen at these points. If this is correct the stone was in a sense at the head of the lower and wider portion of the main stairway.

## Objects

Scattered on the second terrace forward of, yet close to the base of, the second flight of steps, or main stairway, were found the whole or broken parts of sixteen large chert knives. Two are shown in Figure 5.5d. Several of these were well above the terrace floor; but all were in the deposit of disintegrated plaster or stucco and under the layer of stone debris. A small section of a long bone, almost certainly part of a human tibia, was found in the same deposit and general location, in that case behind Stela 9. The presence of these objects in the plaster wash, and near the center rather than the sides of the stairway, below and not mixed with the stone debris, makes it very probable that they had been left somewhere on the surface of the stairway, and had not been cached under it. A small portion of a seventeenth knife was found in the stairway debris, 1 m to the left of center at about the level of the fourth terrace, suggesting that all may have fallen from this or higher levels, possibly from the top.

These knives possibly may furnish a hint of human sacrifice. But the knives appear large for the purpose. A portion of one is 28.5 cm long and 6 cm wide, and it is incomplete. The longest complete example however is only 27.5 cm long. Thicknesses average about 2 cm , though one is 4.4 cm thick. These knives, so far as known, are all more or less leaf-shaped, but are not sharply pointed. An example of each appears in the plate. The form differs from that of a number of thick short flaked knives or celts found near Altar 5, a stone table, at the base of the stairway of Pyramid Temple O-13. Those are
pointed at one end, rounded at the other. The material, a poor, thickly patinated, bluish gray flint or chert, is the same in both cases.

Buried at the bottom of the cist of Stela 9, against the extreme left of the front face of its base, to the right of an observer facing the stela was a crudely tooled stone drum, diameter 20 cm , height, 10 cm . The flat top is much smoother than sides and bottom, and bears a number of scratches such as would result from the cutting of objects placed upon it. Possibly it was originally used as a very small sacrificial round altar. A similar stone was found in the center of the cist of Stela 11, and another was placed against the center of the front face of the base of Stela 8, at the bottom of its cist on the stela terrace of Structure J-4. The latter is shown in Figure 5.5c. Half of still another small stone drum, a little larger, was buried in or under the floor of the rear room of Temple O-13. That example (Miscellaneous Sculptured Stone 1) bears in relief the Initial Series 9.10.6.(5).(9). The bracketed uinals and kins represent missing glyph-blocks as restored with a question mark by Dr. Morley. The scratches on the upper surface were noted only on the stone from the Stela 9 cist.

Two similar stone drums have been found on the floors of small buildings on low substructures, and have been called portable altars. One of those showed a shallow irregular depression in its top, and its sides were painted red, the top being without color.

A rounded piece of pumice stone was found in the floor of the eighth terrace, northeast of the stairway. Placed against the center of the base of Stela 9, at the very bottom, like the stone drum or altar, was the spiked pottery incense burner shown in Figure 5.5a. ${ }^{5}$ It was in all probability set squarely on its base, but was found tilted slightly forward, probably by the later corresponding tilt of the stela base (see section in Fig. 5.2c). The cover was approximately in place. The heavy broken rocks used to support the stela in the cist had been so placed around and over the censer that even after the shifting of the stela, it was but little damaged.

There are no perforations in the bowl, which has a deep ring base. The diameter of the rim is 16 cm , the height 8 cm . The neck of the cover is hollow, forming a sort of chimney about 1.8 cm in diameter. The diameter of the rim is 17 cm the total height 10 cm . From this orifice, at the top, four wide shallow grooves extend to the outer edges of the chimney, in the form of a cross. The top of an exactly similar chimney was found in the debris over the fourth terrace, to the left (northeast) of the stairway.

Under the high floor running into the lowest of the terraces at the rear of the pyramid, corresponding in general to the level of terrace nine at the front, was found an extremely heavy thick portion of a vessel,


Figure 5.5 Objects.
probably a censer. It indicates a deep ring base, the body (or the base) pierced by holes or slots. There is enough remaining to suggest large cruciform perforations.

Figurines and sherds recovered in and about this building, have been considered in the paper on the ceramics of the city, by Miss Butler already cited. Six pottery figurines or fragments were found. One was in the plaster wash on the second terrace, and another in the stone debris, over this wash; one was in the debris at the rear of the pyramid, and two were in the debris on the ninth terrace, at the front. A sixth was recorded as in a floor, but at a level which would place it between the eighth and ninth terrace floors. This was probably also in debris. All may be regarded as probably, but not certainly, post-dating the erection of the pyramid.

A pottery mask is represented by part of the nose, and most of the half-open mouth and chin, and is show in profile in Figure 5.5b, in full face in Figure 4.14.10 of Miss Butler's paper. It is somewhat less than life size. There seem to be no remaining traces of slip or paint. It was found above the second terrace floor in the angle between the right (southwesterly) side of the stairway and the third terrace wall. Notes fail to specify whether it was in the plaster wash, or above in the layer of stone debris.

Potsherds were encountered which may be assigned to a date prior to the final stage of building,
and there are others which may date from before or after that time. In the first category are sherds from under the second terrace floor; in the Stela 9 cist, in the stairway fill on the eighth terrace and under the floor at the rear of the Pyramid. A few sherds encountered in clearing the empty cists of Stela 10 and 11 may or may not have found their way there at the time the stela were erected. The sherds with stucco adhering probably came from stucco decoration applied to the terraces. Sherds were found in the debris on the front of the pyramid at various levels, and on the ninth terrace, at the front. Sherds were not found in groups, nor associated with other objects. The ruin of the pyramid was so complete, however, that sub-floor caches may have been made and subsequently scattered.

Some of the sherds are decorated, both painting and incision being represented. Only those under the second terrace floor can be dated with reasonable certainty as prior to the date of the earliest stela on the terrace (9.15.0.0.0).

The recovered fragments of stucco have been mentioned above. There are only one or two giving information as to the type of designs involved, and these will be considered with examples from other buildings in a later paper.

## Date

The dates of Stela 11, 9 and 10 as read by Dr. Morley are 9.15.0.0.0, 9.15.5.0.0, and 9.15.10.0.0, respectively. The cists for all three were built partially in the later front addition to the second terrace. The date of Stela 40 marks the next hotun ending, 9.15.15.0.0. We did not find the cist for this but we can say from a careful examination of the hard floor that it must have stood well to the front of the widened terrace. The addition to the second terrace, therefore, must have been made before any of the stela were set up, and it seems plausible to suppose that it was made to receive them, toward the end of Katun 15. It seems a reasonable guess that at the same time the new main stairway was built and possibly the first or second addition was then made to the platform at the top.

According to Morley the earliest dated monument in the West Group is Stela 39, 9.12.5.0.0, 11 hotuns (about 55 years) earlier than Stela 11. It is quite possible that even before the remodeling, and beginning of stela erection in the West Group. Structure J-3 was not in its earliest form. We are probably safe in assuming that the West Group Plaza and the Acropolis were in use for some time before the inhabitants began erecting stela here instead of in the South Group, where the earliest dates are found. Consistent with such a hypothesis is the presence of Structure J-6-2nd on the nearby Court 1 of the Acropolis, which was partially torn down to make way for Structure J-6, probably about 9.17.15.0.0, only about half a century later than the supposed date of remodeling here. ${ }^{6}$

## Details of Construction

## Walls, Floors and Fills

The terrace walls are built of rather rough stone blocks of medium size. The original front, side, and first two rear walls of the upper platform, all vertical, are of fairly well selected and better squared blocks of medium size, though the battered rear and right walls of the latest phase were like the terrace walls.

The side retaining walls of the stairway, on the second terrace, include much longer blocks, and are superior to all the others, though still mediocre (Figs. 5.3a and 5.4 b ). There is more chinking in evidence here.

Terrace floors above the second presented the soft remains of mortar and crushed stone concrete. There was no remaining sign of floors on the upper platform, nor on the late addition to the second terrace. The original second terrace was floored with concrete of extreme hardness, as mentioned before. This was so hard that we wonder whether, although its elements must differ from
the others, part of its hardness may not have come with time. If the builders knew what they were laying, it was a triumph of the mason's art.

Floors vary between 10 and 20 cm in depth, and in most places rest directly on pure broken rock fill. The plaster surfaces had in all cases disappeared.

All fills observed were of pure broken rock, dry laid rubble, except under the steps of the stairways, where it was partly or completely solid earth and rock, possible remains of very poor concrete.

The pure broken rock fills are for the most part of fairly large and heavy stones. The crude sloping wall marked (5) on the cross-section of the upper platform (Fig. 5.2a) illustrates an interesting practice in fill construction, much more plainly demonstrated by Dr. Mason under Structure K-5-2nd. This wall consists of ordinary and extremely irregular broken rocks, and shows that the fill behind it was laid up before that in front, and with a fairly regular sloping face. This may have been designed to give added strength, or may result from a task system or some unknown cause. A similar constructional wall was encountered in the fill of the late addition to the second terrace, running from the old to the new front wall. ${ }^{7}$

## Stairways

The lowest steps of the stairway on the second terrace show the method of building the steps. The treads are slabs, as in some other cases, but quite thick and fairly well squared (Fig. 5.3b). Each extends under the next riser, thus binding the steps together. At the front they are supported by one or two small slabs laid flat. The whole rests on a solid earth and stone fill, which possibly may have had some slight admixture of mortar. This construction is shown in cross-section in Figure 5.2b.

The most interesting feature of this stairway is the fact that special supporting retaining walls were built under and behind the solid fill. Part of that on the second terrace is shown in the above mentioned drawing, and in the photograph, Figure 5.4a. The steps and fill placed against it appear at the left of the trench. Similar walls were found in position over the fourth, fifth and eighth terraces, and are shown in cross-section in Figure 5.2b. They are very crude, but superior to the mere fill walls described above. They are true walls and show a tendency to curve back toward the top, probably so that they could be carried fairly high. The curve is not due to subsequent bulging. That over the fourth terrace nearly meets the wall of the fifth. There is little doubt that these walls are in addition to the terrace walls, which follow through behind the stairway wherever they were followed.

Excavations were not sufficient to determine whether this feature was used in the earlier stairway observed on the second terrace or not. The positions and smaller
size of the blocks of that stairway, which was somewhat disturbed, suggest that the treads did not tie under the risers, as in the later stairway. This early stairway differs from the later in having only a thin layer of solid earth and stone, possibly poor mortar, to support the actual steps. This layer of solid fill is marked (3) on the cross-section (Fig. 5.2b), which illustrates the relations involved.

## Stela Cists

All stela whose methods of erection have been studied (all of them in the West Group) have a plain extension or base which was set into the terrace. To receive this a cist with rough walls was generally built below the floorlevel of the terrace. The cists are usually approximately rectangular, except that no rear wall was built possibly this was omitted to assist in the erection of the stone, though the rear wall could easily have been built afterward. The cists are considerably larger than the bases of the stela, and since they were placed in a tightly packed pure broken rock fill, their function is not entirely clear, and they may have been ceremonial rather than structural in function.

The three found on this structure are shown on the plan (Fig. 5.1a). Only that of Stela 9 departs markedly from the rectangular form. In Figure 5.2c is a crosssection from front to rear, through this cist and stela base, the latter in position as it was found. There is plenty of room about the stela, particularly in front. The space at front, sides and back of the base was filled with heavy broken rock, the same sort of construction to be found outside of the cist walls. The weight of these stones, which are angular and irregular, locks them in place. There is nothing to wash away and nothing can give unless there is a general slip of the surrounding terrace, or the stela is forced well out of equilibrium.

If the latter occurs, it is difficult to see how the cist walls would help, as they are nothing more than thin retaining walls placed against and resting on the fill. Perhaps they were built for reception of the ceremonial objects frequently, as here, but not always, found in
them. However the walls do not protect the objects in any way.

The cist floors are merely a thin deposit of earth and small broken stone, possibly with a little mortar. The weight of the stela appears to have been borne by the rock fill, without special attention to foundations, though we have not investigated this thoroughly.

## Notes

1. To distinguish such stones we here add quotation marks to the term "Lintel", where a stone has been already referred to as such; another has been given a number in a series of miscellaneous Sculptured Stones. One carved stone at Piedras Negras we still believe to have been a true lintel, "Lintel" 11.
2. Satterthwaite (1933a); in small scale in Butler (1935b); and to appear in large scale in Morley (1938a). For the sake of consistency, throughout the description, where not otherwise indicated, left and right are those of a person facing the same way as the structure.
3. Stela 9, 10 and 11 are described by Maler (1901:55-58) and pictured in Plates 18, 19 and 20, respectively. Stela 40 is illustrated by Mason (1934b, c).
4. "Lintels" 1, 2, 4, and 6 are illustrated by Maler (1901, Plates 30, 31, 32 and Figure 26 respectively); "Lintel" 3 by Mason (1931b); "Lintels" 3 and 12 again by Mason (1935b).
5. Also illustrated by Mary Butler (1935b). The bowl is of the same form, as modern Lacandon incense burners but lacks the applied face and perforations; while they are not supplied with covers, or spikes.
6. Since this was written a total of five building periods, some of them subdivided into separate episodes, have been established in Court 1. This raises a strong presumption that our Pyramid J-3 is now known only in its latest periods. Burial levels have appeared in pyramids R-3, O-13 and K-5, the latter on this plaza.
7. These interior constructional walls have now appeared in several other fills, and probably date from early Piedras Negras times. Although usually sloping, they are sometimes vertical.

## Part II

Piedras Negras Archaeology: Architecture

# Architecture: Introduction 

Linton Satterthwaite

## General Remarks

Piedras Negras has been a famous Maya site for many years but its fame has little to do with architecture. It rests first on the number and quality of its stone sculptures, most of them discovered by Teobert Maler and made available by him in 1901, when his report was published by the Peabody Museum of Harvard University. Second, the importance of this site derives also from the circumstance that the hieroglyphic inscriptions on these monuments have been in some respects particularly useful in studying the calendrical-astronomical content of Maya inscriptions generally. Dr. Sylvanus G. Morley, of the Carnegie Institution of Washington, is to be credited with adding to the number of known monuments, and with making them, together with still others discovered by the University Museum, generally available in his Inscriptions of Petén, published in 1938.

In that monumental work he devoted 312 pages of text and figures and many plates to this site. Included are the circumstances of scientific discovery by Maler and the subsequent history of investigations here down to 1930. In that year Dr. J. Alden Mason, Curator of the Museum's American Section, first visited the site. Later, in Guatemala City, he made preliminary arrangements for the first season of archaeological work which followed in the spring of 1931. These arrangements included the beginning of a road for transport of large monuments. The 1931 season was followed by seven others in the dry seasons of 1932 to 1937 and, finally, of 1939.

A general group-by-group description of the site, with small-scale map and cross-sections as of 1932 season, was issued in 1933 (Satterthwaite 1933a). These were in mimeograph and photostat form; the edition was very small and is out of print. But it was revised somewhat later and incorporated in Morley's work (1938:3:5-25), and need not be repeated in extenso here. Four other Piedras Negras Preliminary Papers, in mimeograph-photostat format, have been issued. A number of progress reports and notices, usually illustrated, have appeared and are listed in the bibliography. Of the five Preliminary Papers, only that by Dr. Mary Butler, on ceramics as of the 1932 season, was distributed to libraries.

From the first it was intended that these should be superseded by more definitive publications when work should be concluded. The publication now begun is intended finally to describe and provisionally to interpret the architecture, and only such aspects of monuments, ceramics and other objects as can best be treated with it.

The importance of the Piedras Negras structures derives partly from their association with an outstanding series of dated Maya monuments, partly from a rather considerable number of previously unknown features and combinations of features, and partly from the fact that here several distinct types of structure have each been made known by a considerable series of examples. Another factor of present importance is the location of the site more or less between Palenque and Yaxchilan, important sites at which many standing and published buildings are available for comparative study (Palenque: Maudslay (1889-1902), Blom and LaFarge (1926-1927); Yaxchilan: Maudslay (1889-1902), Maler (1903), Morley (1938), Bolles (1938).

## Authorship

The writer of this Introduction is at present (1943) charged with the task of describing all the Piedras Negras architecture. Naturally, in doing so, the work of others on many structures must be utilized. I happened to be the only one present during all of the field seasons and so have the advantage of having been on the spot when each individual operation was finished. Therefore I can more easily see a given structural complex as a whole, even when the most important features had already been discovered by someone else. Notable examples of this are the important sequences at Structures K-5, O-13 and P-7. Excavation of each of these had been far advanced by Mason by 1932. But as time permitted during later seasons various details were dug out and related to what was already known. There is no controlling reason however, other than convenience, for having all sections written by one person, and it seems wise to allow for change of plan in this respect. For this reason authorship of each section will be individually noted.


Figure 6.1 The Acropolis at Piedras Negras. Restoration drawing by Tatiana M. Proskouriakoff.

## Difficulties

Maler might have reconstructed fairly accurate plans of two or three acropolis palace buildings without excavation; his one building plan is fair, except for imaginative and faulty interpretation of debris. But otherwise all of the many structures appeared as mere mounds of debris with, rarely, a bit of wall showing here and there. No details of substructure design were visible anywhere. Practically all architectural knowledge had to be dug out. As work proceeded it turned out that only about half of the major buildings had been roofed with the Maya masonry vault. This extremely interesting fact meant that many floors and lower parts of walls, unprotected by the deeper vault debris, were in especially bad condition and had to be slowly and painstakingly searched for, sometimes in vain.

There were certain other obstacles in our way, notably the Maya use here of pure rock hearting in the platforms and pyramids on which they placed the buildings. This unforeseen circumstance made deep cross-sectioning or tunneling, easy at many Mexican and other Maya sites, laborious or unsafe, sometimes both, at Piedras Negras. The site is three days by pack mule from the nearest source of labor and supplies, Tenosique, which itself is two days by river boat from the nearest port, Alvaro Obregón, on the Gulf of Mexico. The new railroad connecting Tenosique with Campeche was not completed till after our last season of work. Madeira's airplane was the first ever seen at Tenosique, but regular air service to it was established while we were at work.

Digging must be rushed during the short dry season, the limits of which cannot be precisely predicted from year to year. We came to regard the two and one-half
months from March 1 to May 15 as fairly sure to provide reasonably good digging weather. One should plan to start digging before this, rather than to end later. Dryness is not absolute. For instance, in 1936, 4.7 inches of rain fell in April, 8.6 inches in May, compared to 23.3 inches in June.

## Acknowledgments

The costly digging out of so much architecture at one site has been justified, we believe, by the information gathered. Judgments of others will ultimately depend largely on the usefulness of this series of reports in building a more accurate and complete general picture of ancient Maya culture, and the sociological meaning of the tremendously important role which architecture played in it.The cost-producing factors enumerated above should be considered together with the fact that costs had to be met at first during a period of major financial deflation in the United States and later during a period of rising labor costs and sometimes of decreasing foreign value of the dollar. So it should be obvious that more than routine acknowledgments are due from those who urged that the work be done, to those who made it financially possible.

The first three seasons' work, in 1931, 1932 and 1933, have been termed respectively the First, Second andThird Eldridge R. Johnson Expeditions. The first two of these, by far the most costly because of the purchase of permanent equipment and the removal of large monuments, were financed entirely by contributions of Mr. Johnson, and the third by those from him and from an extremely generous but anonymous friend of the Museum. Thereafter very substantial support for fieldwork was received from the American Philosophical Society (Penrose Fund grants 151 and 285). Contributions specifically for the work were received through the efforts of the Museum Women's Committee, and from Mrs. W. W. Fitler and Mr. Boies Penrose. Much of the financial outlay for the later field seasons was from general Museum and University funds. Substantial aid in preparing for publication was in the form of a grant for the purpose from the American Philosophical Society (Grant 10 from the Johnson Fund). The work could not have been continued so long without the great interest and constant efforts of John Story Jenks and Horace H. F. Jayne, respectively President and Director of the Museum during the entire period of fieldwork. Neither could it have even been begun without the enlightened cooperation of the Government of Guatemala and its Department of Public Education. It was prosecuted throughout under a written contract with that government ministry, providing for general control by a resident representative, and for loan to the Museum of one-half of the archaeological objects, including
monuments, removed. Relations with all Guatemala officials were cordial and satisfactory throughout. These pleasant relations were enhanced by the fact that during much of the life of the contract Dr. Lic. J. Antonio Villacorta C., a great Mayanist, was Minister of Public Education, and that Sr. Don Carlos A. Villacorta B., also a distinguished Mayanist and archaeologist, was in charge of the National Museum at Guatemala City which is the eventual repository for all the finds. A sympathetic understanding of our problems and objectives, perhaps to be expected from experts in our own field, was evident in all official contacts.

It was necessary to bring supplies and to export objects through the Mexican State of Tabasco. We are most grateful to various Mexican archaeologists of official status for assistance in repeatedly arranging special customs permissions. Ing. Ignacio Marquina, Sr. Eduardo Noguera and Dr. Manuel Gamio were bothered most often and so deserve especial thanks for special courtesies always encountered in this quarter. To our agent at Tenosique, Sr. Don Francisco Villanueva G., and his associate Sr. Don Francisco Garcia, go unbounded thanks. Without them we should have starved. It would be impossible to overstate our appreciation for the kindly hospitality and general helpfulness which we encountered on every hand, when traveling through the State of Tabasco. We met with nothing else from the coast to Tenosique, and this was as true during the first season, when we were strangers, as in later ones. It is difficult for us to understand a recently published account of a trip through this country by another North American, whose reaction was quite different from our own.

Dr. Morley placed his special knowledge and the Carnegie Institution's data on the site freely at our disposal. Advice from him and from Frans Blom, then Director of the Department of Middle American Research of Tulane University, New Orleans, was helpful in choosing it and in shaping the program of work. Morley recommended Piedras Negras because of its monuments and location. Blom suggested ruins near San Clemente, a small and more accessible site, because it could be more completely examined in two or three seasons. Percy C. Madeira Jr., now President of the Museum, visited the San Clemente site in 1930 in connection with the Museum's Aerial Expedition to Central America, which he promoted and directed. He was accompanied by Dr. Mason. The decision went to the larger site, but the program finally evolved into an attempt to apply to the main ceremonial groups Blom's recommendations for complete investigation. Blom also was very helpful in arranging such practical matters as transportation and supplies.

We had the advantage of very helpful comment and advice while actually on the spot, but by no means as
much as we should have liked. Morley and Mrs. Morley, Ruppert and Bolles spent a few days with us en route to and returning from Yaxchilan, in 1931. At this time Morley noted remains of an inscription on what he called Stela 43, and Ruppert determined the existence of the round markers in the Structure R-11 ballcourt. Pollock, A. Ledyard Smith and Shook, also of Carnegie Institution of Washington, visited us in 1937. Smith and Shook helped Cresson to solve a perplexing problem in a Court 1 buried structure, utilizing what they had learned of early Uaxactún practice. Pollock, on seeing our sweathouses, was able to identify a probable steam-room, which he had seen on his journey, I think at El Chilé.

Our costs were substantially reduced by allowance of special freight and passenger rates by the United Fruit Company and by the Standard Fruit and Steamship Company. From various officials at these companies we received special attentions respecting what must have been to them profitless business, for which we were and are most grateful.

It would not be fair to fail to thank the men who did most of the actual digging. In this kind of work, at an unknown site, a great deal depends on the patience, industry and skill of the workman, and on his good will. They ranked high in these respects. They were either Guatemaltecos from Flores or Mexicans from Tenosique. From either place, they were quick to learn, delightful to work with. I think the difficulties which Maler had with Tenosiqueños must have been largely his own fault.

## Personnel

A list of the personnel of the expeditions, with the years of the seasons during which they were in the field, and indication of their chief responsibilities, follows: Santiago Mendoza, Representative of the government of Guatemala, 1931-1932. Victor M. Pinelo, same, 1933, 1935-1937, 1939. J. Alden Mason, preliminary arrangements with Guatemalan Government and at the site, 1930; field director, excavation, 1931-1932; inspection visit, 1936; general oversight throughout. Linton Satterthwaite Jr., excavation, 1931-1932; field director, excavation, 1933-1937, 1939. Mary Butler, excavation (mainly for ceramics), 1932. Francis M. Cresson Jr., excavation, 1935-1937. Fred P. Parris, surveying, draughting, 1932-1933. Tatiana M. Proskouriakoff same, 19361937. William S. Godfrey Jr., same, with photography and study of the art on the monuments, 1939; T. Egan Wyer, engineering (road construction), construction of camp, 1930-1931; surveying, 1931. John H. Ross camp manager, 1932-1933. Mrs. Linton Satterthwaite Jr., cleaning and registering objects, all seasons; housekeeping, 1932 and thereafter, bookkeeping and
assistance in camp management, 1934 and thereafter. Mrs. T. Egan Wyer, housekeeping, 1931. Mrs. William S. Godfrey casts, 1935 (first part of season). David Amram Jr., bookkeeping, 1932 (first part of season).

Excavators in the main did their own photography, or that of a fellow excavator; and they did a good deal of plan and section-making with tape, plumb-bob and leveling instrument, But only those labeled as engaged in surveying used the transit. In respect to this, the little surveying which Wyer had time to do was later superseded; Parris and Proskouriakoff were graduate architects. Godfrey was not, but he demonstrated the accuracy of his work by drawing it up in the field, and re-doing whatever failed to check satisfactorily.

All except Srs. Mendoza and Pinelo, Mr. and Mrs. Wyer, Ross, and Amram spent short or long periods of time at Philadelphia preparing for a season, or working up its results. Those listed from Satterthwaite to Proskouriakoff, inclusive, were primarily occupied with such work during one to several betweenseason periods. Cresson, in addition to working up his excavation materials, has devoted a greet deal of time to as yet incomplete studies of certain ceramic stratigraphies not available when Butler published her ceramic interpretations as of 1932.

It is proper to record that the services of Butler, Godfrey, Mrs. Godfrey, Mrs. Wyer and Amram were volunteered and not compensated, while those of Cresson, Proskouriakoff and Mrs. Satterthwaite were similarly volunteered in the beginning. In addition, Miss Proskouriakoff presented us with about two months of her time, after her official connection with the Museum had ended, in making the drawing of Figure 6.1.

## Comparative Data

In addition to published sources, unpublished notes, drawings and photographs on architecture obtained on visits to certain other sites have been utilized in reconstructing or interpreting structures at Piedras Negras. Dates and personnel of these collateral excursions are listed below:

- To Chichén Itzá or Chichén Itzá and Uxmal: Mason 1931; Satterthwaite and Mrs. Satterthwaite 1931, 1933, 1935; Butler 1932; Parris 1933; Mrs. Godfrey 1935; Proskouriakoff 1937; Cresson 1937.
- To Palenque: Mason 1930; Satterthwaite and Mrs. Satterthwaite 1931, 1932, 1935, 1936; Butler, Parris and Amram 1932; Cresson 1935-36; Mrs. Godfrey 1935; Proskouriakoff 1936.
- To Yaxchilan: Satterthwaite and Mrs. Satterthwaite 1933-35; Parris 1933.

These visits varied from a day to about a week, except for the last two trips to Yaxchilan, which each consumed about two weeks. The latter were with the kind special permission of the authorities of the Mexican government Departamento de Monumentos Prehispánicos. Thanks are due to Sr. Dr. José Reygadas Vertiz, to Lic. Alfonso Toro, and to Ing. Ignacio Marquina. In 1935 this included permission to make minor excavations. We were somewhat diverted from our architectural objectives that year by a request from Morley to search for certain suspected lintels. Carnegie Institution of Washington contributed toward the cost of this enterprise. Three lintels were discovered, and with another new one found by Don Ulises de la Cruz, the local guardian, were recorded and have been published in Morley's Inscriptions of Petén (1938: Plates 178f, g). For all visits to Chichén Itzá we must acknowledge the generous hospitality extended by Dr. Morley on behalf of the Carnegie Institution of Washington.

After the 1937 season Satterthwaite, accompanied by Mrs. Satterthwaite (except in the Petén) visited a number of sites with the aid of a travel grant of Carnegie Corporation of New York. These provided one to a few days at Tonalá (Chiapas), Sta. Lucía Cotz[umalhuapa], Utatlán, Zaculeu, Xolchún and Pueblo Viejo near Aguacatán, Copán and Quiriguá; and about a week each at Uaxactún andTikal. Excavations for the season had just been concluded by Carnegie Institution of Washington at Uaxactún and Copán and a great deal of its work could be examined at first hand, though unfortunately in the absence of the staffs.

## General Objectives

At first the general objectives had much to do with the sculptured monuments, the discovery of new ones and the exportation of the best ones, new or old, so that they could be permanently preserved. These objectives respecting monuments were satisfactorily realized in the first two seasons, by which time eighteen new monuments or sculptured fragments, four of them important ones, had been discovered. Eight important monument items had been started to Guatemala City and eight to Philadelphia on loan. Another objective was to make a more accurate map of the mounds and surrounding hillsides, including house-mound areas, as a basis for deductions as to cityplanning and for selection of spots for excavation. It was and remains the hope that time-consuming attention to contours of a great many mere mounds will in time justify itself by permitting development of criteria by which to recognize without excavation, provisionally at least, particular types of buildings. This project was completed for the main ceremonial groups in 1932, and for the peripheral areas in 1933.

Naturally, from the start it was hoped to get some notion of the buildings, ceramics, burials and general archaeology of a site which had produced such outstanding sculpture. The original plan was for two seasons only, and a sampling technique was indicated and pursued. Nevertheless some notable progress in these categories had been made by that time. It was then decided to continue from season to season, hoping that each need not be the last. Six seasons of work thus followed the originally planned first two, though during one of these, 1934, in the absence of sufficient funds and therefore with only a local government representative, excavations were not permitted. During this second phase the sampling approach was combined with more or less complete excavation at some spots, or, more usually, as emphases on particular problems shifted or expanded, repeated samplings at one spot came to represent a more nearly complete excavation. During this period the main objective was architectural, and, specifically, to attain a complete picture of the latest structures making up the main ceremonial groups. This has largely been attained. Peripheral house-mounds were neglected (with important exceptions) in an effort to gain completeness in the main areas, and to get to the bottom, both architecturally and ceramically, at selected points in those areas.

If one compares the amount of deep digging for early stratified remains here with that accomplished in comparable periods in Mexico and at such Maya sites as Uaxactún, Chichén Itzá and Copán, the comparison will be unfavorable to us. This is a regrettable consequence of the local use of pure rock fills for platform hearting, already referred to. However, we managed to obtain overlapping cross-sections reaching bedrock at selected points in West, East and South Groups, and in the Southeast Section, and have a fair notion of the general Middle American habit of burying old buildings below new ones, as practiced here.

## Location

Morley, scaling various maps, comes to the conclusion that the best available latitude and longitude approximations for Piedras Negras are 17 degrees 9.75 minutes North and 91 degrees 16 minutes West. It is on the right bank of the Usumacinta River which now forms, at this point, the boundary between the Guatemalan Department of Petén and the Mexican State of Chiapas. It is fairly close to but not at the western boundary of the area of classical southern lowland Maya ruins. It is in part of what has in the past been called the Old or First Maya Empire. Its geographical relationship to the better known Maya sites generally can be seen to advantage on Morley's (1938) Plate 182, which appears also in Ricketson (1937) as

Figure 1.1. The revised edition of the Blom-Ricketson map shows the whole Maya area at the same large scale (Kramer and Lowe 1940). On maps not specifically archaeological it can be roughly located as about 20 km ( 12.4 miles) southeast of the tip of the small point which Guatemala appears to thrust westward into Mexico, just north of latitude 17.

We shall reserve for Conclusions any detailed consideration of this location from an archaeological point of view, but a few preliminary notations seem advisable. Maler grouped Piedras Negras with other sites as in the central portion of the Usumacinta Valley. The sites thus grouped are strung out from southeast to northwest. Of the points at which ruins were definitely found, that farthest southeast (upstream) is Yaxchilan, which he helped to make famous. He was the first to give a systematic account of the many standing buildings there (Maler 1903). Near the other extreme is Chinikihá, a little-known but probably important site, on a small affluent of the Usumacinta, the Arroyo Chinikihá. Palenque, a site very famous for its standing buildings, sculptures and inscriptions, lies about 35 km west and somewhat north of Chinikihá. Maler did not include Palenque in his investigations, presumably because it was so well known. It is near the source of another affluent, the Río Chacamax. Maler's most northerly site, La Reforma, on the Kramer-Lowe map, is only about 8 km north of Chinikihá, and is on the Chacamax. But this navigable stream soon turns north and enters the Usumacinta far down stream (water distance) from the mouth of the Chinikihá.

Although it is on the very edge of it, Palenque is in the same formation of rugged limestone hills as are Piedras Negras and Yaxchilan, and the three are properly bracketed as the best known Usumacinta sites. Piedras Negras is about 45 km ( 28 miles) air-line from Yaxchilan, about twice as far from Palenque. While they have much in common, which is surely to be expected, these three sites are by no means homogenous, and this is especially true with respect to their architectures. In considering this fact, the obstacles to navigation, as well as the disposition of the river-system on the map, are of possible significance.

From about 20 km air-line above (southeast of) Yaxchilan to $2-3 \mathrm{~km}$ above the mouth of the Arroyo Chinikihá, the river rushes through a narrow and often gorge-like valley, with a few and only small tributaries entering it. Small lakes are found on either side. Rapids, occur in almost any kilometer of this whole stretch of river. Water-borne traffic by dugout canoe is difficult and dangerous at all times, especially going upstream. It is apparently never practicable from a point a little below Porvenir (a few kilometers northwest of Piedras Negras) to an impassable rapid just above a point called San José,
shown on Morley's (1938) Plate 179. Just below this point the San José rapids, the last, can be negotiated at favorable times.

From these San José rapids, smooth water passes the mouth of the Chinikihá arroyo and leaves the hills at Boca del Cerro. Thence it traverses delta country to the sea or, through an outlet called the Palizada, to Laguna de Terminos. In this flat country, honeycombed toward the north with streams and lagoons, canoe traffic is the rule today, as it very evidently was in the time of Cortés.

Turning our attention up-stream, there is a rapid a short distance above Yaxchilan which is reported to occasion some difficulty at times. Presumably this is at or near the point now known as Montería, Nueva Orizaba, Maler having placed the uppermost rapid at a Montería Orizaba. Above this I understand easy navigability for canoes reestablishes itself and continues far up the Lacantún, Chixoy and Pasión tributary systems. They have branches and fingers reaching south to the foothills and even into the highlands of Guatemala and Chiapas to the south and west. A map showing exactly how far these tributaries are navigable, and at what seasons particular rapids are more or less serious obstacles, might be very instructive when the many sites still to be discovered in southern Petén and eastern Chiapas are known. As an infinitesimal contribution in this direction, I was reliably informed that the limit for canoes on the Lacanía affluent of the Lacantún is only a few kilometers above its mouth.

Defining the middle portion of the Usumacinta itself as the section of difficult and in part impossible navigation, and scaling from Morley's large-scale map (1938:5, Plate 179), its air-line length is about 90 km . It is a comparatively short section in the middle of the complete Usumacinta drainage system. This system can be envisaged as of a badly misshapen hourglass form, extending from the northwest to the southeast. The smaller lower compartment is in delta-like country shared with lesser systems to the west and to the east. The larger upper compartment is apparently mostly in the midst of rugged but relatively low hills. The middle portion is the stem of the hourglass, and all water from the upper compartment flows through it to the lower. However, the stem lies between important projecting lobes of the upper and lower compartments, drained respectively by the Jatate affluent of the Lacantun and by the San Pedro Martír affluent of the lower Usumacinta.

Pursuing the above crude analogy, Piedras Negras is about in the middle of the hourglass stem, hence lies between the Jatate and San Pedro Martír rivers. It is somewhat retired from extensive water highway systems, suitable to the dugout canoes undoubtedly possessed by the ancient Maya, but one could reach them overland with comparative ease. A portage between
upper and lower Usumacinta navigation systems, If made on the right bank, would pass through Piedras Negras. The present trail from Tenosique to Filadelfia, a semipermanent mahogany camp a little above Yaxchilan, and like it on the left bank, touches the winding river at now uninhabited points called El Retiro and Porvenir, and at Piedras Negras, and then crosses it at Desempeño, 1 km or so below the ruins at El Cayo and Macabilero. Cargo is today moved upstream from Desempeño only when conditions are good, and up-stream cargo must always be portaged a few hundred meters around a bad rapid at Anaite, somewhat above the ruins of Chicozapote. Reasoning to the past from the present, impossible rapids probably did not prevent river traffic where portages were practical and short, and passable but difficult rapids were not too close together. Today this condition is considered to obtain only above Desempeño, and only at favorable times.

As stated, the air-line length of the section of difficult or impossible navigation of the Usumacinta is about 90 km . Piedras Negras is only about 60 km from smooth water at the southeast end, about half this from the northwest end of this section. It is also only about 25 km from the San Pedro Martír river. Of course actual trail distances would be somewhat greater. The upper reaches of this latter stream are navigable in an easterly direction at least as far as Paso Caballo, perhaps farther. This is more than halfway to Tikal and Uaxactún in the heart of the central Petén district. The great obstacles to land traffic now are due to vegetation and, during much of the year, mud. These obstacles exist because of depopulation of the region, except for occasional isolated settlers, small lumbering establishments, and a sparse population of scattered Lacandon Maya families. In ancient times presumably trails were kept cleared of bush and artificially improved to avoid mud, though there seems to be no hint of the high raised roads of northeasternYucatan. It seems safe to conclude that the site was always somewhat isolated from the routes of canoe traffic which presumably led far afield to the northwest, southeast and somewhat to the east; but that in ancient times overland routes, much easier then than now, connected it with these water routes, and with sites which probably lie about it in all directions, including Yaxchilan and Palenque. But the latter differ in that each lies at the periphery of a large area to which it had direct access by water. Piedras Negras lies between those areas.

Exploration on the right (northeast) of the river has thus far been largely confined to the immediate vicinity of the stream itself. Without any particular effort we noted three new sites, San José, Mundo Nuevo and Macabilero, which have been entered on the Kramer-Lowe revision of the Blom-Ricketson map. San José is the correct local name for the first of these, and this apparently small site
is at the absolute upper limit of uninterrupted navigation coming in from the direction of the sea. But if we have occasion to refer to it as a ruin site we shall call it San José Usumacinta, to distinguish it from the San José excavated and reported on by Thompson (1939).

Piedras Negras is set among rugged limestone hills, the highest of which are flat-topped, and in the neighborhood of 100 m above more or less level and narrow valleys which wind between them. The general elevation was not determined, but one may guess that even these tops are not more than $200-300 \mathrm{~m}$ or so above sea level. Hence, in a state of nature, everything is covered by forest. Where this has not been cleared in the recent past, it is not particularly thick, and most of the map was surveyed without much bushing. There is plenty of mahogany, zapote and other hard woods, and of cedar, the beautifully straight-grained softwood of which cigar boxes are made. Rubber is available, ramon, now used for mule fodder, and palm for thatch. Several kinds of the latter occur in patches and we soon had to send some distance for it. The leaves are all of the fan type. There is a very light wood suitable for rafts. In a pinch rope is made today from a local bark.

The fauna includes large and edible birds, the macaw and other parrots, humming bird, duck, toucan, deer, wild pig, jaguar, spider and howler monkey, armadillo, frogs and toads, iguana, lizards, poisonous and nonpoisonous snakes, including a constrictor, and in the river fairly large fish and crocodile. Of insects I will only note that ticks are plentiful wherever animals have been, and mosquitoes comparatively rare in the dry season at least. Dr. Hobart M. Smith, our guest in 1939, made a local collection of reptiles for the Smithsonian Institution, obtaining new species; Amram and Proskouriakoff made small collections of insects, turned over to the Academy of Natural Sciences of Philadelphia, which also I believe included new species. Otherwise no scientific attention was paid to fauna, and none to flora. Both are presumably much like those of surrounding districts. These layman's notes are meant merely to suggest the type of environment in which the site was built.

The middle Usumacinta has cut itself a deep channel, despite its serpentine turns. In the dry season underground drainage appears as occasional springs in the rock walls of the channel. A small lake, known as Santa Clara, upstream from Piedras Negras, appears to be drained by an underground stream emerging just above El Chilé ruins, and there the dry-season flow is considerable. Occasional dry sinkholes in from the river also attest to underground drainage through the porous limestone. The small tributary valleys are, for the most part, dry during the dry season, and probably so during much of the wet season. Sites are thus perhaps most to be expected on the banks of the river itself, where they
have been found, or on small lakes, which have been ill explored. The point to be made here is, that In studying the map of Piedras Negras, one should remember that during the dry season, unless water was somehow stored in quantity, carrying water must have seemed a long up-hill haul to many of the house-mounds at Piedras Negras. Although no sign of sub-surface cisterns has been encountered it seems reasonably safe to suppose that intensive search for them would prove their existence. In any case the city planners here seem to have chosen the best areas possible for the main ceremonial groups; hillsides permitting, the housemounds went to the peripheries, some near the river, but most far from it. It does not appear as if the river as a source of water supply had dictated the location on its bank.

As to food supply, apart from the game in the forest, one must suppose the region, despite its broken-up character, supplied the corn and beans for a considerable population; otherwise the ceremonial sites found in it would not exist there. Presumably Piedras Negras was a religious and market center for a considerable number of villages. One of these may have been at El Porvenir, $4-5 \mathrm{~km}$ away, where low mounds occur near the river, where one would expect them. There is a large flat area more suitable for a ceremonial plaza than anything at Piedras Negras, yet no large mounds.

## Materials

The principal materials of which the Piedras Negras structures were made will be described for each unit as it is taken up, and will be discussed for the site as a whole under conclusions. But it seems proper to note here that, with the possible exception of one roof, practically at the level or approximately level surfaces to be seen on the acropolis reconstruction drawing were surfaced with concrete, while sloping and vertical ones were faced with limestone laid in lime mortar and finished with lime plaster. The interior floors are of plastered lime concrete, and this probably holds for all or most exterior ones, such as court floors here and in the site generally; but one must allow for the possibility that some exterior paving may have been with clay as the binding agent, that is, with clay or adobe concrete. Outdoors usually only the crushed stone remains, the binder being now nothing but earth. But in sheltered spots plaza and court floors are known to have been lime-plastered. At one time in the East Group a large area before Structure O-13, later buried under concrete-capped fill, was paved with flagstones. All the roofs on the West Group side of the Acropolis were of masonry on masonry vaults except for the Structures J-19 (no roof structure identified), J-12 and J-20. We suspect the last two were roofed with masonry, supported on
wooden beams. Of these three, only J-12 is visible on the drawing.

If our suspicion as to beam-and-mortar roofs is correct, then nearly all the structures of the main ceremonial groups had externally flat masonry roofs, presumably always surfaced with plastered concrete. Such buildings were to all intents and purposes fireproof, more or less termite-proof and only roof-combs had anything to fear from high winds; but only about half the roofs in these areas, taken as a whole, were carried on masonry vaults, as of the time of abandonment. There is no reason to deny roof-combs of the rear variety, or over medial walls, with possibly existent beam-and-concrete roofs.

In early times building walls of clay, daubed on wooden stockades of thin poles, or else on wattle work, were undoubtedly used, and used in what were finally, perhaps always, main ceremonial groups. By daub we mean that the clay or adobe, while plastic in the form of mud, was thrown forcibly against the framework, or otherwise forced into it, the result being similar to lath and plaster. Buildings with such walls undoubtedly were covered with pitched roofs of wood and palm-leaf thatch. It seems likely that this type of building, perhaps with masonry base-walls surmounted by daub-walls, was always the rule in the peripheral sections, and one is suggested on the reconstruction drawing. Thatch roofs with all-masonry walls may have been used on major buildings where we suspect beam-and-concrete ones instead. Apart from this possibility they were rare in the main groups in their final forms. The stratigraphically earliest (and the largest) temple building of which we know, Structure K-5-3rd, had all-masonry walls and almost surely a thatch roof.

In view of the above, the general impression of flat roofs, sometimes with roof-combs, yielded by the Acropolis drawing, may or may not be valid for other main groups as of the time of abandonment, and probably is very different from a correct picture for earlier times. It does not and would not be expected to give a correct impression of peripheral "house-mound" areas.

The heartings of the substructures are dominantly of dry rubble (pure broken limestone); masonry facings are of limestone laid in lime mortar (probably a mixture of burned limestone and naturally disintegrated limestone); the concrete was, usually at least, a mixture of crushed limestone and lime mortar; masonry surfaces were usually, probably always, surfaced (and thus protected and smoothed off) with polished lime plaster (apparently pure burned lime); decorative sculpture was of lime plaster (stucco) or carved limestone.

Wooden constructions are presumed to have been of the surviving bush-house type in which there is a great reliance on tying members down with vines, with little
or no shaping of wood as it comes from the forest, and no use of planks or boards. But it would be a mistake to presume that these compared unfavorably in appearance with those of masonry, since we have good evidence that, at least on one side, the walls might be finished with lime plaster on daubed clay, while a neatly made and trimmed thatch roof can be very pleasing to the eye. They were undoubtedly vastly superior to the all-masonry vaulted buildings in the matters of freedom to choose span and of ventilation. They dried out quickly and were probably better as dwelling-houses.

There is good evidence that the bush-house could share the plastered masonry building platform with the more pretentious vaulted ceremonial buildings, which appear to be a development of the substructure masonry techniques. The vaulted buildings here dispensed with all bush-house materials except wooden beams for wide lintels (which here were squared) and, in a surely known case, for beams set transversely across the vaults. Beam-and-concrete roofed buildings, on the other hand, if present, used other bush house materials in a similar way. Horizontal poles, laid parallel in the manner of a vertical stockade bush-house wall, supported by horizontal beams instead of vertical main posts, are supposed to have supported the plastered and originally plastic concrete as, on the bush-house, the stockade supported the plastered and originally plastic clay daub. One combination of vault and beam-and-concrete roof is known.

Finally, in this cursory attention to materials, one may note the special importance of a thin final coat of plaster, which we call finishing plaster.

In modern Maya practice in Yucatan, as described by Morris, plaster for floors and roofs was not merely polished, but first treated with a special bark extract, and tamped for hours on end with wooden mauls. The result was a surface practically impervious to water, and one which does not check in the sun (Morris, Charlot, and Morris 1931:224).

We have Landa's sixteenth century testimony as to the aboriginal origin of this modern practice or something very similar. He does not speak of tamping, but of trees from the pounded bark of which they make a liquor for polishing the plastered walls and it makes them very hard. Elsewhere he notes the use of the bark extract for roof-plaster, and in still another place says that certain building decorations are all made of an extremely hard cement (Tozzer 1941:171, 175-176, 198).

The modern plaster, as described by Morris, turns red, and red-plaster floors are found archaeologically, though not at Piedras Negras. The local finishing plaster is normally cream-colored, a few millimeters thick, and though buried and damp, fairly hard and very smooth. Whether or not it was treated with the modern or some other bark extract, it was certainly relatively impervious
to water, and the small surviving outdoor patches of it, which originally must have been exposed to the sun, do not suggest checking on this account.

In the lowland regions of heavy and often torrential rainfall, such as this one, flat concrete roofs and floors of courts and substructures would soon lose their smoothness if deprived of this finishing plaster. Otherwise they consist of soluble limestone and soluble soft lime-mortar in which mere disintegrated limestone was presumably mixed with burned lime. Without it, roofs would begin to leak and the eager bush would soon invade the constructed surfaces of buildings as well as of courts and plazas. Without it, sun-dried daub walls would not last so long.

Finishing plaster has been found stratigraphically very early at Piedras Negras on masonry floors and walls, and on clay daub-sherds. It seems doubtful if in this climate either beam-and-concrete or vaulted roofs could have developed or taken root here until it was known. While its esthetic possibilities were undoubtedly fully realized, like modern oil paint on wood, it probably had a primary water-proofing and preservative function. So far as we can judge, painting of the plaster was purely decorative or symbolic. We know that plaster was painted, but only from occasionally well-preserved fragments not in position, sometimes as stucco relief fragments, sometimes as flat fragments apparently from walls.

## Labor and Its Tools

When one looks at the plan of a Maya center like this and reflects on the bulk of construction represented he is certainly justified in concluding that the population of the region, now negligible, was then comparatively dense. Several factors must be balanced in making guesses as to how dense it was. Practically all structures of which we know anything here are the result of accretion. This process went on for at least three hundred years, for the carved monuments show nearly this spread in time. Morley's limits are from 9.5.0.0.0. to 9.19 .0 .0 .0 (or 9.4.0.0.0? to 10.0.0.0.0?) in the Maya chronological Long Count calendar (1938:304). One cannot say that building activity ceased with the carving of monuments. Perhaps it did, and this is often assumed. In any case excavation indicates strongly that building began considerably before monuments began to be carved, on a ceramic horizon when flanged tripod bowls and cylindrical jars with solid rectangular "slab" feet were in vogue. Not until some sure means is found for establishing a Maya date as the earliest possible for the introduction here of these types can one say how much more than three hundred years went into the architectural result.

Another factor tending to minimize estimates of the numbers of any one generation is the fact that researches among modern lowland Maya show that workers on the public structures could have spent upwards of half their time on them, yet have raised their own food. Most of the adult men of even a sparsely occupied district could accomplish a good deal in half a year, providing they could be mobilized for such a purpose. Quarrying of the soft stratified limestone, with plentiful outcrops of it everywhere must have been comparatively easy.

On the other hand, estimates must not be on the basis of European experience. No metal whatever has been found here, and either copper or bronze would have left evidence. There were no metal tools, no explosives, no beasts of burden, no power other than human power. Rope was available, and presumably levers, perhaps rollers were used, but it is generally supposed that no full application of the wheel-and-axle principle, as for carts or pulleys, was known. While most of the stone used is rough-dressed only, and that on only one face, or is merely broken into rubble, presumably with mauls, a balancing factor is that a large amount of hard wood had to be cut for the burning of lime in which to lay much of it, and with which to plaster it. Using modern Yucatecan Maya experience, Morris estimates 11.9 cords of wood per 11.2 cubic meters of burned lime powder. His general conclusion, in spite of his special experience with modern Yucatecan masons, was that it is quite impossible to form an adequate concept of the amount of labor expended in construction of one of the ancient buildings (Morris, Charlot, and Morris 1931:224).

## Plan of the Publication

The report of which this Introduction is the first part will in most ways follow orthodox models in the Maya field. Analyses and conclusions of a general nature, speculations and interpretations will be as much as possible segregated from factual descriptions. Sub-headings will be numerous as an aid to thumbing through in search of material or for something remembered. It is planned to make great use of three-dimensional summarizing drawings, usually isometric. These are supposed to reduce somewhat the amount of text needed for clarity. They will replace ordinary plans and sections when they can be made to show what is necessary, but otherwise will supplement the latter. Their main purpose, however, is to make comparative use of the structures easier. One can see similarities or differences in complex aggregations of form much more readily than he can recognize them from verbal descriptions. A three-dimensional drawing can be made to yield an adequate single picture of building plan and of two elevations of the substructure. What can be
thus shown is easier to remember than if on separate plans and elevations. Holmes repeatedly took advantage of this fact, combining vertical cross-sections rather than horizontal ones to give the plan. I suspect that Holmes' use of three-dimensional representation accounts most for the fact that his figures are still being reproduced by scholars of a later generation.

A departure from established practice is the planned grouping of individual structure descriptions on a functional basis, so far as possible, rather than by their particular locations at the site. Separate descriptive parts are assigned to temples, to palaces, to ballcourts, to sweathouses, to unclassified buildings, and to miscellaneous structures. This again is with an eye to future ease in finding and using comparative material. A sweathouse and a temple may be compared; but comparisons of temples with temples, sweathouses with sweathouses, are more likely to be meaningful, and it seems worthwhile to segregate one from the other.

A more radical innovation is the decision to issue the report bit by bit, as funds permit, and to issue some individual sections or numbers of all parts before any part is completed. The reason for this is that it will then be possible to describe first those units of various categories which provide a maximum of immediately useful comparative material. By the time we have described two or three structures of each kind one will have a pretty fair idea of the architecture of the site, without waiting for a complete report.

It is likely that certain analyses and parts of the conclusions can be written before the factual descriptions of all structures are published, and if so there seems no reason for delaying such parts so that all interpretive sections might be issued at once.

However, it is desirable that the whole publication, when completed, shall show a reasonably logical arrangement. To meet this problem each numbered part will be separately paginated, with separate series of Plate and Figure numerations. The whole will run to more than one reasonably sized volume, but one cannot say in advance which parts may be in what volume. The pages forming logical units of description or interpretation will form numbers of the part concerned, much as each issue of a periodical is number such-and-such of its volume. These numbers may be handy in filing or citation; but only the number designating the Part need be included in citations. Practically, this will be no more cumbersome than citing volume and page. If the numbers of the Parts included in each finally bound volume are stamped on it, the impossibility of citation by volume number will be no very serious drawback.

Each number or group of numbers issued together will be merely stapled. Individual issues can thus be filed and used as pamphlets, or punched for loose-leaf binders.

In this form they will be rather handy for current use. When the publication is completed it is supposed that libraries will bind in order of the Roman numbered parts and Arabic numbered sections comprising the parts. All Figures will bear the Part Number and can then be grouped in one place if desired. A complete table of contents, list of illustrations, etc. will be issued then. With some numbers, such as this one, short bibliographies may be useful and are supplied. These are to be paginated with the number of the text page which they follow, plus letters. It is planned to supply a single final bibliography when the job is done, which will make these obsolete. The special pagination by letters will permit them to be then discarded.

In describing what has been found at one mound we have considered it part of our function to describe our idea of the whole, as it was before destruction set in, that is, to reconstruct the unit concerned. As on the map, every effort will be made to distinguish clearly where remaining ascertained fact ceases and reconstruction begins. Naturally, in making reconstruction's we reason from what is present at the spot, then from what may be known at similar situations at the same site. We shall therefore, in describing a given structure, frequently refer to others. This is another reason for grouping structures of a given functional category together in a single Part. At first we shall be referring to structures not yet described. The reader is supposed to understand that we do not intend to build on evidence withheld from him permanently. Sometimes such evidence is already available in some preliminary publication, listed in the bibliography of this number, but these will not ordinarily be cited in the text.

Ordinarily each descriptive unit will be a numbered section of a part. At the head of the text illustrations will be listed. After the text such information as can best be given in tabular or quasi-tabulated form will be added. Some of these tables will be in standardized form, and a few terms used in them can be explained here once and for all. Average in average dimension tables does not mean that we have taken several measurements, religiously added them up and divided in order to get an average figure. The figure given is what the Maya seemed to have aimed at, considering all available information; it may be one, but usually includes several measurements which seldom agree to the centimeter. Base under Lengths means length at base of the component concerned. Depth is a dimension at right angles to that of length, to avoid confusion which sometimes might result if called width. The letter V under Slope means vertical. Terrace dimension tables refer to single terrace elements, consisting of one vertical or sloping surface plus a more or less horizontal one which connects it with another vertical or sloping one. Two depths are given. That
labeled total is usually the only one which can be actually measured. Proceeding back horizontally from the base by this distance, and then up vertically by the terrace height brings one to the inner edge of the terrace top, when seen in cross section. If the terrace face slopes, the depth of the top must be less than this. It is given next under top usually on the basis of a reconstruction. Aprons are decorative apron moldings, on substructure units, and under this heading Offset means the amount of projection at the base of the apron. Stages are formed by set-backs of one component behind another, as, for instance, the exposed part of a pyramid top between the pyramid stairway and the stairway of the next platform supporting something at a higher level. Under this heading Depth is the distance from the outer to inner edge of this area, at center. The elevation of each stage is the height measured from the same common level at the bottom, the basesurface of the whole structure.

We have been dealing thus far with Platform Units, which are separated from Building Units in the tables. Under the latter, Façade Table refers to dimensions along the faces of the building, its length and depth, and the widths of piers and doors as they appear in the façades. They are measured at the level of the base of the walls, when possible. Under Section Table a set of horizontal dimensions taking one from the outside of the front wall to the outside of the back wall, at floor level or levels, is given. W and W' label the thickness of front and rear walls, R labels the span or depth of the front room, R' of the rear room, if any. If there is such there must be an interior wall and this thickness is labeled M . (for medial wall). Wall heights often, and vault heights nearly always, must be reconstructed and are left to the text, under Building.

A Wall-Span Index, figured from SectionTables, is the percentage obtained by dividing the outer wall thickness by the depth of the adjacent room. With vaults this may be called "Vault-Span Index."

Notes on Masonry are brought together at the end of the text, and where it seems worth while, we will give an Objects Table. This lists the field catalogue numbers arranged in columns under various headings, as sherds, figurines, etc., and opposite various numbered positions. Below appears a descriptive key to these position numbers. These tables are supposed to give the associations of architecture and objects found, with the emphasis on chronology. Significant notes on horizontal positions of objects, if any, will be found in the text. We publish these tables because half the objects went directly from the field to Guatemala and we have not been able to pursue them there for proper study; and because only selected groups of those brought to Philadelphia have been studied intensively. Under these circumstances we cannot make full use of ceramics and other objects in our architectural
conclusions; the least we can do is to leave a clear trail by which the two sets of data may sometime be completely brought together. All objects (including each sherd) were numbered in the field; those at Philadelphia (except for the 1939 season) were renumbered with museum loan numbers, and we have lists of field and museum number correspondences. Both field and museum Loan numbers now appear in the field catalogue. The field system for numbering objects is independent of that for mounds and structures. Examples will explain it. S-21-22 is applied to 7 sherds collected during Operation 21 in the South Group. Operation 21 was the excavation of Structure R9. Or again, W-25-1 designated 28 sherds and a figurine from the top level of Test Pit 1, the digging of which was Operation 25 in the West Group. M-6-1 is a figurine head, M-6-2 another, from a particular pocket in the river bed, while M-15-4 is a mano stone found on the road. The letter M. signifies "Miscellaneous."

In later seasons two sorts of preliminary object records were made. The excavator kept up to date, on the spot, a series of lettered "bag sheets" for any operation. The bag letter was a temporary substitute for the final object number, and corresponded to the bag in which the objects were placed. The bag of objects was later gone over, after washing, and if several terminal numbers for the contents seemed advisable, the contents were distributed among several bags bearing the final numbers, and these went back to the registrar for the numbering of the actual objects. The results of this preliminary examination were noted on study sheets. The field catalogue was made up from the "Bag Sheets" (for location data) and the "Study Sheets" (for other remarks). Thus for some particularly interesting object, or if there is some question, a checkback to bag and study sheets might be worth while. The two together we labeled "Objects Work Sheets." The bag sheets often contain rough identifying or locating sketches of objects as they came from the earth; and additional identifying sketches, made after washing, often appear on the study sheets. The latter also show the sherd counts and number discarded, if any.

The unit of architectural description must ordinarily include everything at a particular locus, usually a single mound. Thus it is quite possible that, in tracing backward through the accretions forming, let us say, a temple, some of the early construction may not be classifiable as originally pertaining to a temple.

In arranging the text a short prefatory statement will include or immediately precede an outline exposition of the sequences of construction found, and the symbols used to differentiate them in text and illustrations. Then the constructions making up each sequence unit will be taken up, one sequence unit after another, beginning with the earliest. But by a sequence unit or a sequence we mean all the constructions supposed to have been
built at one time, though they usually functioned with earlier ones still in use. Substructure units will precede building units, if any, and ordinarily textual comment will proceed from the ground up, for any sequence unit, with subheadings marking off various components as for example, Basal Platform, Pyramid, Supplementary Platform, Building Platform, Building. Special features, such as an altar, will be noted where most convenient, but not before the construction with which they functioned. General remarks and miscellaneous facts will conclude the text.

The general idea of the standardized arrangement above outlined is to permit one to determine quickly from the illustrations what, if anything, is of present interest to him, and then, using the list of illustrations at the head of the text, and the textual headings and subheadings, to get quickly to those parts of the text which might qualify or amplify the first visual impression. On the other hand, if the whole history of a particular mound is desired, one may read straight through, and generally find things in a logical, early to late, and bottom to top order.

## Line Drawings

These will consist of plans, sections, sometimes elevations, and "rectified" isometric perspectives. In the latter, a vertical line is vertical, horizontal lines at a right angle to each other are, in the drawing, at an angle of sixty degrees to each other and to the vertical.

Unless otherwise noted, what is definitely known will be followed with solid lines, solid black or with drawings of stone-work. On plans, unexcavated areas may occasionally be positively indicated by stippling. Usually they can be approximately deduced from our use of solid and broken lines, though of course the latter sometimes represent reconstruction made necessary by destruction rather than non-excavation. In section drawings concrete floors and roofs will be represented by a line of relatively large dots or circlets just below the floor line. By exception, if the latter is a broken line above the symbol for concrete, this does not mean the floor is unknown, but only that the finishing plaster had not survived. There will be no difficulty in noting that simple dotted lines are used in sections to indicate original mound surfaces. When these were carefully measured this will be noted in the text.

The isometrics usually show buildings cut horizontally to show the building plan, in heavy outline. On these, in order to give a quick summary of how much specific basis for the reconstruction existed, we will adopt a special convention. Where symmetry on either side of an axis can be safely assumed, a feature or part of a wall may be known for only one side. It will then be shown in solid line on one side only, in the plan, but In the isometric drawing solid lines will
be used as if it were known on both sides. If important misconception could thus arise it will be warned against in the text. This convention permits pictorial statement that a given part shown is known for the side shown, or else for the other side, which may happen to be invisible in the drawing.

Scales used are chosen for use with metric rather than foot rules. Multiplying a measurement made on the drawing by a whole number will give the actual dimension in meters and centimeters. If some drawings seem at excessively small scale one should remember that printing is expensive, while a reading glass is not.

## Special Terms

An architecture completely independent in origin from those of the Old World cannot be described and properly analyzed without using some Old World terms in new ways, nor without inventing many new ones. A few have already been discussed at some length. Both processes are evident in the many published works on Maya archaeology; but since intensive and detailed investigation of the architecture is a comparatively new thing, it would be foolish to try to get along with only those thus far used in the literature, as if these processes had come to a natural completion. It is inevitable, in the formative stage of such investigations that, despite the desirability of standardization, more than one term will arise for the same thing, so that one must sometimes choose; and also that, with increasing knowledge, some old and established terms which can scarcely be discarded should, nevertheless, be restricted to less than their original scopes. In this state of affairs it is worth while, before beginning descriptions of a large number of structures, to define a selected list of terms as they will be used here.

The definitions given below are all felt to facilitate description of the Piedras Negras structures; and are only for new terms or to give precise meanings which are not obvious, or meanings which are slightly different from what might otherwise be understood. Terms for certain traits believed to emanate from the Petén were defined in Satterthwaite (1941), will be clear enough in their contexts, and are not included. Such terms as "altar" and "lintel," when already applied to specific objects, as Altar 1, are retained whether or not they are believed toqualify under the definitions now adopted; doubt on this score will sometimes be indicated with quotation marks, as "Altar" 1 .

In describing structures, left and right (without modification) are used as if the structure had hands as well as a façade, or front face. A left room is on the observer's left if he looks from what we have taken to be the rear, but on his right if he looks toward the rear. Observer's left depends on the point of view selected.

## Altar

An item of outdoor or indoor furniture believed with some evidential basis to have served as a repository for offerings, idols, etc. during ceremonies, or for making ceremonial sacrifices, including burning of incense. Use of the term furniture does not exclude altars built as integral parts of a building, or what may be regarded as considerable permanent additions to them.

## Anta

The side wall of a building the inner face of which extends past a façade doorway to form one of its jambs, resulting in a wall-jamb doorway.

Apron-Molding
A sloping one-member molding, its projection from the wall decorated by the molding being slight in relation to molding height. The term will be confined arbitrarily to moldings with base higher than the wall-base. The lower member of twomember medial moldings, called apron molding by Pollock (1932:123) will be called triangular (i.e. in cross-section).

## Basal Platform

A platform which appears to have been constructed to obtain a more nearly level base-surface than provided by prior natural or artificial surfaces.

## Base-Surface

A surface from which a structure, component or element appears to rise, as a court floor, a basal platform top, a pyramid top.

## Base-Wall

A low free-standing masonry wall, supposed to have been carried higher by walls of more perishable materials, such as wood, daubed wood or wattle, or adobe (instead of foundations of Pollock 1932:112).

## Beam-and-Mortar Roofs

Masonry roofs supported on wooden beams. Beam-andmasonry roofs would perhaps be a better term. The one sure example at Piedras Negras combines this type with vaulting; here the final surface was plastered concrete, river gravel replacing the usual crushed limestone. The bulk of the roof masonry was presumably of rubble and mortar, without such careful selection for small size of the rubble as implied by our term concrete. For better preserved beam-and-mortar roofs in the Maya area see Lothrop (1924:34) and Andrews (1943:41-42). Flat roof is sometimes used as a synonymous term. While vaulted roofs lack the flat ceilings of beam-and-mortar ones, the upper surfaces were nearly flat in either case. We shall speak of flat roofs with either type of support, invisible from outside, to distinguish them from pitched roofs of wood and thatch.

Bench
A bench-like or table-like piece of indoor or outdoor furniture. At Piedras Negras various types are to be distinguished. Functionally they seem here to be either altars, or thrones. Bench is also applied to ballcourt structure elements next the central field or alley.

## Block

A masonry quasi-rectangular element of doubtful function found on stairways or in stair angles (See also tabular block).

## Bonding

Interlocking of individual stones to give strength in masonry (adapted from L. Roys 1934:34). Bonding of corners at Piedras Negras amounts to an imperfect approximation of in-and-out bonding as defined by Webster. It means here that stones with longer and shorter axes occur at the corner with their longer faces occurring in both wall-faces forming the corner, and that from bottom upward long and short faces of the stones tend to alternate in either wall-face. This alternation may be interrupted by vertically adjacent long stone-faces in the same wall-face, by large or small corner stones with equal faces, and even by mere spalls at the corner. But the alternation is considered to be more than chance, and to strengthen the corner by interlocking the two wall-faces which form it.

## Building

A structure supposed to have had one or more doors, rooms and a roof. Probably universal on a substructure, hence a superstructure, and often so called in the literature.

## Building Platform

A platform on which the walls of a building immediately rest; if the substructure is a compound one, the uppermost substructure component only, considered apart from the rest, whether structurally separable from lower components or not; also, in supposed absence of a building, a platform which may be classified as a building platform because of essential similarities or similar placement.

## Component

A major part of a compound but clearly unified structure, separable from other parts for descriptive purposes, whether actually constructed separately or not. Examples, Structure R-9, from the court floor up: Basal Platform, Pyramid, Supplementary Platform, Building Platform, Building. Element and Member are used in the same way, but less inclusively. Examples: a stairway is one element of a pyramid; a step is a member of the stairway.

Concrete
Rubble, selected for very small and more or less uniform size, mixed with a plastic binder which dries and hardens for use. Such selected rubble will be called crushed stone. In lime concrete the binder is supposed to have been burned lime and naturally disintegrated limestone. In exposed positions, as in plaza and court floors, the stone remains but the binder has become mere soil. There is a hint or two that crushed stone may have been mixed with clay as a binder at one time. If this could have been established it would have been called clay concrete.

## Court

A more or less level and more or less square or rectangular area fairly set apart by platform and/or building walls on two or more adjacent sides. See also plaza and corridor. Ballcourts are special gaming courts which may not comply with this definition.

## Corridor

A relatively long open space between structures or between structures and natural features through which traffic might naturally pass.

Element
See Component.

## Fill

The hearting of platforms and foundation masses. At Piedras Negras typically dry rubble, i.e., pure broken rock of small, medium or large sizes. Does not imply that the rock was entirely or even mainly thrown in. Typically the hearting was built up in blocks, separated from each other by fill walls laid of the same formless rubble, without chinking, but so carefully that they stand if carefully excavated, though they are vertical or nearly so. Solid fills in which rubble seems to float in earth, occur sparingly, but never in a deep fill. There is no evidence here of rubble and mortar (rubble masonry) fills, except of a doubtful character.

## Janus Façade

Either the front or the rear face of a building, the two being identical or substantially so as indicated by the ground plan alone. Quasi-Janus Façade: The front or rear face of a building in which the two differ substantially as indicated by the ground plan, yet the rear, if substituted for the front face, would form an adequate front by local standards for buildings of the same kind.

## Member

See Component.

## Molding

A decorative element comprising less than the whole face of a single wall, of which it must be considered a part. Most Maya moldings are narrow, but apron moldings on platforms may account for most of the wall. A basal molding in our usage must form the lowest part of the wall-face, and will not be used as an alternative term for what we call plinth, or for what we call sill, or for substructure moldings forming upper parts of walls. Our use of basal molding is thus less inclusive than in Smith (1937:25), and apparently in Andrews (1942a:257-258).

## Palace

Classifying term for Maya buildings usually supposed to have been residences of priests. Used here, with negative functional significance, for supposed public buildings other than temples and sweat-houses. A more positive local definition will be attempted under Conclusions.

## Panel-Stone

A stone, usually carved, and supposed to have been set on edge as a panel. All Piedras Negras carved lintels, except "Lintel" 11 and perhaps "Lintel" 6 are now supposed to have been panel-stones.

## Pier

Masonry weight-supporting element of width less than adjacent door-width, and square, rectangular or modified rectangular in cross-section. Slender square piers here are equivalent to square columns of some writers, except that piers here never are monolithic in horizontal crosssection. Andrews uses pier in our sense and also for a projecting minor platform element (1943:43). At Piedras Negras similar elements will be called stair-blocks.

## Platform Court

Unless further modified, the top of a platform made into a court by assemblage of structures on two or more sides of the top. Low platform courts at Piedras Negras seem to be the equivalents of Thompson's plazuela in British Honduras (Thompson 1931:223). Plazuela, used by Maler for an ill-defined open space on his Piedras Negras map, is discarded.

## Plaza

Like a court, but differing substantially from square or rectangular form.

Plinth
That part of a low or medium height building platform of which the face follows the building walls at a short and more or less constant distance from their bases. Apparently the same as Ruppert's podium (Ruppert and Dennison 1943:6). A plinth which makes the complete
circuit of the building may be called a plinth platform, and if low enough, would be the same as Lothrop's step at Tulum (Lothrop 1924:167).

## Projecting

As a classifying term applied to buildings, platforms, or their components, indicates that they lack their full complement of faces and can be considered as projecting from a hillside or from other structures; instead of builton buildings and false pyramids used in some of our earlier publications.

## Pyramid

A terraced substructure, or terraced substructure component higher than other components, with a stairway element connecting its top with its base-surface or a still lower surface, and serving only one building; also, platforms like the above except that they may not have supported a building. Two-building pyramid might cover the Aztec variety.

Rubble
Rock broken to irregular chance forms.
Sill
Specifically a low narrow interior bench, perhaps an altar, common at the rear of Piedras Negras temple rooms.

## Stair-Side Extension

Instead of balustrade. General term for elements including continuations of stair side walls forward from a riser. Various types are to be distinguished but none utilizes balusters.

## Stepped Top

To describe platform tops with two or more levels, the highest at the rear; top of a platform with a higher rear level.

Stucco
Restricted here to sculpture in plaster.

## Supplementary Platform

Specifically, a substructure or platform component other than a pyramid, on which the building platform, or a platform corresponding to a building platform, appears to rest.

## Tabular Stone

Stone split off from stratified beds, hence possessing parallel upper and lower surfaces without further working. The typical stone at Piedras Negras, with some further trimming, for wall and vault facings. If thickness is slight compared with two other dimensions, called slab; if thick, called tabular block or simply block if thick in relation to one dimension only, called long block The
latter were often obtained by considerable trimming for use at corners.

## Temple

Structure believed to have been designed for public practice of religious rites and ceremonies. For criteria used in recognizing them at Piedras Negras see Satterthwaite (1937a).

## Throne

A bench on which there is direct or inferential evidence for supposing that human beings were seated while others present stood or were seated at a lower level or levels.

## Unit

Used freely. What is included depends on the particular context. Extreme examples: one step of a stairway or all structures of a main group.

## Veneer

In a sense, all Maya masonry facings may be considered veneers applied to very different heartings (Lothrop 1924:29). Here restricted to facings in which an edge of the stone is placed downward. At Piedras Negras veneering of vertical surfaces was confined to panelstones, probably thus used. Sloping veneer (of sloping surfaces) was used only on one ballcourt and on part of one platform, in the latter case with megalithic slabs.

## Wall-Jamb Doorway

Denotes a doorway with one jamb formed by a continuation of the inner face of a room wall. Examples: Structures R-16 and J-11 (exterior and interior doorways, respectively). This type of doorway reduces the number of corners to be constructed and therefore reduces the amount of special treatment here devoted to corners.

## Window

A wall-opening sufficient to admit a substantial amount of light, or affording a ready view through the wall, or both. Rare, and confined to interior secondary partition walls at Piedras Negras. Most windows at Tulum (Lothrop 1924:32) would here be called ventilators, the usual term for the typically small openings through thick Maya walls or vaults.

## The Map

Maler published a sketch map of Piedras Negras which roughly located the monuments then known and a few of the buildings, and also gave some indication of the topography (Maler 1901, Plate 33). In 1920 Morley published his own sketch map to show location of monuments (Morley 1920:569). This was obviously
little more than a copy of Maler's, since it reproduces the same mistakes in orientation and assemblage of the same structures. The structures he numbered for the first time. Neither of these maps gives any idea of the very considerable development of the rectangular court idea at this site. Both omit one of the South Group pyramids and assign its stela to another. Maler seems to have used his compass in orientating certain structures, but to have guessed wrong by as much as 90 degrees at others. These maps will be referred to as the Maler and Morley maps, without implication that Morley actually repeated Maler's mistakes in the field.

Morley returned to the site in 1921 accompanied by Ricketson, who made an excellent sketch map of the main groups. A copy of this map, never published, was very kindly supplied us by Morley, and was invaluable during the 1931 season. It was seriously faulty only for the Acropolis Courts 2 and 3 areas, which must have received less attention. This map carried a new series of structure numbers, and these appear in our 1931 notes except for certain buildings on the Acropolis, which were provisionally numbered as a continuation of the Ricketson series (after discarding his numbers XLV to L), and are shown on a supplementary sketch map of this area, made by the writer and attached to it in the files. A table of equivalents between the unpublished Ricketson and our own final structure numbers is on file. A similar table of equivalents with prior published designations appears on this edition of the map.

After the first season, in view of the excavations made and projected, it was decided to start afresh, and to obtain a map more complete and accurate than is justified for preliminary surface surveys. In passing it is proper to remark that there is no reason why such preliminary maps should not indicate the general forms of mounds, so far as is easily discernible, and this is now generally done. The Ricketson map showed very clearly such items as the here characteristic stela-bearing basal platform or terrace, and from it Lothrop was enabled to recognize the presence of a ballcourt. He could just as easily have recognized two (Structures K-6 and R-11).

The map of Figure 1.1 we shall distinguish as the third edition of our own map, its reason for existence being that it covers a much larger area and presents a great many more details than its predecessors. The first edition was a photostat at a very small scale, as of the 1932 season (Butler 1935a; Satterthwaite 1933a). At Morley's request, although this map was avowedly incomplete, a copy was made for publication in his Inscriptions of Petén, appears there as Plate 202, and can be designated the second edition. Both editions were from the same tracing, which carries the legend Ruins of Piedras Negras, Department of Petén, Guatemala: Partially Completed Plan of Principal Groups; Eldridge R. Johnson Expeditions 1931-1932:

The University Museum, University of Pennsylvania. Surveyed and Drawn by Fred P. Parris, Architect. The drawing for the second edition bore the further legend Copy Omitting Certain Details Prepared for Carnegie Institution of Washington. In printing the second edition the legend was reduced to Map of Piedras Negras, after Parris, and so falls to indicate its incomplete and preliminary character. A simplified version of the earlier editions appeared in Mason (1935b), and brings out the crescentic distribution of the larger structures.

Parris added the results of his 1933 surveying to the same pencil drawing from which the 1932 tracing was made. After the 1939 (arid last) season necessary parts of this same original were erased and redrawn by Proskouriakoff. These parts are for the most part ground plans, including reconstructions. They reflect a great deal of resurveying by her, especially on the Acropolis below Court 3 and at Structure O-13; but she also integrated plans and notes of various others, including those of Parris which needed no change because of later excavation. Notes, sketches and drawings of various excavators were utilized, and the final map results from a group enterprise. The final inked tracing is by Proskouriakoff, except for the grid-lines, numbering and lettering, and a few minor final corrections.

## Distinction between Mound and Structure

We shall use mound only for apparently heaped-up masses of material whose final form is largely due to the action of nature or, if entirely due to human agency, then either no particular form was sought, or it was adjusted to utilize for its sides the natural angles of rest of the materials used. At Piedras Negras this means that small earth mounds result from activities of ants, a mound of human refuse may accumulate, a small mound of earth may be (and was) found in a burial chamber. Platforms might have been built on the mound principle as here defined, as in the Mississippi Valley and I think in some parts of the Maya area, but here there is no evidence for them. Such platforms might, I think, be properly labeled mound structures or mound platforms. However, buildings and substructures could, and nearly all did, fall to such ruin that the upper parts then formed mounds, concealing and protecting surviving lower parts. Only this type of mound will be called mound such-and-such, and the implication is that it is the mound formed by the ruin of structure such-and-such. Such mounds often give a clue to original structure form.

Structure, including buildings and substructures (the latter being platforms or combinations of platforms), if the word is not descriptively modified, means a construction which solves the problem of vertical slopes or slopes steeper than the natural angle of rest of the materials in crude form; and/or which to greater or
less degree provides protection against weathering. The term platform mound has been applied elsewhere to include vertically or steeply walled masonry structures from which evidence of a supposed superimposed building of perishable materials has completely or largely disappeared (Lothrop 1924:26). Platforms of this general description occur at Piedras Negras. We will simply call them platforms and say that they were probably true substructures. Platform mound is also used in the literature to classify large platforms, still supporting buildings, as not being of the pyramid type (A. L. Smith 1937:5). The term sometimes is close to equivalence with Acropolis (Pollock 1932:109). Since none of these usages conform to our own definition of mound, yet the latter is really necessary in describing what is found, we have invented such terms as Court Platform, Supplementary Platform, etc., for platforms not considered to be pyramids.

Where, as here, mounds formed by ruin are schematically represented by forms with plane surfaces, side by side with excavated or reconstructed Maya architectural forms with plane surfaces, occasionally one may be in doubt as to which is which. Thus the shoulders on the stairway of Structure J-6 appear somewhat similar to schematic mound surfaces elsewhere, but are actually what the Maya built. Here the vertical sides make a sufficient distinction. In a number of cases schematic mound surfaces are shown as if broken off, by irregular wavy lines, which are meant to avoid confusion in this respect. An example is at Structure F-4, where an attempt is made to indicate that the building and building platform are known, and that we know there was another platform which gave it added height, but know this only from measured heights and mound contours.

## Numbering of Mounds

A very considerable number of Maya sites are now represented by maps. Most of them are based on preliminary surface examination only, but the general forms of the mounds are indicated. Usually some or even many of the mounds shown are not numbered. Experience has shown us here that a particular mound form might have been used to predict a particular type of ruined structure, notably the Piedras Negras type of sweat-house. As noted elsewhere, ballcourts were already being recognized in this way from site maps. There is no reason why, with further knowledge, especially among the little-known "house-mounds," other types may not become recognizable in advance, from their mounds, and provisional distributions deduced from them. At the least, mounds may be classified for size, and certain of them eliminated as ruins of ordinary dwelling houses; and much may surely be learned about assemblage by comparative studies of such maps. To facilitate such uses of this one we have identified all structures, whether known only as
ruined mounds or not, and no matter how small, with locus number "names" placed on the map. Many of these mounds we shall probably never refer to by name, but if someone else sees significance in some of them now or later he can select them out by using our designations, and these will locate them with reference to everything else on the already published map. Thus far little attention has been devoted to house-mounds, except by Wauchope (1934 and 1938). They must be systematically investigated before a complete understanding of a Maya "city" can even be approximated.

## Structure Plans on the Map

An important principle utilized in determining rectangular or parallelogram general form In broken line reconstructions is explained under Accuracy A distinction between locus and structure numbers, and the principles underlying the latter, are explained under Structure Designations. The structure numbers include the locus number plus, in many cases, additional temporal designations; but in all cases only the locus number appears on the map, as for example, "K-5." The question thus arises, which part of a time sequence of structures at one spot is shown on the map? The answer is, the latest at each locus, so far as possible without sacrificing readability for each component of the structure concerned. For example, the latest construction at K-5 is known as Structure K-5-lst-A. Small remnants only of the final Building Platform and Supplementary Platform survived. They may have been quite simple, like the Building Platform of Structure J-29. But not enough survived to justify reconstruction. We show a line locating the Supplementary Platform remnant, which cannot be understood without this explanation; lacking space, we omit showing another for the Building Platform. We also show these platforms as complete in their next earlier forms, those of Structure K-5-1st-B.

Despite this consistent selection for lateness one cannot say from inspection of the map that such and such a structure, or even part of a structure, was designed and built in a late period. Some complete structures, as shown, surely pre-date others by significant amounts of time; and various parts of a single structure commonly pre-date other parts. Probably nothing shown as a structural plan represents the earliest feature at the given spot.

## Accuracy

Parris' schematic mounds do not, of course, show minor irregularities of debris contour, but they are not mere sketches. Their placement is based on a system of backsighted traverses which, on being drawn up at 1 to 500, closed within a meter or so. From a station or stations of this system all points of a mound which seemed to have
significance in judging of its general form were located vertically and horizontally with transit and stadia rod, but generally not by triangulation. However, all structure plans by Parris were made with transit triangulation from taped base-lines with taped measurements on the structures as checks. Those on the present map made by Parris or depending largely on his work are Structures J-2, J-6, J18 , J-23, K-6, R-3 and R-11. Proskouriakoff and Godfrey used only the triangulation method. They usually used the transit only when necessary to supplement triangulation with tapes, done by themselves or by Satterthwaite or Cresson. As with Parris, straight measurements acted as checks. Apart from details thus supplied in some cases by the excavators, Proskouriakoff is entirely or mainly responsible for the plans of Structures J-4, J-9 to 13, J-20 to 22, J-29, O-13, R-1, R-2, R-4, R-5, R-7, R-9, and for the final carefully re-surveyed positions of Structures J-4, J-21 and J-22 and all the buildings of Acropolis Courts 1 and 2. She supplied necessary transit work at Structures R-3 and R-10. In the same way Godfrey is responsible for the plan of Structure K-5, its alignment with respect to Structures K-6 and N-1, and for controlling transit work on the pyramid of Structure O-13 and at Structures O-12 and R-16. Plans of Structures F-4, N-1, P-7, U-3 and V1 are entirely from taped triangulation by Satterthwaite, that of Structure O-15 by Cresson. Measurements for other plans had little or no triangulation control.

The placement of South Group plans on the map is by Proskouriakoff. It is my impression that time was lacking to make these placements as exact, with reference to each other, as on the Acropolis, and that some reliance had to be placed on the positions of Parris' mounds, drawn before excavation. Resulting errors must be small in amount, and I think probably non-significant. Plans in the Northwest Group, East Group, Southeast Section and of Structures O-12 and R-16 were located on the final drawing by this method.

Naturally those parts of plans which are reconstructed with broken lines or hatching cannot be exactly correct. Their credibility can best be judged when the particular structures are described in detail. In the meantime inquiries will be welcome. It may be noted that most plans tend to take a parallelogram form. This we believe resulted from careful linear measurement by the Maya when the structures were laid out, but without any accurate method of laying out the first and presumably intended right angle. Very clear examples of this form are the two ballcourts, Structures K-6 and R-11, and, among the more conventional structures, the pyramid of Structure K-5 and the palace Structures J-9 and J-11. We have used the parallelogram, rather than the rectangle, as our guide in reconstructions whenever a part only of the building is known, but that part indicates the amount and direction of the distortion to be expected in the rest.

We have built a great deal on very little in this respect at Structure R-16; but had we allowed for it in excavating we should have saved considerable time in locating an altar on the pyramid, which is a confirming circumstance. Failure of pyramid stairways to fit into the parallelogram scheme is well established at Structure K-5.

There are other cases in which we know something of details, and where we can deduce a good deal more from debris contours, but not enough work was done, or measurements made, to determine the presence or absence of parallelogram distortion from the ideal rectangular plan. In those cases we have drawn what we call rectified plans, meaning that we use right angles but in so doing are probably righting, in a double sense, what is actually present. All plans on the map in which true right angles appear consistently throughout, or as to any component, are of this rectified nature. In presenting detailed descriptions plans will regularly be rectified for purposes of constructing isometric three-dimensional drawings.

Parris did not take cognizance of small irregularities on the surfaces of mounds. If he had, he would never have finished. The writer always intended to take the Parris map in hand and sketch these in, but it never got done on a large and systematic scale. So one should not reason from a flat-topped mound on the map that it supported nothing whatever of an imperishable nature. The presence of trees, large and small, often complicates such surface interpretations, even on the spot, though the plans of some buildings, later excavated in whole or part, were correctly read from the debris.

The areas disposed of with contour lines are of course represented with least accuracy. In some areas these slopes doubtless cover constructions, especially terracing too low or too badly disintegrated to yield a surface clue. This is especially likely on the southern side of the East Group plaza, though bedrock probably showed at the top of this slope. We neglected to map and to show a low outcrop which was permitted to remain in the West Group plaza, between Structures K-4, K-5 and K-6, and again next Structures O-12 and J-23. A wall, then steps or a stepped terrace, are known to have extended southeast from the end of the basal terrace of Structure O-13, the known distance being about 18 m . This was set back about 60 cms from the face of the basal terrace. Unfortunately when this was excavated Parris seems not to have been notified, so we retain his contour lines here.

By and large all concerned have endeavored to make the map as accurate as could reasonably be expected, more so rather than less, with attention-emphasis decreasing in the order: building plans, substructure plans, groupings, mound contours and natural contours.

The original map is drawn to 1 m contour intervals. Datum for all heights of contour lines is 9.8 m below the
lowest point on the incised circular band on the Sacrificial Rock. This is approximate low water level. Separate datum points, sometimes several, were used in measuring heights at individual excavation units. We should have related these to the river datum at once, but did not do so. A table giving exact base-surface heights above the river datum, for each structure, will be worked out so far as possible and published later. They can usually be approximated by reading the published 2 m . contour lines.

## Uses of Arbitrary Squares

Division into squares by a grid, which we have used, has a number of advantages and also some disadvantages. With the squares exact points not indicated on the map can nevertheless be added there from textual notations utilizing the principle of coordinates. Thus we could have warned future archaeologists that a modern burial lies North 75 m , East 74.5 m in Square C, instead of actually showing it; and if we should return and find some new buried or overlooked structures we could very briefly indicate textually their exact locations, and these could be added to the present printed map, by hand. For this purpose the squares need not, of course, be actually drawn.

They can be used as boundaries for independent series of locus numbers. This permits designation of large numbers of these, without running the risk of numbering a later discovered feature, and needing to place the number on the map far from its own numerical neighborhood. Thus, given a structure number (which includes the locus number), even if it is somewhat out of its logical place, it can soon be found if one knows the square. We follow the Kilmartin-O'Neill map of Chichén Itzá (Ruppert 1935, Figure 350) in adopting this practice, but add the square designation to the number, so that the complete designation or name of a structure or mound is or includes a locus letter and a number. Thus the name of a structure automatically locates it as within an arbitrary group, and this group is located on the map by the grid. The artificiality of this namegrouping has been minimized as much as possible in placing the squares and in choosing their size, which is 200 m . Thus all structures on the Acropolis carry the letter J, while all those on the South Group Court are R-structures. But not all J-structures or R-structures belong in the same natural groupings, that is, the groupings probably meaningful to the Maya themselves, and this is an admitted disadvantage.

At Uaxactún natural groupings were lettered, and the disadvantage is avoided on the Uaxactún map by Blom, Amsden, Ricketson and Smith (Ricketson and Ricketson 1937, Figure 198). The mounds shown on that map are
actually in definite clusters. Here we wished to include large numbers of house-mounds, and we did not feel competent to split all of them into groups which would be any less arbitrary. What we did in effect was to borrow ideas from both the Chichén Itzá and Uaxactún maps.

As a general rule minor series of numbers run clockwise or counter-clockwise around natural subgroupings, and an effort has been made to have a new minor series begin near the end of another as an aid in locating a given number. The letters of locus designations have been omitted when space required it, but can always be supplied from the square-letter, which is given in a circle, usually at the southwest corner. A diagram of squares is placed on the map as an aid in finding them quickly.

We have lettered our arbitrary squares, as at Uaxactún the natural groups are lettered, instead of giving squares coordinate letters and numbers. The advantage is in simpler designations. For example, at Chichén Itzá. In a comprehensive system of names covering all structures the Great Ballcourt might be 2D-1, the West Colonnade 3D-1. On our map, corresponding designations of two small mounds, unlikely ever to be known by more descriptive terms, are $\mathrm{K}-1$ and $\mathrm{O}-1$, and could be KI and O1. This simplifies note-taking somewhat, and I think reduces the danger of misnomers in notes, and makes the designations easier to remember as names.

The letters in these designations, though they appear to be exactly similar to those at Uaxactún, and like those indicate geographical proximity of structures of the same letter, do not also necessarily indicate what might be termed a family connection between them. Our letters are more like given names, those at Uaxactún like family names. To meet the need for the latter, we use descriptive words, such as "West Group," and "Acropolis" for a part of that group. Here we also apply numbers to three courts, but it is understood that, for instance, "Court 1" means "Acropolis Court 1." Such group terms could hardly be avoided in any system. Thus, in descriptions of what is labeled A-V at Uaxactún it is called a "palace," with "south" and "main" courts and, I think, others (A. L. Smith 1934).

Division of the mapped area into simply designated squares provides a convenient basis for textual naming of topographical features which largely controlled the city plan, but which do not pertain exclusively to any one natural (i.e., Maya) group of structures. Those listed below will be useful, and others could be added if needed. The hills of major consequence are named after the squares in which they culminate, if the tops are within the grid; but if not, by the squares into which their lower slopes extend. Valleys are named after the squares in which they or their mapped parts chiefly lie, the square of the lower part first.

Hill Z
Hill AB
Separate peaks in Squares A and B.

## Hill D.

## Hill L

L-shaped as it affects the surveyed area. The northerly arm extends westward from Squares $H$ and $L$, and is not of full height. This is the 11 GK extension, supporting many mounds in those squares. Another lower extension of the main body of the hill extends to the south and might be called the P extension of Hill L. The top of Hill L is a narrow flat bed of stratified limestone, and is as high as anything to be seen from it, and higher than anything else in the immediate neighborhood except the top of Hill S.

## Hill S

Really a separate part of Hill L, its flat top separated from the latter by a high saddle through which the old trail formerly climbed. Only the lower slopes of this hill appear in Squares $S$ and $V$.

Hill Y
The sculptured cliff is at the base of a gradual but narrow slope starting in Square Y and rising to a high top far to the south.

## Hill X

Starts at south side of UV valley, culminating south of Square X , and lies between HillY and the river.

Hill J
The hill of the Acropolis.
Hillock $O$
A gently sloping eminence rising about 10 m between the East Group Plaza and South Group Court.

## Valley C

North from GH valley, a minor finger-valley carrying the trail past Structure C-33 toward Porvenir and Tenosique.

Valley GH
East from corridor leading to Northwest Group Plaza.
Arroyo RO
Northeast from river, between West and South Groups; The Ravine.

Valley UV
East from river, lying south of South Group and Southeast Section; includes Maler's Valle transversal and Plazuela de las Cuevas.

## Valley VS

Northeast from Maler's Ceiba tree in the UV valley, which still stood and is located on our map, leading through the Southeast Section to the saddle between Hills L and S.

A disadvantage of our simply lettered grid system is that it cannot be logically expanded beyond 26 squares. The Chichén Itzá map can be logically extended to a rectangle with any number of squares on one side and 26 squares on the other, and could have been placed to allow for very great extensions in all directions. The Uaxactún style of lettered natural groups allows for addition of twenty more groups, though additional letters probably would not always fall into logical places on the map, i.e., in the same "alphabetical neighborhood." We are committed to the lay-out of squares used in the earlier editions, and to a miscalculation which now requires placement of Square Z in an illogical position. The 26 squares used include all mapped mounds, but not the whole of the mapped area; and we have no letters left for squares which some day should certainly be added east of Squares S and V, to complete the Southeast Section. Having decided on the simply-lettered grid system for the sake of its advantages, we could and should have reduced the disadvantage of non-expandability to practical non-importance by choosing 300 m or possibly 400 m squares.

## Use of Terms "Group" and "Section"

For descriptive purposes and in our notes we have made a distinction between formally named "Groups" and "Sections." Named Groups are fairly well defined and include a court or plaza or two adjacent ones, each containing one or more pyramid-temples and being named for the group, as for example "West Group Plaza." Four of the five thus distinguished and labeled on the map contain all the monuments found in position, so the named Groups comprise the main ceremonial centers of the site. The choice of names, Northwest, West, East and South, is perhaps not very felicitous. Naturally one cannot avoid using group also in ordinary ways.

The term "Section" has been applied to mound areas, peripheral to the named Groups. It should not be assumed that these contain no ceremonial buildings, but they appear to be primarily areas of platform supported dwellings, i.e., of "house-mounds." They are less well integrated, the major grouping implied by section depending more on the terrain. One has the impression that, had the country here been flat, the mounds of the sections would have been disposed as a continuous ring around the groups. Only one, the Southeast Section, has been labeled on the map. A glance at the map will show that there is a North Section in the surveyed area, capable of subdivision. We might speak here of a Hill Z Section. A well marked section south of the West Group
and another west of the South Group are obviously determined by terrain. The mounds east of the West and East Groups also may be considered together, many of them being high up on the same hill, the L-Hill. Both Groups and Sections thus seem to reflect a nuclear approach to city planning. The site is an assemblage not merely of independent structures, but of quasi independent aggregates of structures. However, the groups are inter-connecting, except for the North west Group, where planning for inter-group communication is not so clear. In general, the sections are cut off from each other, but connected with a Group, sometimes with two Groups. Thus the VS Valley forms a corridor through the Southeast Section to the East Group; a stairway probably connects with Structure R-14, and minor ones may lead to the South Group Court between the pyramid temples. The map shows at once that a section may contain many sub-groupings of minor size, including small courts. For the most part these small courts are confined to bottom land or the gentler lower slopes of the hills.

But there is such a court, more nearly like to the Acropolis Courts than any other, in the Southeast Section. This is a little outside the surveyed area, about due east of Structure S-29, and on the top of a low spur of Hill S.

## Structure Designations

The combinations of letters and numbers on the map, such as J-1 and J-4, can be conveniently thought of as locus numbers. They direct attention to the location of something on the map, and are placed on or near the feature concerned. In practice this feature is or was some kind of structure, though it may be known only as a mound. The names of mounds, if we had any which were not ruins of structures and worth naming, would be the same thing as the locus number. But we have applied locus numbers only to known structures and mounds which we are sure are structure ruins, and name them all Structure such-and-such.

The names of structures known only as mounds, and of structures of which only one temporal unit of construction is known, are the same as the locus number. Examples are Structure J-16, known only as a mound, and Structure J-17, a partly excavated mound showing, thus far, only one temporal period or phase of construction.

However, with sufficient excavation it is almost universally found that one mound, at one locus, contains an accumulation of several constructions of different ages. All of the earlier construction may be completely buried and hidden by the later, but usually part of it remains in use, and we say it "survives." For the purpose of note-taking and of analysis of the results some logical system of nomenclature reflecting temporal sequence (usually known from vertical position) seemed desirable. Where this (the normal) condition obtains, the locus

Table 6.1 Comparison of Stratigraphic Designations Between Uaxactún and Piedras Negras

| Uaxactún 1932 | Uaxactún 1937 | Piedras Negras |
| :--- | :--- | :--- |
| Locus-Period | Locus-Period-Phase | Locus-Period-Phase |
|  | A-1-A | Earliest |
|  | A-1-B | K-5-4th |
|  | A-1-C-1 |  |
|  | A-1-C-2 |  |
|  | A-1-C-3 | K-5-3rd |
| A-1-Primary | A-1-D-1 |  |
|  | A-1-D-2 | K-5-2nd |
|  | A-1-E | K-5-1st-C |
| A-1-Secondary | A-1-F-1 | K-5-1st-B |
|  | A-1-F-2 | K-5-1st-A Latest |

number is only part of the structure number. Ordinal numbers are added to it to distinguish the main units in the sequence, as K-5-1st, K-5-2nd. In writing about such units of construction, 1 st means the constructions of the last main period of building activity at the given spot or locus; 2nd means that of the period before that, and so on. Where the temporal relation is revealed by vertical stratification rather than horizontal juxtaposition, these ordinal numbers may be thought of as numbering the sequence units in the order in which they are usually found, that is, in digging down from top to bottom.

We have refined our nomenclature scheme further by using, when necessary, final letters. These like the ordinal numbers, run backward in time and, usually, downward in space. The alphabetically last letter used (if any) is attached to the construction of a major period, which may be the only one known. An example is Structure O-12-B, which includes the basal platform, pyramid, building platform and building at locus O12. Structure O-12-A is the same, plus a partly known addition to the building platform.

Structure K-5-1st-C is another example. This includes parts of Structures K-5-3rd and K-5-2nd, which were never completely obliterated, but denotes also major changes and additions, including a partly new basal platform, entirely new supplementary and building platform, and a new building. Structure K-5-1st-B comes next after in time, and covers such changes and additions as the provision of stucco masks, again an entirely new building, and of stela platforms. Structure K-5-1st-A covers a number of comparatively minor, but still later features.

It will be clear from the above illustrations that judgment must be exercised in deciding what is a minor period or lettered phase and what is a major numbered period of building activity. The final letters are labels for what distinctions have been decided upon, and one
should not rely too heavily on the implication that they are minor in character. A phase at one locus may seem most comparable with a numbered structural period at another. But it is supposed to be minor in respect to the periods at the one spot, either in physical bulk or in the effect of the new constructions. I do not think we have ever distinguished structural periods (ordinal numbers) or structural phases (final letters) without definite proof of their existence. But sometimes judgment and deduction are necessary in assigning a particular unit of construction to one phase or the other. And when a number of such units are assigned to a single phase, this does not necessarily mean that they may not actually belong in subphases. One must stop somewhere. It does mean that no positive proof of temporal sequence within what we call a phase has been noted. Of course units known to have followed each other are assigned to the same phase when it is presumed that they are merely sequent units of the same job. Had more temporal distinctions been provable, more lettered phases would have been used.

Unfortunately in the earlier editions of the map we committed ourselves to the use of small letters in mere locus numbers. There are not many of these, and they should not have been used. For example, we labeled the twin structures of the ballcourts a and b . As a result, we now have Structures $\mathrm{K}-6-\mathrm{a}-\mathrm{A}$ and $\mathrm{K}-6-\mathrm{a}-\mathrm{B}$, a situation likely to lead to confusion. To minimize this we shall write these K-6a-A and K-6a-B, and always use small letters in the locus number parts.

The use of numbers and letters running backward in time is likely to meet reader resistance. This order was adopted for the sake of expandability. It has the very great practical advantage that once a particular complex of construction has been named, this name need never be changed, in notes or publications, yet the temporal relationships can be brought up to date with further
digging. When we adopted it there was difficulty at Uaxactún in this respect. A comparative tabulation of published A-1 Complex destinations there against ours for Structure K-5 will show the difference (Table 6.1). Descriptive terms, such as pyramid are omitted, but can be used with any of the formal nomenclature schemes shown. The Uaxactún designations are from A. L. Smith (1932), and R. E. Smith (1937b).

At Piedras Negras, Structures K-5-1st, 2nd and 3rd were discovered by 1932. Notes, drawings and preliminary published remarks referring to them required no relabeling when a K-5-4th structure was discovered in 1939 , and K-5-lst was divided into phases.

Our reversed system of temporal structural numeration exhibits another property of some value. Any structure labeled 2nd, 3rd, etc., differs considerably from what finally came to exist at its locus; any structure labeled B, C, etc., differs also, but perhaps to a lesser degree. Conversely, when we refer to structures known as more than mere mounds, if they lack temporal labels or are labeled A without ordinal numbers, or are labeled " 1 st " or "1 st-A," they are the latest known at their respective loci. These are the structural units to be gathered together for a picture of the site as it presumably was at the time of abandonment. A 1st-A structure at one spot may easily pre-date that at another, or even a 2 nd or 3rd structure at another. But the period of use of each such structure is supposed to have ended with the abandonment of the locus and there is some indication that there was a general and sudden abandonment of all, or at least all of those of the main groups. So all structures so labeled may have enjoyed a late period of contemporary use. We have found no satisfactory evidence of abandonment of a structure locus followed by later building there, nor any positive reason for suspecting final abandonment of one structure before abandonment of others.

It should be emphasized that the system of nomenclature above described is primarily one of naming physical units of construction for precise and ready reference. It does not encompass evidence of use of structure ruins by later groups. The time periods implied are valid only for the temporal series at a particular spot or locus. These are the raw materials, so to speak, out of which more general periods and sub-periods, applicable to the site as a whole, or to selected parts of it, may be formed when evidence and reasoning permit. For instance, on the Acropolis, the known stratigraphy permits definition of six main periods of building activity. Most of these are evidenced by more than one structure unit already specifically labeled as digging progressed. But now, in contexts where general change and passage of time are the primary considerations, and since there seems little danger that the earliest period of Acropolis construction has not been reached, we may utilize "Acropolis Building Periods I to

VI," the numbers taking one forward in time. Similarly, if numbered or lettered temporal periods. Similarly, if numbered or lettered temporal periods are sought to be deduced from typological analysis and if they are numbered at all, they will be numbered in order of time. A pre-vault period (which is suspected) would be so named, or might be "Roof-Type Period I," the later vault period "Roof-Type Period II." Ceramic periods probably will be numbered in this way, the numbers carrying one forward in time, and not backward as in the temporal parts of our structure numbers.

For the most part we have applied the locus parts of our structure designations in the same way they are used at Uaxactún, and as simple numbers are used at most sites, that is, they are applied to what appears to have been a unit to the Maya themselves. But there are two differences to be noted in some instances. Another comparison with Uaxactún will illustrate the first. Structure A-V there is in many ways comparable to our Acropolis Courts 1, 2 and 3 , with their buildings and substructures. "AV" at Uaxactún locates and names a whole complex of distinct units, including numerous buildings at the final surface. We apply the standard nomenclature system to each of the smaller units, and leave the larger unity to the descriptive term Acropolis Courts. Or if we want to include Structures J-1 to J-23, this is done with the term "Acropolis." The second difference is that we have departed from usual practice in an opposite direction, when this promised greater descriptive convenience. Thus Structure J-1 may be considered as the basal terrace of Structure J-4, and properly part of it. But it seems not to have been designed with this only in mind, and in large part predates it. Structure R-32 is a basal platform serving three separate and decidedly different structures. Where, as in these cases, there is likelihood that the Maya built them, or parts of them, before they became more or less integrated with other units requiring separate designation, or for some other reason we foresee a need to discuss them separately, we have given them separate names, still utilizing a locus number.

So long as the Maya chose a spot for a unit and thereafter did not spread a single later unit over several early units, our combined locus-and-temporal designation system is adequate for whatever we may find. However the reader may react to it, it has proved useful to us in keeping our notes and drawings in order and in analyzing and especially in tabulating results. But its point of departure is the surface or the first construction identifiable below it. Where, below this latest level of what has already been called by a single name several structures requiring different names are found, or partly found, some special system of designation must be utilized. Our notes reflect two or three makeshifts in this regard for poorly known structures at several buried
levels in Court 1. Also at Structure R-9 a number of structural features within the basal platform cannot be satisfactorily assigned to one series of periods and phases, though all are finally fairly well integrated into what seems to be a single unity, as one can see by the map. In such cases the designations used will be explained with the detailed descriptions.

## Areas Subject to Flooding

At the ends of our field seasons, sometimes extending into early July and well after the beginning of the wet season, we estimated that the river usually rose about 20 m (over 65 feet) above low-water level, which we have taken as datum. However, it then extended up the little gully southeast of Structure E-1 only to about the limits indicated by the 16 m contour line; it had then reached the well-defined vegetation line on the banks, and obviously our estimate was too high. But one year, after we had left, flood water was reported by Don Victor Pinelo to have made a peninsula of the ground supporting Structure E-1, and to have extended far back over the Northwest Group plaza. The rise that year was undoubtedly more than 20 m . It seems safe to say that the 20 m contour line outlines more than the maximum area which is likely to be under water during part of each year; but that areas several meters higher are probably now subject to occasional flooding. Of course we do not know whether deforestation in head-water regions may have increased the rise over what it was in Maya times. But it is at least possible that floods might then sometimes have covered much of the bottom-lands in the UV-Valley and the Northwest Plaza and possibly they could have extended some distance up the VS-Valley. It is worth noting that these areas are barren of mounds, and that the bases of the lowest mounds mapped are a little over the 20 m contour.

## Unmapped Peripheral Areas:Town Limits

A hundred yards or so east of Structure V-4 a small gully runs northeast from the UV-valley. Following the streambed, dry in the dry season, one comes to a low cliff on the right, about opposite Structure V-1 which, however, cannot be seen. Climbing out on the V-1 side, where there are more mounds not shown, and looking across the gully, one maybe able to make out the badly weathered cliff-carving of Maler, which was finally rediscovered by Cresson. A long narrow slope leads up from the top of this cliff to HillY, culminating much farther south.

Hill Y, together with Hill S, here much steeper, effectively cuts off a large open area to the east. From the carving, a short walk, at first continuing up the gully which drains it, brings one to what we knew as "Rufino's Milpa." Mounds with masonry walls showing, and an apparent broad-tread stairway 5 m wide leading to a platform about 2 m high, were discovered here by Cresson, 260 paces from the carving.

Going back through the gully to the UV-Valley, and turning away from the site, occasional mounds were noted on its sides for $1-2 \mathrm{~km}$. These were seen in riding to or from Desempeño, and many were doubtless missed. But there was no evidence of the sort of concentration of mounds, easily noted from the saddle, to be seen in the VS-Valley.

The base of the south side of the UV-Valley, just east of Structure U-20, is a low cliff, an overhanging portion forming the "cave" in which Maler lived. A cleft in this leads to a small flat area at its top, with a few mounds more or less filling the unsurveyed gap between Structures U-20 and V-28. Farther up the slope southward is a long high cliff running in from the river side to the trail side of Hill X, with one shallow cave which was noted. Above that cliff is a considerable nearly level area, with one small mound, part of a masonry wall visible, but no others. The situation of this mound is similar to that of Structures B-1 to B-3 in the North Section. From here the Acropolis was in sight over the main groups, with a magnificent general view. At the top of the hill there are some striking large crevasses in the culminating cliffs, and many more in an adjoining peak upstream. This hill was rather thoroughly explored by Cresson and the writer, without encountering any other mounds. Hills Y, S, L and $A B$ were fairly well covered by the writer. Their tops are devoid of mounds, both $S$ and $L$ being flat-topped mesas. Strs, Z-5 to Z-7 were the only ones encountered and describable as hill-top mounds.

If mounds not mapped or mentioned exist on the slopes facing the main groups they are probably few in number.

Low mounds were reported across the river, in a valley opposite the West Group, but this lead was never followed up. This is of course crossable by canoe, but in the dry season only in the neighborhood of the Sacrificial Rock, and again in smooth (but swift) water opposite the Acropolis. At high water, crossings are possible anywhere, but one is carried 200-300 m down-stream in the process. There are no extensive open areas on the opposite shore. So, though settlements undoubtedly existed on the Mexican side, they were rather effectively cut off by steep hills and the river itself.

Our cursory explorations, supplementing those of Parris in the mapped area, were meant to find the limits of the peripheral sections, if such exist. To the north they seem to be established and shown on the map. Areas of concentrated mounds to the south cease with the UVValley. To the east of the main groups, while they tend to climb the hills, they do not get to the tops. Thus the upper slopes and the river form a sterile ring around the site proper.

This ring is pierced by the C and GH-Valleys, which are quite wide, and we do not know how far the north
sections may extend eastward. But to the south, the mounds become suddenly sporadic in the comparable UV-Valley, after passing the gully leading to "Rufino's Milpa."

It is quite possible that unmapped sections of concentrated mounds exist to the east of the mapped area. if so, they are effectively screened from the main ceremonial groups by the hills, but readily accessible via the C and GH-Valleys, and via the gully of the carved cliff.
"Rufino's Milpa" is named for Rufino Ramos, one of our most faithful workers who has lived at Piedras Negras since 1932. If the bottom lands immediately to the east contained mounds of large sizes, he would have found and reported them. It seems reasonable to believe that we have mapped all the main ceremonial groups and an adequate sample, approaching completeness, of the peripheral house mound areas.

## Errors and Questions Respecting Prior Editions

The writer has been over the main groups countless times since Parris completed his work, and has seldom noted a flaw in it, except those which were his own (the writer's) fault. A few gave seriously wrong impressions. These include the provision of rear doorways in the temple buildings J-4 and R-5. In both cases I undoubtedly misinterpreted the sides of rear niches for the jambs of doorways, and these errors, like most of those noted below, have been corrected on the present edition of the map.

Entirely too much of the Structure K-5 temple building walls was shown in solid black. One slip we can lay to Parris: either the front and steamroom of Structure J-17 was wrongly located, which is unlikely, or the sketching of contour lines behind it was incorrect. The mound results from a structure only about 8 m deep, and the slope to the rear begins just behind the room. As shown, the mound (and therefore perhaps that of J -16) was too wide. It suggested a reconstructed plan like that of Structure P-7, another sweat-house, but the steamroom was undoubtedly all the way to the rear as at Structure $\mathrm{N}-1$. This mistake has been carried to the present edition. It was overlooked.

The Structure O-12 temple building incorrectly indicated known absence of a rear niche and columnaltar, later discovered rear sills were omitted here and at Structure J-4 and K-5. Our original guess as to the rear wall at the top of Structure R-3, properly indicated as hypothetical, has been abandoned after further investigation.

Morley published large-scale plans of Structures R3 and R-4 (1938, Figures 9a and 104), and of Structure J-4. These are evidently after Parris, so that the mistake at J-4 is repeated. But the R-3 plan differs from that
of the map. It shows the interior of the room and the doorway correctly, but we now believe the exterior outline, which must be reconstructed, was of irregular Petén type, and show it thus now. He also published a perspective reconstruction of Throne 1 and its niche. This was drawn from data supplied by the writer, and from Plate 13 of Preliminary Paper 3, with which it disagrees. Morley's reconstruction nevertheless follows our own ideas, as expressed in the text. One may now reflect that wooden beams were used to cap vaults in Structure P7, and could have been used here to reduce the height of the niche vaulting. It is changes in opinion such as these, which are to be expected as one learns more and more about a site, which suggest the advisability of using broken lines for reconstructions of all sorts, unless the drawing is very plainly labeled as partly hypothetical. We have adopted that policy in this publication, though we have not always practiced it in the past. The placement of monuments (red ink, second edition) is entirely the work of Morley, apart from stela at Structures J-3 and J-4, Throne 1, Throne 2, and "Lintel" 5. Morley sent us a proof for criticism in 1933, which was turned over to me. At that time I knew little about precise monument location except in the West Group, and I expressed some doubt as to the lintel function of "Lintels" 4 and 5.1 have since come to the rather definite opinion that none of the Piedras Negras numbered lintels were such, with the exception of "Lintel" 11 and possibly of "Lintel" 6 and so I believe that they should not have been shown in doorways (except "Lintel" 11). Morley made his locations on our map from notes or observations originally made without it. His information was supplemented by such controls as we could supply from excavation and accurate surveying, but at this time these latter were very incomplete. In placing stela on this edition of the map we usually have had more complete and accurate data than were then available, and have used them. We have not recorded on it speculations as to possible Maya removal of a monument from one structure to another, where it was found. Nor do we indicate positions of re-used fragments, or of whole monuments incorporated into the masonry of the structures. This eliminates from this edition the thrones, lintels and miscellaneous sculptured stones, and also Stela 45 , shown by Morley in red. Morley at one time proposed renumbering Stela 29 as "Lintel" 14, at which time we thought it was part of a lintel (Satterthwaite 1933a). This opinion was soon abandoned, and I think there has been no other published reference to such a change.

## Original Locations of Monuments

In the first and incomplete map published by Morley (the second edition) his opinions as to original monument positions are indicated in red, as already stated. We now give our own as to stela only, which in some instances

Table 6.2 Association of Stelae and Structures

| Structure | Monuments |
| :--- | :--- |
| R-9 | Stelae 24, 25, 26 (NE to SW) |
| R-10 | Stela 27 |
| R-1 | Stela 28 |
| R-3 | Stelae 42, 29, 44 (around the top, starting at SE). "Lintel" 11 not indicated. |
| R-32 | Stela 31 |
| R-4 | Stela 30 |
| R-5 | Stelae 32, 33, 34, 46, 35, 36, 37, (SW to NE). "Lintel" 4 not indicated. |
| R-16 | Stela 41 |
| R-11 | Misc. Sculptured Stones 4 and 5 (SW and NE markers). Stela 45 not indicated. |
| O-12 | Stela 22 |
| O-13 | Stelae 15 and 12 (top, NW to SE). "Lintels" 1, 2, 3 not indicated. Stela 14 (basal terrace SE side). |
| East Plaza | Stelae 13, 16, 17, 19, 20, 21 (NW to SE beginning front of Str. O-13). |
| J-3 | Stelae 40, 9, 10, 11 (SW to NE). "Lintel" 5 not indicated. |
| J-4 | Stela 1 (centered before pyramid stairway). |
| J-1 | Stelae 2, 3, 4, 5, 6, 7, 8 (SW to NE). Stela 43 not indicated. |
| K-5 | Stelae 38, 39 (NW to SE). "Lintel" 7 not indicated. |
| J-6 | Throne 1 indicated, but not labeled on map. |
| Note: The "lintels" 1-5 and 7 were probably panel stones used on the structures with which they are mentioned in the above |  |
| list; Stelae 43 and 45 were integral parts of the structures with which mentioned and either were not true stelae or were re-used. |  |
| Positions of other numbered sculptures shown by Morley are considered as due to chance re-use. |  |

differ. The five legged benches known as Altars 1 to 5 are labeled on the map. Other monuments, not including carved stones structurally incorporated in masonry, are indicated, but their numbers are not placed on the map. Anyone desiring to insert these designations can do so from the following tabulation. In it the monuments given are assigned places on or near the structures mentioned (Table 6.2).

The evidence for positions now assigned will be presented with the detailed descriptions of the structures concerned. The evidence for replacing stela in their original positions of course is more satisfactory in some cases than in others. Maler and his successors found no standing monument. Where a standing butt, or the cist from which a monument had obviously fallen, is now known, the monument is presented by a solid black cross-section, otherwise by an outline section. In two cases where special doubt exists (Stela 24 and 33) the monument is represented as lying on the ground in the approximate location in which we found it. The restored positions of Stela 18 and 29 are more doubtful than the others, and there may be some question whether Stela 21 and 24 were stela at all. Otherwise it is believed safe to reason from the indicated stela and altar positions, including the restored ones.

However, special attention is called to the fact that on Structure J-1, Stela 2 to 7 were set on an additional stela platform apparently common to them all. Definite evidence that this was completed at one time is not
available; but it is certain that Stela 8 was not on it. We have restored the platform to include Stela 1, part of the cist of which survived. But it is possible that Stela 1 had a small stela platform of its own separated from the other. Evidence on this point was probably destroyed by Maler, while turning the heavy monument for photography. A similar low platform base for Stela 25 and 26 may originally have stood entirely free, like that on Structure J -1. One should not reason from their absence on the map that such platforms were surely absent where not shown. Those shown are in the neighborhood of 40 cm high, except for that of Stela 9, which can hardly be called a platform since it is only about 10 cm high.

## Miscellaneous Notes

"Bur. 6" in Square L locates a burial, excavated by Butler, in a small true cave. The Christian cross in Square C locates a Christian grave which should not in the future be disturbed. The word "spirals" indicated in Square N denotes the approximate location of petroglyphs of spiral forms; and the X in Square Q shows the approximate location of what may have been intended as a very large lintel or a small stela. It is a plain rectangular block, well shaped, but not smoothed. Spirals and block are below high-water level, the block exposed only during very low water. The presence of this block, plus an exposed
face of thinly stratified bedrock near the spirals, and a similar spiral on a vault-slab from the Acropolis mounds suggest that this was a quarry area. But no other signs of it survive. The block lies as if it had been dragged some distance toward the ruins, or dropped there, and then abandoned. Exposures of suitably thick strata slope up nearer the channel. The Sacrificial Rock is a remnant of one of these stratified beds of limestone, which uniformly slope upwards in the direction of the river which has cut through them.

If large monument stones were in fact quarried in the river-bed during the dry season, rafts prepared then could have been used to float them to gently sloping ramps of earth or timber, leading to any of the groups in which large monuments were found. But exposures of thick strata also exist at the tops of Hills L and S, and also high up on their slopes, whence transport to the location of stela would have been almost entirely down-hill.

Our camp was in the Northwest Group, between the river and a point opposite Structure F-6, where Rufino Ramos' apparently now permanent home marks the easterly limit of our own modern occupation. Wherever we have worked, our dumps as well as excavations have modified the mound contours we found. The approximate locations of these will be indicated in the unit descriptive reports.

## Cross-Sections Through Main Groups

Section A-B (Fig. 1.2) starts from a point a few meters west of Structure E-2, cuts across the corner of the lower component of Structure E-1, and runs thence southeast through Structure P-5 and the northerly part of the basal platform of Structure S-1. Section C-D runs from a point in the river-bed (here dry in the dry season) thence passing about 20 m southeast of the Sacrificial Rock and between Structures U-1 and U-3 to Structure P-6, which it cuts longitudinally.

These cross-sections were made by Parris for the map in its 1932 form, before we acquired much of the information respecting particular structures now appearing on the completed map. Hence, in particular, elevations of mounds are shown on the sections which correspond to restorations of structures on the map. But the sections still serve to give a summary picture of the relative heights concerned, which the contour-lines, which "run under" schematically drawn mounds, cannot do. It is interesting to note that Parris' elevation of the R16 mound (Section C-D) correctly forecast the unusually narrow pyramid stairway which we later identified by excavation.

The vertical position of the Sacrificial Rock is indicated in broken lines on Section C-D. It is near the in-shore edge of a sort of half-bowl-shaped formation, largely of sand-banks, cut by drainage from the UV

Valley. The remnant of ledge which forms it stands 2-3 m above the surrounding surface on the in-shore side, a fact not adequately indicated. As the water rises the rock is for a time entirely surrounded, then finally submerged. There can be little doubt that this occurred every year in Maya times as today.

## Acropolis Restoration Drawing

Individual Maya ceremonial structures were undoubtedly usually planned as parts of larger groups. While each structure is best studied as a separate unit, a picture of the larger assemblages formed by them is surely one of the chief end-products we should seek. Maps and sections provide such pictures in conventional forms, but three-dimensional drawings from them are scientifically valuable also. They give a much better basis on which to judge of the esthetic results achieved, and make it easier to imagine how the various units shown could have been actually used.

Figure 6.1 is a rendered perspective drawing of the Acropolis at Piedras Negras. I think it is the first to assemble on one plate complete reconstructions of nearly all the buildings making up what must have been regarded as an important architectural unity by the Maya themselves. It is the logical application of the technique of presentation by perspective drawing of W. H. Holmes to the results of excavation. But unlike the Holmes drawings of sites it shows the buildings as they are thought to have been, not as in their ruined condition. In order to achieve a close approximation of the original esthetic effect, the very considerable amount of hypothetical reconstruction is not indicated. For each individual building this will be ascertainable from detailed descriptions, when published. But similar drawings of individual units at other sites have already begun to appear, and many more, including groups, have since been made for Carnegie Institution of Washington by the author of this one. These, for the most part unpublished, are to be issued as an album. Direct comparisons of features shown on such realistic drawings are inevitable. A few notations as to the necessary amount of imagination involved in this one will be useful.

## Reconstruction Without Specific Evidence

Nothing whatever on the drawing results from uncontrolled imagination. By referring to Square J of the map one can easily identify by name the various structures shown on the restoration. The latter is a rendered mechanically plotted line drawing. As a basis for it the Acropolis portion of the map was nonsignificantly distorted so that buildings at approximately right angles became actually so, merely to simplify labor. As to all buildings shown, and as to substructure elements other than as to be noted, plans and sections of what remained standing were well known through excavation.

The stairways supplied to Structures J-8 and J-18, at the left margin, were not actually identified in the field. At least some part of all other stairways shown was sought and found. There is good evidence on both sides for the ramp-like extensions of the stair side walls (or of something similar) before Structure J-2 in the foreground. Such members are generally called "balustrades"; their presence on the J-4 temple at the right is, however, entirely hypothetical, and possibly they should not have been placed there. But there was a remnant of a probable balustrade at the base of the J-3 pyramid stairway which, esthetically considered, balanced this one. The unique truncated-pyramid relief design on the lower terraces crossed by the J-4 stairway is definitely known on the near side; there was no excavation on the far side. The rounded terrace corners on Structure J-1 are incorrect; during the last season when excavated, these were found to be rectangular. The inset corners on the Structure J4 pyramid with their basal and apron moldings, and the corners of the lowest terrace of the platform of Court 1 which supports Structure J-2, and of the corresponding terrace of the platform of Court 3 which supports Structure J-18, are known to have been round. Other round corners may be incorrectly shown thus, and we are not sure of the correctness of the manner of joining the terraces on either side of the J-2 stairway to it.

Upper zones of buildings are largely hypothetical, and stucco-work on them is entirely so. But medial moldings, all consisting of an upper member rectangular in cross-section and a lower member triangular in crosssection, were known for Structures J-2, J-8, J-9 and J-11, $\mathrm{J}-21, \mathrm{~J}-22$, with medial molding height known for J-6. The rectangular cornice (i. e., molding at roof-level) of Structure J-13, invisible in this drawing, survived at one end. Roof heights for Structures J-2, J-6 and J-9 are based on good evidence. It is possible that not enough roof combs have been supplied. It is known that quite similar palaces at Palenque might or might not carry them. Fragments, apparently of open-work roof-combs, were found at J-4 and J-18; hence hypothetical combs are restored there. The only evidence for the third and most conspicuous roof-comb on Structure J-23 (upper left) is a unique combination of wall and room-span dimensions, suitable for its support, with fragments of stucco. The J-4 comb is to the rear since this is the position of known combs on temples of the Central Petén with similar building outlines, though such combs at Tikal and Uaxactún are not of the open-work type.

No reliance on the specific stucco designs, either on roof-combs or upper zones of buildings would be justified. The motifs used or suggested are derived by Miss Proskouriakoff from better preserved Maya buildings at other sites, particularly at Palenque. Fragments of stucco relief were found at Structures J-2, J-4, J-11, J-18 and

J-23. This type of decoration is restored also on Structure J-6, but without this basis for it in what had survived. Other buildings, shown without relief decoration, may of course have had it. At J-4, part of a red painted and more than life size stucco human head was found.

Structure J-12, beyond which the river appears briefly in the distance, is restored as if with a flat beam and concrete roof. An alternative possibility is a peaked roof of thatch. All other Acropolis buildings in view here had flat roofs supported by masonry vaults. Beyond the temple J-4 thatch-roof houses are suggested among the trees. These are entirely hypothetical. Presumably the hill-side mound areas were not devoid of trees, but we really know only that there are mounds at this spot which is near the end of the GK extension of Hill L. Whether the Acropolis area of temples and palaces and the West Group plaza were entirely devoid of vegetation, as shown, would be hard to determine. Certainly wherever we tested, all level surfaces betrayed the former presence of concrete.

The plastered concrete roofs of the buildings are shown as if rising slightly to a detectable ridge at center. This feature is based on House E at Palenque, where the roof is finished with plastered stone slabs laid in mortar. The roofs here may have been slightly arched in cross-section instead, an alternative water-shedding arrangement fairly certain at Yaxchilan.

## Point of View

The point of view chosen could not have been available to the Maya, but a similar one, looking west instead of north, could have been found on Hill L. It did not seem practicable to include more than the lower corner of Structure J-3, a high pyramid, with four stela, two of which appear at lower left, in this view. This pyramid, though possibly lacking a building, by its mass balanced the J-4 temple pyramid shown, in any real view.

## Accuracy

The drawing was made by Miss Proskouriakoff as of the 1937 season. She devoted great care and attention to it and was never one to reduce surmises to the seeming reality of drawings if definite evidence could be obtained. She was dealing with an area much of which she had resurveyed in the field and had just drawn up, and with plans, sections, and for the most part also elevations of particular structures recently drawn by her. These all showed what had survived and what had not. The majority of these structures she had also recently remeasured and surveyed herself. There was close collaboration and discussion of moot points with the writer and Cresson, who had done practically all the excavation here. We were required more than once to justify our own records and notes. So, apart from some unexcavated details, and theoretical restorations of destroyed features, most of them noted
above, we can claim that this Figure 6.1 is literally true and accurate, as of the time of abandonment. It is not a mere "artist's conception."

## Sources Giving Original Data on the Archaeology of Piedras Negras

Andrews (1942b); Baker (1936); Butler (1935a-b, 1936a); Cresson (1937, 1938, 1939a-b, n.d.); Godfrey (1940); Maler (1901); Mason (1931a-b, 1933a-b, d-e, 1934a-d, 1935a-b, 1938); Mason, Satterthwaite, and Butler (1934); Mason and Satterthwaite (1938); Morley (1922, 1929, 1938); Ricketson (n.d.); Sattherthwaite
(1933a-c, 1934, 1935a-b, 1936a-d, 1937a-b, 1938a-c, 1939, 1940a-b, 1941, 1942a-b).

## Other Sources Cited

Andrews (1942a, 1943); Blom and LaFarge (1926); Bolles (1938); Holmes (1895); Kramer and Love (1940); Lothrop (1924); Madeira (1931); Maler (1903); Maudslay (1889-1902); Morris, Charlot, and Morris (1931); Pollock (1932); Ricketson and Ricketson (1937); Roys (1934); Ruppert (1935); Ruppert and Denison (1943);A. Smith (1932, 1934, 1937); R. Smith (1937); Thompson (1931, 1939); Tozzer (1941); Wauchope (1934, 1938).

# - 1. Structure R-9 (Temple and Associated Constructions) Linton Satterthwaite 

The structures segregated for description in this part of the report have been classified as temples, an essentially functional term. Underlying such a process of selection are two things which require use of judgment, and therefore our classification should not be considered unchangeable, nor given more weight than it deserves.

One factor is the definition of temple adopted. Ours has been "A structure believed to have been designed for public practice of religious rites and ceremonies." The underlined words allow that some Maya buildings may have been designed for private religious ceremonies, as of a family or other highly restricted social group; and also that others may have been designed for public or semipublic ceremonies which were not primarily religious, even if conducted by the priesthood. For modern analogies we may compare the Christian altar in modern Maya dwellings, perhaps with a special niche, with the Christian church which serves the whole community of the same Maya family; and we might compare the Christian church building and altar with differing architectural provisions for ecclesiastical courts, audience chambers for higher ecclesiastical dignitaries, etc.

The second factor underlying the selection of temples at a site is the decision as to what physical criteria justify the conclusion that a given structure functioned as a temple, under the definition adopted. For Piedras Negras, this was discussed at some length in Satterthwaite (1937a). Presence of a pyramid, possibly without a building, but usually serving one building only, has been considered a certain temple criterion, as has presence of one or more centered column altars, centered niches in building walls, room-length benches or sills, and building plans similar to those of the pyramid temples at Tikal. Petén-style decorative forms on substructure units have been used as confirming evidence of temple function at this site, since they seem to be linked with other temple criteria.

One should allow, I think, that a given criterion may be justifiably used here, though it may have a different connotation elsewhere. Its validity depends on inference
from a large sample of unselected structures, and on what is known from history and modern ethnology concerning Maya religious expression.

## Preliminary Remarks

Structure R-9, in final form, was a pyramid temple with a step-terraced basal platform, incorporating a stela platform and the important Stela 25. Very likely this same statement would apply to a number of earlier phases, but this was not proved. The basal platform, at least in part, pre-dates the pyramid, and is made up of a rather complex accretion of constructions. Some of these were partly destroyed or buried, with other parts surviving to the end. Others were eventually completely buried and hidden. Most walls and floor surfaces, where left exposed, were badly ruined, with complete slippage and destruction of the rear of the pyramid-top and higher components (Fig. 7.7). Excavation was superficial or by the samplehalf method, except for the building, where ruin was extreme. Nearly everywhere plaster had entirely disappeared, and where present, excavation during the rains made identification of finishing plaster questionable where it may actually have been in place.

Miss Proskouriakoff accurately surveyed only a few key points, from which a certain amount of triangulation was done. Accurate levels were taken wherever they seemed useful for reconstruction. The work was done a few days at a time, as opportunity and results elsewhere dictated. Satterthwaite worked here in 1933, 1935, and 1939, Cresson in 1937. This complex never received the undivided attention which it deserved. However, the occurrence of a new sort of stairway, combined with a stage, a very small crude and surely unsculptured stela, associations with two dated stela, and with some ceramics, and four column altars in situ justify a full presentation of what was learned.

## Unit Designations and Temporal Sequences

As elsewhere in this report, various structural unities are lettered for ready reference in the text and for quick identification in the drawings. Parts of a supposedly single unit not actually proved to be such by connecting excavation are distinguished by priming or doublepriming the same letter. The choice of letters accords with our standard rule as much as is here practicable. The rule is that in alphabetical order the letters run through a group of supposedly contemporary units, or else run backward in time.

There is here, however, a complicating circumstance, which can be illustrated by a simpler hypothetical example. If we find a platform, A , built on part of another, B , we know stratigraphically that there were two phases of construction. We have the sequence A -over-B. If a third platform, separate from A, lies on or against another part of B , we also have the sequence third-platform-over-B. But we do not know whether this precedes or follows A or was contemporary with it. So we have two proved
sequences, with $B$ at the bottom of each together in the final phase they may form a single unity which grew by accretion in either two or three phases. To meet this situation without completely abandoning the rule of letter selection stated in the first paragraph of this section, we can distinguish the two proved sequences as Series One and Series Two, and assign an alphabetically later block of letters to Series Two, considering the alphabetically first of the block as indicating latest time in the second series. Thus in the hypothetical illustration, we could call the third platform Unit W , the latest in its series, and still have three letters ( $\mathrm{X}, \mathrm{Y}, \mathrm{Z}$ ) left for earlier units between Unit W and Unit B in that series. We then have the stratified sequences B-before-A and B-before-W; and can speculate on the temporal relationship between Unit A and Unit W , or leave this unsettled.

The designation device [in Table 7.1] has been adopted. Series One consists of Units J and I and also of Units Z, Y, X, W, the last four accounting for the pyramid and higher temple components (Fig. 7.7). Series

Table 7.1 Structure R-9, Adopted Scheme of Temporal Sequences

| Series One, Phase C (earliest) | Early court floor (Floor 2) and postulated <br> white-plastered clay-daubed wooden building <br> (Unit J) | Court Floor 2, and Unit J |
| :--- | :--- | :--- |
| Series One, Phase B | High and probably long platform and stairway with <br> standard steps | Unit I |
| Series One, Phase A <br> (latest) | Pyramid and stairway, Supplementary Platform, <br> Building Platform, Building | Units Z, Y, W, X |
| Series Two, Phase H <br> (earliest) | Same as Phase C, Series One |  |
| Series Two, Phase G | Same as Phase B, Series One, plus small low <br> compound platform (Unit H), associated with <br> Court Floor 2. This may belong in Phase H, or in <br> an unrecognized phase between Phases H and G, <br> or between Phases G and F | Units I, H |
| Series Two, Phase F | Changes in Unit I stairway, providing high <br> battered stair-side extensions and low stage, <br> incorporating Unit H | Units G, G' |
| Series Two, Phase E | Low platform on Unit G, possibly for small plain <br> stela | Unit F |
| Series Two, Phase D | High compound platform of Stela 25 | Units E, E' |
| Series Two, Phase C | Veneer-like new front wall (Unit D) on Unit E; <br> extension of platform-unit H to abut Units E and <br> D | Units D, C |
| Series Two, Phase B | New step-terraced low stage (Unit B), probably a <br> contemporary unit with that of Str. R-10 to the <br> southwest; apparent lateral extension of Stela 25 <br> platform with provision for Stela 26 | Units B, B', B' |
|  | Short projecting step-terraced element, providing <br> additional centered narrow stage and completing <br> burial of stairway of the early Unit I | Unit A |
| Series Two, Phase A (latest) |  |  |



Figure 7.1-6 Isometric reconstruction: Series Two, Phase G (Units I, H) (1); Series Two, Phase F (Units G, G') (2); Series Two, Phase E (Unit F) (3); Series Two, Phase D (E, E') (4); Series Two, Phase C (Units D, C) (5); Series Two, Phase B (Units B, B', B") (6).

Table 7.2 Structure R-9 Stratification Table

| Series and Phase | 45 | 45 | 46 | 46 | 47 | 48 | 49 | 50 | 51 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| One-C; Two-H | J | J |  |  |  |  |  |  |  |
| One-B; Two-G | I | I |  |  |  |  |  |  |  |
| Two G |  |  |  | H' | G |  | H | H |  |
| Two F |  |  |  |  | F |  |  |  |  |
| Two E |  |  |  | E |  | EE' | E |  |  |
| Two D |  |  |  |  |  |  | D |  |  |
| Two C | B | C | C |  | C |  | C |  |  |
| Two C | A | A | A | B | B |  | B | B | BB' |
| Two B | Z |  |  |  |  |  |  |  |  |
| Two A | Y |  |  |  |  |  |  |  |  |
| One A | X |  |  |  |  |  |  |  |  |
| One A | W |  |  |  |  |  |  |  |  |
| One A |  |  |  |  |  |  |  |  |  |
| One A |  |  |  |  |  |  |  |  |  |

Two consists 6 f the same earliest units J and I, and also of Units H to A . All of these series two units pertain to what was finally, if not always, a basal platform, with the possible exception of Unit H. Figures 7.1 to 7.6 illustrate most of the phases of growth of this basal platform. Figure 7.7 shows the final form, together with Series Two units.

Lacking proof, in assigning units of each series to temporal phases, some units have been treated as contemporary, though they may result from accretion. There were hints that the Supplementary Platform of the temple (Unit Y) is later than the Pyramid; and that the Building Platform (Unit X), and therefore the Building, are later than both. It should be understood that the two series of temporal sequences result from our ignorance and lack of stratigraphy. If we knew the complete story, the phases of Series One would doubtless merge with the phases of Series Two. So, even if we show too small a number of phases in Series One, the eight phases in Series Two probably represent the maximum number. However, deep digging at the rear of the Basal Platform might add to this number, at the common early end of the two series. It is also quite possible that, in the longer Series Two, Unit H really was built during a separate phase, and the same applies to Unit C.

Just what the unit-letters represent and their supposed temporal relationships can, it is hoped, be quickly comprehended by finding them in Figures 7.1 to 7.7 , and in the following tabulation. In the latter, lettered phases are assigned in each series as if two separate structures were involved, Phase A being the latest in each case. Following our standard practice, only the new construction assigned to each phase is listed, though it functioned together with units of earlier phases.

Features not assigned in the above scheme: Stela 24 and a small round stela or large column altar (see under Monuments); Column Altars 1, 2, 3, and 4 of Structure R-9 (see under Column Altars and Caches); a small plain stela, crude, and found broken in two parts used as building material in Unit C.

The tabulation [in Table 7.2] lists the stratifications available as controls, proceeding downward with unit letters in advancing time under the number of each figure which illustrates the situation.

It seems safe to assume that Stela 25 fell from the cist in Unit E' see Figures 7.6, 7.7, 7.8 and 7.12. Figure 7.8 shows the locations of both Stela 25 and 26 as we found them, on edge, and (in dotted lines) as Maler probably found them. If we also make the reasonable assumption that Unit EE" was built to receive Stela 25, then it is certain that considerable building activity occurred here both before and after its erection. Morley reads its date as 9.8.15.0.0. in the Maya Long Count. It is the earliest of the four of similar Buddha design. It is very unfortunate that the pyramid and higher components, including the nonvaulted temple building, are not stratigraphic ally related to the platform of this stela. Neither the stratigraphy nor the Petén style of the pyramid would prevent assigning that unit (Z) to any phase of Series One later than Unit H of Phase G.

In addition to the illustrated stratifications, a fragment of the right (northeast) wall of Unit G was seen to be at least structurally later than Unit I, which it abutted. This remnant was identified as part of the stageforming Unit G by its position, correct for symmetry on the axis marked by the column altars. Furthermore, it shows the molding at the expected height. It is shown in Figure 7.2 as if it had been found on the left side of
this unit, in connection with what we did expose there. Another item of stratification not reflected in the table is the fact that Unit C was at least structurally later than Unit D, which it abuts. So the sequences of Figures 7.12 and 7.13 can be safely combined to yield the order of construction H-E-D-C-B.

One may readily see from the Stratification Table [Table 7.2] that so far as definite proof is concerned, Unit EE' probably dating from 9.8.15.0.0, followed Unit H; but both could be moved back until the stela platform became contemporary with Unit I. We did not follow Unit E far enough in to prove that this is not the case, but analogy with similar stela platforms at Structure K-6 argue against such a situation. Further, it seems esthetically improbable that the crowding to be seen in Figure 7.4 was part of the concept when the stairway modifications of Figures 7.2 and 7.3 were planned. At any rate, these, and not proved stratifications, are the factors on which we rely in assigning the stela platform to a phase later than Phases G and F in Series One. It rests on the early Court Floor 1, but is probably later, since the floor material runs under it. The later Court Floor 2 dates before or with Unit D, hence before Units B and A, despite the fact that a finished plaster surface dividing the two floors could not be identified. At this point, a division marked by change in size of the crushed stone remains was made out.

## Discussion by Phases - Series One

## Series One, Phase C (Court Floor 2, Unit J)

The foundation for Structure R-9 is a mass of fill laid on bedrock sloping sharply down to the Southeast Section (see site map). Bedrock is only 17 cm below the base of the final forward extension of the structure, or about 29 cm after necessary allowance for settling. Farther back, two floors were clear, Floor 1, here 8 cm thick, resting on an earlier Floor 2, its surface 21 cm above the bedrock level referred to. Excavation here was not deep enough to make sure that there may not have been a still earlier floor or floors, and the evidence was lost in the exposed position where we reached bedrock; but there is no reason to suspect that Floor 2 is not the earliest South Group Court Floor. It may be contemporary with the earliest structures in our lettered sequences, but may be still earlier, since its crushed stone remains, according to the notes, seemed to run under Units H and 1. We have considered it earlier than those in the assignment to phases.

Pure yellow plaster (or clay?) soft when wet, covered the crushed stone floor material of Unit I. The material of the early court floor was described as yellow,
and may have been colored by a similar surfacing. No finishing plaster was found on either of the court floors, nor on that of Unit I, but all, where protected by burial, troweled to a good surface. Hard white finishing plaster seems to have been present on the floor of Unit H , which dates with or next to Unit I in one sequence. A suspicion that the earliest floors were made of crushed stone and clay, rather than lime concrete, can be noted, but without much conviction. Probably all floors were lime-concrete, with a real suspicion that white finishing plaster may not have been used on the earliest court floor.

Before the earliest properly known structure (Unit I) was built, a clay-daubed building, plastered with hard white finishing plaster, had been constructed, presumably in the immediate vicinity, and had been destroyed by fire. The evidence of this is a burned daub-clay fragment (Fig. 7.9, and Object Table, Position 1). Deep penetration of Unit I would quite possibly show one or more buried low platforms with post-holes, such as one found in an early stratum at the Acropolis, which supported daubclay buildings. These might indicate that the South Group Court was first devoted to structures of this type; or they might appear at lower levels, facing down the now buried natural slope. In the latter case they would pertain to an early phase of the Southeast Section, rather than to the South Group Court. A building of this type has been postulated and assigned the unit letter J.

## Series One, Phase B (Unit 1)

Unit I is common to both Series also, but is described under Phase G of Series Two. As part of Series One here being described, this unit forms only a part of the basal platform in the next and final phase. Whether in this phase more of it, possibly all of it, functioned with the temple units proper could not be proved.

## Series One, Phase A (Units Z,Y, X,W)

These units were, respectively, the Pyramid, Supplementary Platform, Building Platform and Building of a temple, apparently in use at the time of abandonment. With units of Series Two, which contribute to its basal platform at this time, they are shown in Figure 7.7, so far as reconstruction seemed safe.

## Basal Platform

Though formed by accretion of units to be described in more detail under Series Two, the basal platform is here treated as a single component of the final temple complex. There are two principal levels, the lower so broad in parts as to remove it from the category of a mere terrace. This seems to be an adaptation to earlier "artificial terrain." Although we failed to draw the section in the field, memory is certain that a cut through the left end of Unit B1 showed the same situation as in Figure

Table 7.3 Structure R-9, Average Dimension Tables: Platform Units

| Platform | Height | Length <br> Base | Length <br> Steps | Depth |
| :--- | :--- | :--- | :--- | :--- |

Note: Starred dimensions are approximations usually based on reconstruction: the letter $V$ means approximately vertical. See Part I for further explanation of dimension tables.
7.16. Hence, the lower level, $B$, is here, as well as at the front, a unit with B1. The mound of Unit B extends past the neighboring temple R-10 to the corner of the court (see map). Parris was wrong in ending it between R-9 and R-10 on the first and second editions of the map. The debris contours indicate continuity. Indications are that despite the wider first step of the R-10 basal platform, in the final phase at least, that platform is a continuous unit with Unit B of Structure R-9. Structure R-10 is the only known pyramid placed originally directly on the plaza or court level, while the pyramid of R-9 was placed partly or wholly on a pre-existing platform. Unit B was perhaps designed to minimize the visual effect of the different base levels of the two juxtaposed pyramids by raising that of R-10 and dividing the height of the basal platform of R-9. In that case, Unit B here may be contemporary with Unit A at Structure R-10, and structurally continuous with it. At the same time, Unit B largely eliminated a complicated accretion of survivals at R-9 (cf. Figures 7.5 and 7.6). The final addition of Unit A, step-terraced in the same style as B, further simplified and unified this side of the court (cp. Figures 7.6 and 7.7).

The step-like terraces forming the face of Unit A are consistently parallel with those of B, and are about 10 degrees short of being either parallel with the front of the pyramid $(Z)$ or at right angles to a line joining the altars. In the isometric drawing of Figure 7.7 we have assumed all front lines as at right angles to this axis. As a result, the amount of forward projection of A from I, as seen at the right side (left of observer) is greatly exaggerated. The projection is only 1.9 m at the base of Unit A.

## Column Altars 1 and 2

On the court was a badly damaged column altar, upright and almost exactly on the pyramid axis (see plan, Figure 2.6). It rested partly over a cache and is here distinguished as Column Altar 1. Column Altar 2, also on the axis, was upright on the basal platform, its back 18 cm from the pyramid stairway. Excavation showed a fragment of an ordinary grooved metate, but no cache, below it. The base was 10 cm below the base of the stairway (Fig. 7.9). Both altars had surely been set in floor concrete, and were permanent features. In this case, bearing on the rock fill below was obtained with crushed stone, perhaps mortar. Possible dating of these altars with or after Units A and/ or $B$ is discussed under those units.

## Stela Placement

Two monuments associated with this structure are not shown in Figure 7.7, because of doubts as to their exact locations. These were however certainly on the court floor and are discussed below. Here we first make some observations on the placement of Stela 25 and 26 in Figure 7.7 and of Stela 25 only, in Figure 7.12. The low stela platform, really here the upper component of a high compound stela platform, is known only at the right end, as Unit E’ (Fig. 7.6) which served Stela 25. As we have reconstructed our sequential units it was lengthened (B") to accommodate Stela 26. The latter stela had fallen on the stepped front of Unit B , in front of the position assigned; Maler evidently dug into $B$ to get a view of it. We failed to excavate for this extension (B"), which is entirely theoretical. It is quite possible this plinth-like platform
originally stood free, as in Figure 7.6, but this was not proved. If so, with the addition of the stepped Unit A, which runs against its right end, the space between them was later filled up to give the continuous effect as in Figure 7.7. This also makes for simplicity.

A stela cist (Figs. 7.5 and 7.12) was found directly behind Stela 25, which was probably merely set on edge by Maler, and there is no doubt that it held this stela. The positions of Stela 25 and 26 as found by us are shown in Figure 7.8, with dotted lines indicating probable positions as found by Maler. The cist walls were formed of building stone, surviving in one corner to a height of 40 cm with 20 to 40 cm of debris above this. It was walled on four sides but we have merely assumed this full height all around. It was badly ruined. There was no indication of a floor, other than a working surface, and no cache was found.

Table 7.4 Structure R-9 Average Dimension Tables: Terraces

| Terrace | Height | Depth | Depth |
| :--- | :--- | :--- | :--- |
|  |  | Total | Top |
| B | $0.5^{*}$ | $0.5^{*}$ | $0.5^{*}$ |
| A | $0.5^{*}$ | $0.5^{*}$ | $0.5^{*}$ |
| Z | 2.5 | 2.3 | $1.6^{*}$ |

Provision of a special high stela platform for a single stela, jutting out from the basal platform, has its analogy at Structure K-5, where similar ones are dated in Katun 13. One of the two there is also off-center. The extension to the left to accommodate Stela 26 seems natural. The rearward extension of Unit B' in Figures 7.6 and 7.7 is based on debris contours only. The original part of the compound unit (EE') will be further discussed later.

The height and width of Stela 25 were measured as 3.2 and 1.2 m respectively, which check well enough with Morley. The stone is restored to its place in Figure 7.12, and the main outlines of the design are added from Maler's photograph.

It is interesting to note that this earliest of the "Buddha" stela has a long butt, compared with the latest, Stela 14. Nevertheless much of this plain part was apparently exposed. In both cases the base of the niche stood about 1 m or so above the pavement and the face of the figure was about on eye level. Part of the butt here is used for incised glyphs, while on the later stone this area was used for very low' relief sculpture. A point to be made is that the length of the plain butt is not a reliable criterion of the depth of interment, unless our reconstruction here is entirely wrong. The upper stela platform component is restored rather higher than the only other known one (on Structure J-1).

As with Stela 25, there can be no reasonable doubt that Stela 26 fell from about the position to which we
have restored it, to the left (observer's right) in Figure 7.7. But we did not have time to excavate for the Stela 26 cist, and have placed it on an assumption of symmetry for Unit E’ B" (Fig. 7.6). Preliminary to this it was necessary to estimate the length of this subsidiary stela platform from debris contours. Morley places these two monuments chronologically a katun apart, at 9.8.15.0.0 (Stela 25) and at 9.9.15.0.0 (Stela 26). This agrees with our conclusion that Stela 26 was set on construction secondary to Unit EEO, which surely supported Stela 25. The readings of the dates will be found in Morley (1938:3:49, 57).

While we may have spaced these two stela a little too far apart, Figure 7.8, where their present locations are shown, leaves no doubt that the impression of close juxtaposition on Morley's edition of the map is incorrect, though required by Parris's delineation of mound contours here and by the scale of Morley's red stela symbols.

Table 7.5 Structure R-9, Average Dimension Tables: Aprons

| Apron | Height | Offsets |
| :--- | :--- | :--- |
| Z | $1.7^{*}$ | $0.2^{*}$ |

Morley has centered Stela 24 with reference to the pyramid mound (Morley 1938, Plate 202). My memory of this monument is that it was not over a meter or so in length, But Morley gives its length as 2.9 m and probably it was partly buried when I saw it. This much of it appears on Figure 1.1 in what I believe to be an approximately correct location. We neglected to locate it accurately but it surely lies several meters to the right (northeast) of an extension of the pyramid axis. Maler places it "on the ground" and "to the right $\ldots$ of the terrace" and "on the right wing" (1903:66). Morley's stela locations were submitted to us for comment, after the second or third field season, but at that time we had no particular idea as to exact locations of monuments on this side of the South Group. The centered position, now that we have definite points on the structure by which to orientate ourselves, will, I am sure, be proved incorrect.

As matters stand on our edition of the map, this is the only stela placed on the South Group Court floor itself, except for the atypically small Stela 46, oval in crosssection, which was centered with reference to Structure R-5. But the following note was made by Satterthwaite: "Oval base of stela (?) 3 m more or less east of Stela 26, in rubble fill, stands with broken upper surface about on level with floor, 15 cm below humus; $48 \times 33 \mathrm{~cm}$ at top, sides rounded". This note, undated, was a hasty one and was never followed up, as it should have been. It may not be correct, for 3 m east of the present position of Stela 26 takes one from court to basal platform level, which should have been noted. This butt could have been on


Figure 7.7 Isometric reconstruction: Phase A of Series One. Letters refer to units described in text. Unit A also constitutes Phase A of Series Two. Rear of upper units not reconstructed; Elevation and section of panel; double scale, slopes restored.
the court level 3 m east of Stela 24. When this note was made, prior to my detailed interest in this structure, it is not impossible that I reversed the direction in which the monuments were numbered, and put down 26 for 24 .

In 1933 I photographed "an apparently complete short stone column ... length 1 m to 1.1 m , diameter 0.5 m by 0.4 m ; flat on one side and there questionable signs of carving. This side was up, is badly eroded. Butt and sides worked; top eroded; no signs of other fragments; found in 1933 to be partly under Stela 24". Its position was noted as in front of the right end of the stela platform (i.e. of Unit B) and on the court floor. This is undoubtedly the "piece of a thick column" which "stood close by" Stela 24, according to Maler (1901). The word "stood" seems to imply it was upright in Maler's time, but, had this been the case, we should not have found it partly under the stela. Morley says it was "in front of" the stela, and elliptical in cross-section.

Taking all these data together it seems highly probable that a small oval stela, or possibly a large column altar, was erected in the court, near Stela 24. If the latter has
fallen backward they may have been more or less side by side, and about 3 m apart. If one of the two was centered, it was probably the oval one; but both may have been right (northwest) of the axis line, and to a certain extent they may thus have balanced Stela 25 and 26, though on a lower level. The assumptions here are that the "butt" end in our photograph note was the top of the oval stone, and the eroded "top" end was actually the end fractured from the real lowest fragment, which was found in position, or from a missing intermediate piece.

Table 7.6 Structure R-9, Average Dimension Tables:
Stages (Latest Phase)

| Stage | Elevation | Depth |
| :--- | :--- | :--- |
| B | 1.1 | 1.1 |
| A | 2.1 | 1.3 |
| AI | 2.7 | 5.1 |
| Z | 7.7 | 2.0 |
| Y | 9.1 | 1.8 |
| HG | 0.8 | 2.9 |



Figure 7.8 Partial plan, Series One, Phase A. Lines a-b and c-d refer to altar locations. Lettered arrows locate sections in Figs, 5.1-5.2. Locations of Stela 25 and 26 are indicated. Temple faces northwest.

Units Z and $Y$ (Pyramid and Supplementary Platform)
Evidence seemed definite that the pyramid (Unit Z) was later than Unit I, and later in a real sense rather than merely structurally sequent to it. Floor material was followed 50 cm or so in below the base of the pyramid unit, near the stairway. It here consisted of a surface of yellow mortar 2 or 3 cm thick on lime-whited crushed stone, the combination noted as "unquestionably a plastered floor". One can, of course, argue that this is a mere structural sequence, in spite of the plaster. We lacked time to follow it in.

Unconnected cuts through UnitY satisfied us while in the field that pyramid and platform were a contemporary unit, as at Structure K-5-3rd. But on placing these on the section (Fig. 7.9) uncertainty results. The rear pit is not so deep as it should have been surely to encounter the pyramid floor, if it had settled, and settling is probable. Floor material (crushed stone) definitely ran under Y a considerable distance, as it did not at Structure K-5-3rd, and as it did at $\mathrm{K}-5-1$ st where the platform is secondary. Finishing plaster could not be identified on the floor here, but this was very scarce and hard to identify anywhere. On

Table 7.7 Structure R-9, Average Dimension Tables: Building (Unit Z)

| Section Table |  |  |  |  |  | Façade Table |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| W | R | $\mathrm{W}^{\prime}$ | Length | Depth | Piers | Doors |
| 1.25 | $1.7 *$ | $?$ | 9.1 | $?$ | 1.0 | 1.3 |
|  |  |  |  |  | 1.6 (center) |  |

the other hand, the pyramid floor may have extended far under the platform as a working surface, as at Structure R-3. Hence units Z and Y may be contemporary, or not. There is no reason to suspect an original pyramid without further construction on it since, so far as we know, an unknown platform may exist within the latest, or have been removed, as happened at Structure R-3,

Whether originally contemporary or not, the R9 pyramid and Supplementary Platform, as we have reconstructed them, are very similar to the same constituents of K-5-3rd. Although the back of both components here had slipped off, there is no specific reason to doubt that the platform plan was intended to form a simple rectangle. The position of a probably fallen specialized corner-stone suggested a depth of about 50 cm more than the surviving depth shown. If these interpretations are correct, the rear wall of the temple was probably no thicker than the thickness (depth) of the piers. Still, a rear projection could have permitted a rear foundation mass for a roof comb on the building, and the plan of the platform (but not its section) would then be similar to that of the platform of Structure J-3 (see site map).

The two-terrace pyramid is long for its depth, judging from mound contours. The length, at the front, is considered certain within narrow limits. Insetting of left corners on both terraces, and the rounding of the lower one are known. A maximum surviving height of 60 cm for the inset corner permits reconstruction of an apron molding of standard proportions, though this feature could not be definitely proved.

The stairways were reduced to debris except at the bases. These, however, give the approximate minimum angles of ascent. For the pyramid this was about 45 degrees. At the left, stones of the second riser indicated standard steps. The upper step, on this basis, theoretically must be double width, and is made so on the analogy of K-5-3rd.

For the Supplementary Platform, a measurement first read as 3 m would require "standard" steps also, or at least a 45 degree angle. A standard step at this site has risers and treads measuring $25-30 \mathrm{~cm}$. But a series of check measurements ( 54 plus 127 less 18 cm ) requires this same measurement to be about 3.8-3.9 m. The note of 3 m was made hurriedly, and there is a suggestion of a tail for the required 9, instead of a zero, in the recorded
dimension. The check measurements are clear and give a minimum ascent angle of about half "standard" of 45 degrees. This is used in the reconstruction, again by analogy with K-5-3rd.

There was no surviving evidence of stair-wall extensions or balustrades. The lowest step of the pyramid stairway survived in good shape to a height of 38 cm at the center only. To account for this we have restored a block behind the altar. The nearest analogy is the block of Structure U-3-1st.

## Column Altar 3

A column altar, No. 3 at this structure, was in position on the pyramid (Unit Z), its back 18 cm forward of the lowest step of the Supplementary Platform stairway. It was nicely lined up with reference to Altars 1 and 2 below (Fig. 7.8). Apparently it had been let into the identified floor only a few centimeters, if any. Excavation to 40 cm below it showed an unexpected slab in the pure rock fill (Fig. 7.9), with three eccentric obsidians on it. It seems unlikely, but possible, that a cache bowl had been present, broke, and that most of the contents worked down out of sight between the rocks of the fill.

The fact that the altar seemed to rest on the floor material which passes under the stairway leads us to reconstruct a secondary pyramid floor. This is necessary if the altar butt was firmly imbedded in the floor, as everywhere else where conditions permit certainty. If so, the altar post-dates the pyramid. We shall find similar late indications at the two other outdoor altars, with additional evidence that secondary floors were laid there. Even so, this altar may be contemporary with that in the building, since the building and its platform may also post-date the pyramid.

## Unit X (Building Platform)

The front of the Building Platform is quite surely correct as shown, unless we should have added a centered step, for which there was no surviving evidence. The height is about 50 cm , the same as the steps of Unit B at the bottom. The sunken panels were badly ruined, leaving no evidence for or against stucco ornament here. Elevation and cross-section of the left panel are at double scale in Figure 7.7. The frontal side outset is certain, its rear corner on the left side having been found, though badly disrupted at the base by roots. The general ruin at the


Figure 7.9-15 Composite section, including Sections E-F, G-H, I-J (9); Section K-L (10); Section M-N (11); Composite section, Sections O-P and Q-R. The latter passes through Stela 25 cist, the stela restored to position (12); Section U-V (13); Section S-T. This drawing shows positions of the two fragments of small plain stela as found in Unit C (14); SectionW-X (15).
top was so complete that all known surviving lines at this platform are shown in Figure 7.7. The side is about parallel with that of the Supplementary Platform and, like the latter, makes a poor angle with the front. Since the depths of the Pyramid and Supplementary Platform are guess-work, so is the depth of this. Presumably it had a rear projection. By analogy with K-5-3rd we should expect this platform, and also its building, to be simply rectangular. The fact that it is not perhaps raises a certain presumption that it is non-contemporary with the rectangular Supplementary Platform. The uncertain evidence is consistent with this. Floor material of Unit Y runs under Unit X (Fig. 7.9), but was exposed under wet conditions. Gray mortar with charcoal was found adhering to apiece of crushed stone, with a trace of thin white finishing plaster. This is first-class confirmatory evidence of non-contemporaneity, but it is hardly conclusive.

The slope of the walls could not be measured with assurance, but the steepest part was at 78 degrees. The sides of the panels seemed to have been vertical; the depth was 19 cm at the base; the back was vertical, or slightly sloping.

## UnitW (Building)

We dug everywhere that clarification of the plans of the building and its platform seemed possible. The ruin was almost complete. In preliminary digging in 1933 the writer removed the fronts of the piers, without knowing it. Fortunately the piers had settled into the floor, or had been based about 10 cm below floor level. As a result, basal stones in the destroyed area were later found in place, except for a corner-stone of each pier.

These stones, indicated in the plan, Figure 7.8, are at the same level as the bases of the surviving rear parts. The disposition of all stones remaining in 1937 convinced us that no front face for these piers had existed behind the line at which they are restored. The exceptionally deep piers are regarded as satisfactorily established, despite our unconscious vandalism and the absence of a vaulted roof.

The remainder of the right pier stood to a maximum height of $60 \mathrm{~cm}, 10 \mathrm{~cm}$ of this below floor level. This is taken as sufficient evidence that piers and walls rose to roof height. Absence of slabs, cap-stones and a maximum room debris depth of 30 cm prove that the roof was non-vaulted.

The right inner wall was reduced to base stones only at the front, probably by our inadvertent vandalism of 1933. Elsewhere it stood two or three stones high, back to a point 2.4 m from the front. Another stone, loose but in line, justifies a minimum of 2.7 m for this wall. If we add 25 cm for a sill, and subtract 1.25 m for the pier depth, we get 1.7 m for the room depth or roof-span, and this dimension is used in the reconstruction. This is confirmed by sunken and disrupted tabular stone in semiposition on the center section (Fig. 7.9).

No other part of the building survived. The use of antae, as at Structure R-16, seems as certain as the uniquely deep piers. The frontal side outset is probably required by the same feature on the building platform. This feature seems everywhere linked with a rear projection, except on the anomalous Structure J-3. We have not reconstructed the rear because the slippage here would have removed all evidence of a possible rear foundation mass. But that the building and its platform

Table 7.8 Structure R-9, Object Table (Operation S-21)

| Position <br> Number | Sherds | Figurines | Modeled <br> Fragments | Cache Contents | Eccentric <br> Obsidians | Miscellaneous |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | -23 |  |  |  |  | Daub-clay |
| 2 |  |  |  |  | -65 |  |
| 3 | -2;-24(?) | -3 | -4 |  |  | Daub-clay |
| 4 | -5-;-7 | -6 |  |  |  |  |
| 5 | -8-;-10 | -11 |  |  |  |  |
| 6 | -1 |  |  |  |  |  |
| 7 | -62 |  |  |  |  |  |
| 8 | -61 |  |  |  |  |  |
| 9 | -63 |  |  |  |  |  |
| 10 | -56 |  |  |  |  |  |
| 11 | -55 |  |  |  |  |  |
| 12 | -42;-58 |  |  |  |  |  |
| 13 | -41 |  |  |  |  |  |
| 14 | -50:-53: | -54 |  |  |  |  |
| 15 | -46:-52 |  |  |  |  | -48 (flint) |
| 16 | -25;-26 |  |  | -27 |  |  |
|  | -29;-34? |  |  |  |  |  |
| 17 | $-15 ;-16$ | $-36 ;-38$ | -37 |  |  | -30 (clay pellet) |
|  | -35;-43; | -47 |  |  |  |  |
|  | -45; |  |  |  |  | Daub-clay |
|  | -49;-51 |  |  |  |  |  |
| 18 | $\begin{aligned} & -32 ;-39 ; \\ & -40-1 \end{aligned}$ | -59 |  |  | -28 | -33 (cinnabar?) |
| 19 | -17;-18; |  |  | -20 |  |  |
|  | -19(?) |  |  | -21 |  |  |
| 20 | -12; |  | -13 |  |  |  |
|  | -22;-31 |  |  |  |  |  |
|  | -44;-64 |  |  |  |  |  |

Note: The number S-21-14 not used: S-21-9 applies to animal bones, S-21-57 and 60 to plaster samples.

Key to Position Numbers
1—In Unit I.; 2_-In Unit Z, possibly intrusive with pyramid altar.; 3—After Unit Z, in or on probable secondary Unit I floor; 4-After Unit Z, same, but probably on the floor, i.e. surface; 5—After Unit Z, same, probably in the floor; 6-In Unit X, possibly intrusive with building altar; 7-In Unit G to in Unit B; 8-In Unit G to surface; 9—In court Floor 1, a few sherds from Unit B or surface; 10_Probably in same floor; 11——In Unit H (lower element); 12—_In Unit C; 13—Same or later, probably before Unit A; 14——In Unit B or earlier (possibly Court Floor 1 or 2); 15—In Unit B or surface (probably not surface); 16-In Court Floors, probably intrusive; probably not before Unit B; 17—_In Unit B or surface; 18_-In Unit A or surface; 19_-In Court Floors, contemporary with court altar; 20-Specific locations not noted.
were in general of Petén style, with side outset and probably projection, seems fairly certain.

## Column Altar 4

There can be little doubt that this final column altar was set upright in the room floor at time of abandonment, but moved slightly as the rear of the room sank (Fig. 7.9). It would have been lying on its
side if it had been torn out before the collapse. Its position in the plan is off-center with reference to the door (Fig. 7.8). This is easily explained if the room is correctly restored on the parallelogram principle. It was found on the axis of such a reconstructed room, which is not at a right angle to the façade line. Two or three sherds, but no cache, appeared below the altar.

## Discussion by Phases - Series Two

## Series Two, Phase H (Court Floor 2, Unit J)

These units [are] the same as those of Series One, Phase C.

## Series Two, Phase G (Units I, H)

Excavation for the form of these early units was sketchy.

## Unit I

The center section showed that this high platform was served by a standard stairway, probably rising from the court in one flight, though we did not get to the lowest two steps (Fig. 7.9). Our reconstruction of it is given in Figure 7.1, where the position of the pyramid stairway is indicated in outline. We do not know when the pyramid and its stairway were built, but are sure it was in a phase later than this. The outline is placed on Figure 7.1 merely as an aid in following the changes in the platform.

Nothing is known as to corner design. The Petén style is reconstructed as the most likely, since it occurs in a similar situation, and with a similar degree of slope, on the early Structure K-5-4th. Where the right end of Unit A later formed an angle with it, it was followed to court level. There was some slipping of stones at Unit B level, suggesting a molding in the face of Unit I, but there is little doubt that it here rose as a single plain terrace as shown.

If all of it is a contemporary unit as restored, it formed in this period a suitable basal platform for the pyramid Z found on it, or for an earlier one which may easily lie buried within. But it is long enough for early palace structures and may be deep enough for a group of them. Nothing interferes with dating the pyramid Z immediately after the unit under discussion, but evidence fails.

Floor material of the court seemed to run under the front wall, and this unit may mask still earlier structures. The slope of this wall, as measured for a height of only 50 cm at the base, was about 69 degrees. A 74 degree slope higher up had probably been caused by fill pressure.

As already stated, in this and other isometrics we have indicated the outline of part of the base of the pyramid (Unit Z), though it was almost surely later than Unit I. This is to help visualize the fact that a single axis for buildings and stairways may have been used throughout. Also, this line forms a key permitting superpositions of tracings of earlier period figures on later ones. By adding in another color the lines showing through, and erasing those parts of black lines enclosed by colored ones, a drawing can be obtained showing what part of the later unit is new construction.

## Unit H

This low compound platform is known only at its left end, as indicated in Figure 7.1. The relation of its back to
a later extension of the Unit I stairway, that is, to Unit G, is shown in Figure 7.11. This, and the absence of a rear wall of Unit H a few meters away at the center section (Fig. 7.9), seem to justify the nearly square form shown. There is the possibility, however, that it extended across the Unit I stairway, with a rearward extension covering the lower steps. In that case, Units H and G ' in Figure 7.1 would form a T-shaped unit, and G (Fig. 7.2) would be a modification of HG'. This alternative possibility is entirely consonant with Figure 7.2, but would not affect the number of sequences. Relationships to court floors seem definitely to rule it out. As shown, the little platform might have served for a small stela, and can date before, with, or after Unit I.

The upper component of this low platform seemed to slope very slightly. It seemed to be contemporary with the lower element, but was not cross-sectioned. This lower element, at its left, runs about 14 cm under, and therefore predates, Unit E. It rests on the earliest of the two court floors, as does Unit E except for this overlap. At the center axis, the lower element of G' (Fig. 7.2) rests on the upper of two court floors. It is not there a structural unit with the upper element, which runs down behind it to the same upper court floor (Fig. 7.9). At the left, the upper court floor contained "unusually large" crushed stone, and at the center it was recorded, at a different time, that this stone was "fairly large". If the upper court floor at each point is a continuous contemporary unit, then this platform, H must have ended somewhere short of the center axis, as restored. Probably both Units H and I rested on the same early court floor.

The surfaces of upper and lower elements slope noticeably downward toward the front, and the lower one also slopes noticeably down to the left.

## Series Two, Phase F (Units G, G')

The modification of the Unit I stairway shown in Figure 1.2 is fairly sure. The front part of the double scale elevation shows how much of the end was seen at the left, and the rear part shows the same molding, which was seen on the right side running out from Unit I, as if seen on the left side. The cross-section of Figure 7.11 shows clearly that the original steps, above the third, had been extended laterally; these extended steps rise from fill behind Unit H in this section. The floor material of Unit G, resting on this fill, ran to and over H, but under F. Bits of finishing plaster under Unit F confirm this evidence that it is later than G, structurally at least, and Unit G must be later than Unit H . The wing-like stair-side extension or balustrade rests against and partly on H. Its base is 90 cm forward of the steps, a distance much exaggerated in the isometric figure. The surface of the platform G, G', H is entirely unknown, but surely in this position it did not support a building, and we have called it a stage.

The top part of the stair-side extension is highly theoretical. At the left it was cut off by the Maya nearly 50 cm lower than necessary to make way for Unit A, but not low enough for submergence by Unit B. Curiously, at the right the buried stairway extension was not found where expected. The molding on the outside extended only 80 cm forward of the terrace. Ancient stone-robbing there is indicated.

A thick sheet of plaster was in place on the left side of G, though it soon peeled off from the upper part of the stair-side extension. It converted the rectangular molding into one with a curved section, and curved out at the base. The sharp lines of our drawings are misleading in this respect. Surface of the plaster was rough, as if weathered, even at the deeply buried base.

The main body of the stage, as known at center, seems to be a continuation of Unit H , to which it corresponds in cross-section. This part also is known to be later than H because it rests on the later of two court floors, while H rests on the earlier (Floor 2). At the center, the upper element runs down to this floor, behind the lower element (Fig. 7.9). We have assumed that the sequence between them is merely a structural one.

There may have been an early unit corresponding to H , on the right side, in which case G' merely joined two balanced units. In any case, the effect of this stage and stairway modification was a unifying one. It may be noted that from this time on some sort of stage always lay before Unit I (see Figs. 7.2 to 7.7).

## Series Two, Phase E (Unit F)

Only the left end and about 1.5 m of the back of Unit F were uncovered. Stone robbing is indicated (at the later time of Unit C) because upper courses were missing toward the front. Evidence that this unit J was square, or at least short, is absence of its walls at center (Fig. 7.9). Evidence that it post-dates Units G and H has been stated. Its surface was not investigated. Placement of the small plain stela on Unit F is hypothetical (Fig. 7.3).

## Small Plain Stela

We shall describe the stela here. It is shown in the photographs of Figures 3.7a, 3.7b and 3.7c. The top fragment, 63 cm long, hence a heavy stone, formed the top of the retaining wall of Unit C , being placed there in Phase C. The bottom fragment, 1.4 m long, was found in the otherwise pure rubble fill of this unit, behind the wall which utilized the upper fragment. The latter is visible, in position, in Figure 21. The lower fragment lay with its butt end forward. Both fragments are indicated, not very realistically, in the cross-section of Figure 7.14.

Considering the monument in its original complete condition, the sides, by no means perfectly straight, taper from a maximum width of 40 cm at the top to 38
$\mathrm{cm}, 1.4 \mathrm{~m}$ from the top, after passing a lesser width of 36 cm somewhat above this. From here down the taper increases, the width dropping to 34 cm in 25 cm at a point 40 cm from the base, and to 24 cm at the base.

The top was a nicely worked flat curve, tool marks being plain. It produces noticeable ridges where it meets the sides. Tooling was apparent on one side to about 39 cm above the base. This side was nevertheless uneven and wavy. It showed possible traces of original plaster, in addition to plaster from the wall against which it lay, but this was very doubtful, and probably was lime deposited after burial in the fill.

While the stone was by no means in good condition, and one face was smoother than the other, it is regarded as certain that it was never sculptured. The following note was made on the spot: "The best side (face) is flaked and perhaps eroded, but not much, no sign of erosion of sculpture. On the right side rough tooling is apparent, but the surface nevertheless is wavy."

The indications are that an exposed piece of laminated stone was split off from its bed and the smoother split-off face used for the front. While the top was nicely cut to shape, the makers did not invest their time in the requisite amount of fine dressing to get straight sides. Probably the quarried piece tapered to start with, for there is no evidence that the butt was purposely made so narrow. The thickness is uniformly 21 cm to a point 57 cm from the base, where it begins to thicken to 29 cm and then drops to 25 cm so that the base is square. Of the total length, 2 m , probably no more than 1.5 m showed, above the surface, when in position. This monument was therefore narrow with a flat-curved top, in these respects like the supposed Stela 45 at Structure R-11. The widths correspond almost exactly.

The re-used stela here is important in three respects: it seems to establish the relatively early use of plain stela, the existence of which at this site had been impliedly denied by Morley; it shows that such stela could be in general quite crude, at a time when better work was possible; and it shows that they could be very small. In addition, it can be argued that the tapering of stela occurs in an early context, but this may be unintentional in this case.

## Series Two, Phase D (Units E, $E^{\prime}$ )

The right end of this compound stela platform was followed back till it ran under the upper step of the later Unit A. Figures 3.1, 3.3 and 3.4 show its stratigraphic position before Unit D and after Unit H. A comparison of Figures 2.1 and 2.2 shows our reason for believing that it followed Units F and G. The stela platform is crowded against G and hides its ornamental molding from almost any point of view. If Unit F was a platform for the small stela later broken and re-used near it, the crudeness and


Figure 7.16 Small plain stela. Double rule measures 21 cm .
diminutive size of that monument suggest it was earlier than Stela 25. The front wall of Unit E rests on the upper of two court floors, while Unit H is based on the lower.

The front of Unit E, or of its secondary facing D (Fig. 7.5), was followed for a distance of only about 4 m from the corner. If the platform was at first long enough to accommodate Stela 26, the cross-section of Figure 7.13 should have been repeated in front of that stela. Instead we found the section of Figure 7.15. Here Unit B', which lined up well with the top of E or D in Figure 7.12, did not run down behind the latter stepped Unit B ; nor did floor material of Unit B seem to run under it. We have no reason to suspect Unit B is not a single contemporary construction. With B post-dating E at the right, contemporary with what corresponds to E at the left (i.e. with B'), we have good reason to reconstruct this platform as in Figure 7.4.

Stela 25 almost certainly fell from Unit E'. At the right, opposite Unit G, the buried end wall of Unit E was in good condition, full height. Its slope is about 81 degrees. The front was not in good condition. It was nearly vertical, probably due to fill pressure.

## Series Two, Phase C (Units D, C)

For some reason the front, but not the side, of the Stela Platform E was provided with a new wall, placed against
it like a veneer about 25 cm thick. This is called Unit D (Fig. 7.5). Maximum surviving height of 1.5 m indicates that it ran to full height. This may be compared with Unit D at Structure R-11b. Its end is flush with the end of the original platform, so that it forms a new well-made corner overlapping the lower element of Unit H. About 10 cm behind the corner a new wall was added to connect with the upper element of Unit H , and the area behind filled and surfaced. Whether D and C are contemporary or not cannot be said. No plaster survived to help. Unit C is at least structurally the later.

The top of this little piece of wall was formed with the top fragment of the small plain stela (Figs. 7.14 and 7.15). The rest of the stela formed part of the fill behind this wall. The fill supported an extension of the surface of Unit H, which now ended against Units E and D.

It is easy to imagine, as we have done, that the small stela had stood on Unit F and was now removed as obsolete, its probable painted inscription perhaps badly weathered. It would have been a natural time to eliminate the little blind alley between Units G and H. If the stela had not stood nearby, why should the larger piece, a very heavy stone, be moved without further breaking-up to form part of an otherwise small rubble deposit? The only logical flaw is the fact that the supposed stela platform for it (Unit F) was not also removed and used in this fill (see Figure 7.5).

At or before the time of Unit C, the left end of Unit H , toward the front, lost the upper stones of its upper element. Either Unit H had fallen to ruin, or more likely, was robbed for building stone for Unit C. The floor of Unit C passed over the broken part, ending at the side of Unit F; to the rear it must have merged with floor material of G. The possibility that Unit G and C floors were a contemporary unit is ruled out by continuous plaster on the side of G, from well up on the stair-side extension down to base level at this point, well below the C floor.

There is a certain probability that the minor change represented by Unit D was incident to a general rehabilitation of the court. The upper court floor lies structurally in time between Units E and D, and may have been contemporary with the latter; if not, it would be another unit in the sequence, or might go with Unit C; but it must precede Unit B. It is hard to see any function for Unit D, except as an extensive repair, and the same applies to the floor. If an assumption that Unit B is all of one piece is correct, and the evidence of the section in Figure 7.15 justifies seeing Unit B' as contemporary with it, then the Unit D and the supposed renovation occurred between the erection of Stela 25 and 26, that is, according to Morley's readings, between 9.8.15.0.0 and 9.9.15.0.0.

It is not impossible to assume that new floors were laid on the basal platform (Unit I only at this time) and on the pyramid-top (Unit Z) at this same time, but, unlike the court floor, there is no definite evidence for dating those apparent repairs.

## Series Two, Phase B (Units B, B', B")

The simplifying effect of the Unit B construction, its probable unity with parts of the stela platform called Units B' B", and with the basal platform of the neighboring temple Structure R-10, have already been pointed out; note also its failure by 10 degrees to be parallel with the R-9 pyramid. Its visual effect is something entirely new at this locus. As we have interpreted the fragmentary evidence, at Structure R-9 stepterraced Unit B submerges the little platform F and all but the upper steps and stair-side extensions of the rather complex stairway GGI H (Figs. 7.5 and 7.6). Its sequential position is shown in Figures 7.9 to 7.15. If our uncertain belief that Units B and B' B" are contemporary Is correct, Unit B was presumably built at the time of erection of Stela 26 on Unit B", about 9.9.15.0.0 according to the Morley reading.

The maximum surviving height of a step-terrace face (the lower) was 40 cm . The lowest four steps of Units B and A, at least at the left of A, taken together, had to reach the height of Unit $\mathrm{E}, 1.7 \mathrm{~m}$ above the upper floor. Allowing 13 cm for slope of the surface, this would make an average face height of 40 cm , as observed at center.


Figure 7.17 Masonry of pyramid (Unit Z), lower terrace at junction with stairway.

However, there the base of the lower step of the later Unit A was 1.1 m above the upper floor, requiring faces of about 50 cm for the Unit B steps considered separately. Probably the Unit B steps varied between 40 and 50 cm , increasing toward the right. We have called the Unit B height 1.1 m instead of the minimum measured 1.1 m , to avoid a false impression of significant accuracy.

The base of the plaza column altar (No. 1) was only 2 cm below the base of Unit G' at a point about 1.4 m behind the face of B. Unit B, of necessity, must have rested on the upper court floor, here disintegrated, since the earlier G' is on the upper floor. The wall of Unit B had settled considerably here, as indicated by careful drawing of all center-section units. On raising it the required 12 cm and extending the upper floor at this level, the butt of the altar would be buried only 14 cm by the upper floor, less if the altar also had settled. The lower floor surface, identifiable 2.9 m distant, was 8 cm below the upper. There is thus a probability that the altar base was 6 cm or less below the lower floor surface. This is much less than the amount of penetration of similar altars in known cases. The altar was probably set in the position found at or after the time of the upper floor, that is after Unit D, which was probably after 9.8.15.0.0. Presumably a hole in the lower floor (or in both) was made to accommodate the lid, here used as a cache bowl, and two shells beneath it.

A second cache, the bowl and lid broken to sherds but obviously in semi-position, was found on bedrock (Fig. 7.9). Its center was about 20 cm forward of Unit B and 13 cm left of a line joining the court and basal platform column altars (Line c-d, Figure 7.8). Thus there is a probability that it was originally placed under a column altar or other special feature which was centered with reference to the pyramid, or to some earlier construction
on the basal platform having the same lateral position. Bedrock was here only 17 cm below the level of the base of Unit B which, as we have seen, had probably settled about 12 cm . This is quite possible since the bedrock drops sharply between the cache and the wall. If we raise the wall it would be 29 cm above the base of the cache. Subtracting 8 cm for the upper floor thickness, and about 15 cm for the bowl and lid, would leave the butt of a column altar only 6 cm below lower floor level, even if the lid was in contact with the altar base. Hence, if a subaltar cache, this also probably dates from after Unit D.

If placed in time with or after Unit B, the cache was close to the step behind it, like all those on higher levels, and perhaps column altar 1 was placed here and later moved forward and provided with a new cache. The fact that only these two complete caches were found under, or possibly originally under, altars, with four altars present, tends to link them in time. A Unit B or later date for both seems the best guess. Disruption of floors made sure dating impossible.

The caches and column altars are described in the section under those heads. Stela 26 is considered to have fallen from Unit B", a hypothetical extension of Unit E'.

## Series Two, Phase A (Unit A)

Apparently the esthetic function of this unit was to complete the obliteration of the stairway $\mathrm{GG}^{\prime} \mathrm{H}$ and integrate the basal and stela platforms as much as possible (Fig. 7.7).

On the altar line or center the upper court floor was carefully measured as 2.6 m below the basal terrace floorheight at the pyramid stairway base. We have called this 2.6 m for the Unit I tabulated average height. An allowance for 20 cm of forward slope in the considerable distance to the front edge seems probable, and we have called the Unit I height 2.4 m at its face. Evidence of bad settling of the Unit A upper step is present. Its base was below the surviving


Figure 7.18 Masonry of pyramid stair, side wall.
top of the next; and at the left it rose 25 or 30 cm within a distance of only 1 m to rest on the top of Unit E and abut E' (compare the settled step stones with the restored position, Figure 7.5). The base of Unit A, center, was 1.3 m below the assumed front height of Unit I , so that the three Unit A steps could have been about 40 cm each in height. If, however, they agreed with the Unit B steps at this point, and were 50 cm each, the top of Unit A at the front would be 20 cm higher than the face of Unit I. This would require that the old basal platform be refloored with a surface continuous with Unit A.

In Figure 7.9 this is indicated, with an additional 10 cm for the floor, as probable. Without such a floor the amount of penetration of the basal platform altar, 10 cm , is too little for known cases of similar altars; with such a floor, and dating the altar as of this time or later, the penetration could be normal. In addition, excavation to the left of the pyramid stair showed a 30 cm deposit of sherd-bearing material devoid of building stone. This lay on the crushed stone of the Unit I floor, though a dividing line could not be identified. It contained pockets of crushed stone at the bottom, and practically all sherds were reported as from the middle of this deposit, that is about 15 cm above the level of the pyramid base. On the spot, the sherds were listed as "from above (the Unit I floor) or else on or in a secondary floor." These sherds included Alta Verapaz Carved Orange Ware, a type which, wherever found, has had to be classified as surface, meaning, as here, that they may have been left on the surface at the time of abandonment. If that is the true fact here, the top of Unit I must have received a thick new floor.

The base of Unit A projects 1.9 m from the Unit I wall against which it is built. The isometric drawing exaggerates the projection because, contrary to fact, it assumes that the faces of both are parallel.

There are three step-terraces, the third set back to form what may be called a separate stage in front of it. In


Figure 7.19 Masonry of building platform (Unit X) and ruined piers (UnitW).
clearing the surface of this an eccentric obsidian was found close to the altar axis. These objects are usually found in caches. Floor material as such had here disappeared and this may be the remains of a cache. Caches, in turn, are usually (though not always) found under or at the base of altars or monuments, so it is not impossible that the stage of this unit at one time was so marked.

## Measurement

The partial plan of Figure 7.8 is based on a few surveyed points, and taped measurements from them. The step faces of Units B and A were identified at many more points than the use of broken lines suggests, but most of these exposures were not accurately located. There is no reasonable doubt as to the, continuity of those faces in the reconstructions.

The direction of a step of the extended stairway IG (Fig. 7.2), known by two points, at center and end, is nearly parallel with the pyramid (Unit Z); that was therefore probably laid out carefully by linear measurements from the face of Unit I, or from an unknown structure within, similarly laid out. Errors in estimating right angles in measuring back from Unit I would show little effect on the pyramid direction, if made near its two ends. Why then should the faces of Units B and A (Fig. 7.8) be about 10 degrees out? The face of the stage HG' (Figs. 7.2 and 7.12) was the easiest base from which to lay out Unit B. Unlike the steps, the face of the HG' stage shows the same discrepancy, as known by points at center and end. Presumably an error in measuring out from Unit I was made at the time of this stage, and this affected the later Unit B, and this in turn Unit A.

The evidence of linear measurement combined with estimated right angles is fairly clear higher up. For the Supplementary Platform, in reconstruction we have assumed a forward bulge at center, such as was noted on the K-5-3rd pyramid. For the building, the façade line is somewhat weak, due to our destructive early excavation, but the surviving evidence makes it parallel with the base of the building platform. The right inner room wall fails of a right angle to this by about 5 degrees. Having established parallelogram asymmetry elsewhere, (especially at Structures R-11, K-5 and R-16), the position of the building altar, its center behind a point about 30 cm left of the center of the doorway at the façade line, confirms the parallelogram room reconstruction of Figure 7.8. The center of the doorway, at the façade, and the altar, form corners of an accurate parallelogram with the left wall of the room forming one side.

The line a-b (Fig. 7.8) is drawn in both directions from a point at the pyramid base, at right angles to it. This point is below the center of the stairway at this base line. A small portion of the right stair wall was found, though above floor level, for this purpose. We do not know how nearly it may be the center of the pyramid. The left stair wall, known at the base, is about 5 degrees short of the intended right angle. Unless the right stair wall converges, this a-b line cuts both
upper and lower steps from 35 to 40 cm off center. Yet it touches the court altar and passes directly through the basal platform altar, both of which were accurately located by us, and through the other two altars, less accurately located. The pyramid altar is located from a surveyed point by short linear measurements involving estimation of a right angle; but the lateral error could scarcely be more than a few centimeters. This a-b line passes about 20 cm left of center of the center doorway at the façade, and happens to strike the position of the building altar.

It seems probable that the lower altars were located laterally by sighting to a center point higher up, which may have been measured. The pyramid altar may have been at this point, or located also by sighting. This need not have been done all at one time. Once one lower altar and an easily findable center point (such as in a doorway), or any two altars were established, sighting over them would make accurate subsequent placements on the same line easy and natural.

The line c-d joining the centers of the two accurately located lower altars passes through the center of the doorway, or a few centimeters to its right, and our inaccurate manner of locating the pyramid altar would permit a shift to this line. Sighting from or to this center for altar location, or over existing altars for lateral building location, is distinctly possible. Our a-b line, an arbitrary one, passes about 20 cm left of the door center and happens to join the three upper altars as placed on the plan.

The building altar is on this line, and its position, by triangulation from points later surveyed, is reliable. But it could not very well have been sighted from below, and its position has been satisfactorily accounted for by independent measurement. It probably was placed before the middle of the rear wall of the chamber, hence is affected by parallelogram distortion.


Figure 7.20 Pier masonry of building (UnitW). Right (NE) side of right pier. Front portion torn out except for two base stones.

## Column Altars and Caches

Since all exposed floors were disrupted or at least without surviving plaster, there is no sure means of dating the altars and two caches with reference to the structural units, except that placement of those on platforms was at least as late as the platforms. But we have developed strong hints that the three outdoor altars were late in the respective sequences. All altars were exposed at the time of abandonment, and presumably in use at that time.

We have some hope of working up a typology of column altars at this site. While they are all similar, and generally show evidence of fire, they are by no means all exactly alike, either in form or size. A detailed account of the four found here, with exact measurements, is deferred to a later section in which all from the site will be presented together. Only Column Altar 4 of this complex, in the temple building, was complete. Its total height was about 48 cm , exposed height probably about 30 cm . In cross-section at the top it was an oval flattened on one side, the long diameter about 33 cm , tapering to bottom diameters of 25 by 25 cm . What was left of nos. 1 to 3, respectively on the Court, on the Basal Platform and on the Pyramid, indicates stones of about the same size and form. Enough survived to show tapering on nos. 2 and 3 , and no. 3 showed the flattening on one side. Here it was certain that the flat side faced front. Only 4 was sufficiently preserved to yield evidence of fire, which was clear; but the uniformly bad condition of the others, above the portions let into the floors, is itself fair evidence that they had been softened by heat. This is not, however, conclusive, since all were of limestone and all except no. 4 were always outdoors.


Figure 7.21 Masonry of Basal Platform Units; relationships of Stela 25 (right) and units B, C, and E. Man stands behind Stela
25. Faces of Unit B are in foreground. Behind them this unit has been excavated to show end wall of Unit E. A stick rises from Stela 25 cist (left top of picture). Top of Small Plain Stela shows in situ behind upper step-terrace of Unit B a partly opened rule crossing horizontally from one to the other. Front face of Unit E is hidden by ruin of Unit D.

It is planned also to describe all caches in detail in some one place. The cache under Column Altar 1, on the court floor, consisted of eccentric obsidians and eccentric flints; small worked pieces of jadeite, not carved or engraved, some possibly tools, and pieces of pearly univalve shell. The container was an inverted pottery lid; immediately below this were two large univalve shells.

Behind this and in front of the lowest Unit B step was a plain simple-silhouette cache bowl with lid. Besides the usual eccentric flints and obsidians, this contained a thorny oyster shell, and pieces of jadeite, some similar to those of the other cache, others engraved.

Stray eccentrics suggest the disappearance of caches into the fill on the Unit A stage floor, and below Column Altar 3. Details concerning exact placement of altars and caches have been given in describing the units containing them, together with speculations as to their dating.

## Decoration

No signs of stone sculpture, other than on Stela 25 and 26 , nor of stucco relief or painting, were encountered. Evidence of stucco and painting might easily have disappeared. One should reckon especially with the possibility that the sunken panels of the Building Platform (Unit X) were painted or contained stucco reliefs. They were too much destroyed to say whether or not protruding stones for stucco support may have been present. In any case, they might have been unnecessary for stucco in such a small enclosed space.

## Ceramics

Pottery from this operation will be considered in the section on ceramics, and has not been studied except in a preliminary way. The quantity recovered is small, and most sherds were too small or weathered to yield information as to form or decoration. However, there is enough to confirm our supposition that Unit I is quite early. Floor 1 almost certainly contained a beveled orange rim-sherd attributable to a flanged bowl, and another, with the flange, comes from the fill of Unit I. A speckled maroon sherd comes from within Unit H, lower part. This maroon paint and also flanged bowls appear at the beginning of the long Acropolis occupation. The latest ceramic types are represented by Alta Verapaz carved orange and gray sherds, some surely, others possibly, surface finds, as everywhere at the site. A fragment of a pottery drum, from Unit B or later, duplicates a form at the time of abandonment on the Acropolis. The ceramics, pending thorough study, can be said to indicate that the Structure R-9 architectural sequence began very early in the history of the site; they tend to confirm the supposition that changes were made before and after 9.8.15.0.0, and that the complex continued in use down to the time of abandonment.

Intermediate types are present, including negative painting, probably from Unit $C$, and what seems a vestigial flange from Unit B or later. There is good reason to suppose that a major excavation here would produce sherds in reasonable quantity well stratified by building sequences, and very likely with rich early dumps at the bottom.

Four reasonably complete figurine heads, moldmade, were recovered. One, of the large flat Mexicanoid type, was deposited later than Unit Z, presumably in a secondary floor on Unit I. This rare type occurs at the beginning of the Acropolis series and suggests that Unit Z be inserted early in the longer sequence. Two grotesque heads, and a typical Usumacinta head, except for bulging forehead, come from Unit B or later.

## Dating

It must be remembered that our use of Stela 25 and 26 in connecting certain units with the Maya Long Count depends on the unproveable assumption that these monuments have not been moved here from somewhere else. Such movement is especially unlikely at Piedras Negras because of the presence of other monuments of the same general period in the same courts.

We have used the presence of a plastered floor to indicate non-contemporaneity with a unit placed on it. Apparently this would be erroneous in the case of freestanding walls at an early period at Uaxactún, and on an early Acropolis horizon here. But one doubts that in building substructure elements a lower one would be surfaced with plaster just before a large part of it was to be buried by the evenly distributed fill of the next higher element, such as Unit F on Unit G, and Unit Z on Unit 1. Our excavations at Structures K-5 and R-3 indicate that working surfaces may or may not develop between lower and higher elements of substructures, but that plastering was done last.

The two series of phases worked out utilize all available stratifications, and we have placed the platform of Stela 25 about in the middle of the longer series, and that unit seems well dated at 9.8.15.0.0. But in this particular assignment judgment and reasoning had to intervene. Building activity on this spot probably began at an undetermined but considerable time before the above Maya date, and extended a considerable but undetermined time after it. But even this vague dating of architectural features cannot be claimed to be absolutely proved.

## Function

In considering the use of this complex our artificial grouping of units in two series must be abandoned. From the time of the pyramid on there can be little doubt of the temple function, lower units then combining to form a
basal platform. Before this we have no information, since we did not penetrate the pyramid sufficiently to find out what sort of building was first placed on the early platform unit.

It is a reasonable guess that the Supplementary Platform, plain rectangular so far as it survived, supported an earlier building of simple rectangular outline. If so, there may at that time have been a close correspondence with Structure K-5-3rd, except that the platform and temple were of normal size. It remains possible that originally there was an over-size temple building with its platform, later removed from the pyramid, though these could not have been so large as at Structure K-5-3rd. I do not think that any of these possibilities lessen the probability that the pyramid unit was first constructed for temple purposes. This is positively indicated by its Petén style which, at this site, seems to belong to temples only. Petén style elements also appear on the building platform and therefore probably were present on the building. Temple function in the final phase seems guaranteed by the line of column altars, extending from court to building.

## Future Work

The almost complete ruin of the pyramid and higher units makes this complex especially suitable for deeper examination. With an anchor in the Long Count and early-to-late ceramics, and a strong probability of encroachment over early wooden-and-daub-clay architecture in the area most suitable for the original settlement, major excavation of this structure, with more extensive sampling operations to its rear, is indicated. Steam baths and palaces with nonvaulted roofs and a new minor type of substructure have already been identified there (Structures S-4 and S-19, S-17 and S-18, and S-5 respectively). The best chance chronologically to relate this intensely interesting group of the Southeast Section to the chronology of the Long Count lies through Structure R-9 (Tables 7.1 to 7.8).

## Masonry Notes

## Fills

Pure broken rock, Units IZYXGG'C. Also noted in BB'; but elsewhere in Unit B as solid. Infiltration of floor material and surface earth may account for this. Fill stones small in C, probably in X, elsewhere probably medium to large (memory as to size). No excavation was sufficient to detect fill walls, except by luck, and none was noticed.

Walls
Too much ruin and exposure to expect chinking and mortar survival. Notes or photographs justify describing following units as of rough tabular stone of variable thickness: IZYXW and G'EDB. "In-and-out" bonding at
corners of Unit E and on the piers of UnitW seemed quite clear; these were the only outside corners sufficiently preserved to show it.

## Concrete

Floors of all periods were presumably concrete: evidenced by surviving layers of crushed stone, except for the exposed Units B and A.

## Plaster

Thick gray with white finishing plaster noted on Unit G wall; it had colored the whole fill of Unit A next to it. A fragment of thick gray, with white finishing plaster
surface, was found in the crushed stone of the Unit Y floor, where it was settling badly and was buried by Unit X . If found, gray or yellow color should have been noted on Unit G floor, where buried by Unit F, but was not. A fragment of finishing plaster recovered here shows that white finishing plaster was used on the G floor as well as on the wall. Thick yellow plaster was seen on Unit 1, below Z, without discernible finishing plaster; the color of the crushed stone of the lower court floor (Floor 2) was noted as clearly yellow, where seen below Unit G'. There was nowhere any sign of stone temper in the plaster seen, such as occurs elsewhere in this group. The Unit C floor was noted as surfaced with gray mortar.

# Ballcourts 

Linton Satterthwaite

## Ballcourt Terminology

The two ballcourts at Piedras Negras to be described in this Part differ remarkably in details which must have greatly affected the style of play. These differences are to be seen in cross-sections of the respective structures, and such cross-sections have very properly been made a chief basis for a typology of Middle American ballcourts. In 1932 Blom distinguished two types of courts by crosssection criteria, with a third depending on the material of supposedly always used rings (Blom 1932:516). Acosta (1940:188-190) has distinguished three types, using cross-section criteria for each, though linking the ring with one of them only. Acosta's Type A seems to include Blom's early and second stages; at least it would do so if subdivided to allow for presence or absence of permanent stone rings. Our Structure R-11, without stone rings, clearly falls into Blom's early stage type, and Acosta's Type A (Figs. 8.6a and 8.6b).

Acosta's Type B was unknown when Blom made his analysis, and is announced as a new type. His Type C is the same as Blom's "last development," the type of the great court at Chichén Itzá. Acosta properly, I think, notes the paucity and confusion of data and the danger inherent in present attempts to deal with the questions of ballcourt origin and evolution. Surely, as he assumes, a proper approach to these fundamental problems is proper classification of each new court on an empirical basis, as it becomes known. Our Structure K-6 is not of his Type-A or C; and one must decide whether it is Type B, a new type, or whether it should be considered a variant of Type B.

This Piedras Negras structure (K-6) was apparently the second of its kind found in the Maya area, and the first of this sort to be recognized as a ballcourt, but it is now by no means unique. Its correspondence with others can better be noted if we adopt the device of numbering the inner surfaces of a ballcourt structure (of whatever kind), beginning with the surface which rises from the field between the twin structures. This reverses the direction of Blom's device of lettering them A, B and C, in order to allow for more than three surfaces which may have affected the play. A fourth surface is sometimes present.

The vertical nature of surface 1 on our Structure K6 , and (as a probability) of surface 3 , was noted in 1932; at the time a somewhat garbled interpretation of Structures 9 and 10 at Copán as a ballcourt should have allowed for verticality of surfaces Nos. 1 and 3, and a sloping surface no. 2, plainly indicated in a sketch by Gordon many years ago (Satterthwaite 1933b:21-22). This vertical-slopingvertical combination was established for Structure K-6 in 1933, but is now published for the first time (see Figs. 8.19 a and $8.19 b$ ). It was soon noted at Uaxactún by Smith (1938:4). Similar brief notices of others in the Maya area describable in this manner have appeared since. They differ from Acosta's Type B court at Tula in that surface No. 1 is vertical, but agree, in the sequence of slopes, with the court at Yucununahui, Oaxaca. I think Acosta means to include the latter in Type B. But the sloping surface No. 2 in the Maya courts mentioned is not nearly so deep as at the two Mexican sites, and the structures are much shorter.

It is quite clear that this vertical-sloping-vertical type of cross-section is of fairly wide distribution in the central and southern parts of the Maya area, at least. Whether it should be considered a variant of Acosta's Type B is a question I should like here to leave open. But it is clear that both of our courts must find their places in an eventual general classification of Middle American courts; and presumably these in turn will eventually be compared in detail with ballcourts in the Antilles, as well as with structures interpreted as ballcourts in the southwest United States. We ought therefore to use terms which will facilitate such comparisons, and such as now seem to have a chance to survive changes in tentative classificatory schemes. Such changes must surely come as classifications are extended to cover new data, or refined to make sharper distinctions.

Beginning with the early sources, ballcourts have often been described too simply, and Blom's example of carefully labeling each playing surface should, I think, continue to be followed in principle. But numbers or letters, constantly used in other connections, do not stick in the memory. Blom did not use his letters in finally describing his stages.


Figure 8.1 Isometric reconstruction: Structure R-11-2nd-B (Units M, Ln, Ls, Ka, Kb, J, and J') Structure R-11-2nd-A (Units I and I'). Letters refer to units of construction described in text.

The definitions below are chosen with known and possible function in mind and with an eye to wide applicability, ease in memorizing, and, in most cases, to the clear limitation of a term to a particular part of the complex. Current terms are retained if thought consistent with these objectives. The major omission is "side wall" or "wall," sometimes used as if there were only one wall per structure to be considered. The most radical innovations are stop surface (which ought to be bettered by someone), "apron," and "bench-top." Using these, Acosta's Type A is one including a level benchtop and apron, and his Type B is one including a sloping bench-top and vertical stop-surface; his Type C is one including a level bench top and vertical stop-surface plus rings. All include the bench (as that term is used here).

## Terms as Used in this Report

## Ballcourt

As used here, a symmetrical or quasi-symmetrical arrangement of surfaces in more than one plane, especially
designed for the playing of an aboriginal game involving the bouncing of a rubber ball against some of these surfaces.

## Ballcourt Structure

A construction with a playing surface or surfaces adjacent to the central field: the main range of Pollock (1932:109). Typically in Middle America there are two such structures, one on either side of the central field, their ends also partly delimiting end fields. Distinguished from end-field structures or walls, which may or may not be present and thus further outline end-fields. A ballcourt structure may be called simply structure when only ballcourts are under discussion.

## Bench (of a Ballcourt)

An element of a ballcourt structure providing two playing surfaces, a face rising from the central field and a top connecting with a third playing surface, which latter may or may not be the limiting or stop-surface. Distinguished as level-top or sloping-top benches. The face may be sloping or vertical (see also ramp). Under the definition
adopted the bench may be comparatively insignificant like the low sill at Cobá (Pollock 1932:110), or provide most of the playing surface of the structure; it includes the "terrace" of Blom and others, and the "platform" in our Preliminary Paper 2.

## Capital I

Same as preferred Double T. May be modified by partial, complete, etc. Properly applicable to representations of ballcourts in native manuscripts and to many actual courts, but not to others with one or both end-fields open.

## Double T (see also Capital I)

Term used by Acosta, perhaps by others, to represent the outline of delimited end- and central fields taken together. Preferable to I since T can be used for courts with one open end-field and one delimited end-field. Modifying adjectives can be used, such as partial or complete T (or Double T) outline.

## Extension

A bench extension is that part of the bench which sometimes extends longitudinally beyond the ends of the higher part of the structure. A possibly significant detail, apparently of wide distribution in Middle America. It
occurs in the Great Court at Chichén Itzá, at Monte Alban, and at Piedras Negras on Structure R-11 (see Figure 8.1). At Piedras Negras the K-6 structures were secondarily extended to the rear and also at the rear portions of the ends, thus forming an angle in this part of the end-fields. Perhaps this feature should be looked for elsewhere, and if found, also given a name.

## Field

An approximately flat and level surface adjacent to a ballcourt structure, all or part of which is supposed to have been used in the play.Typically in Middle America the central field lies between two ballcourt structures, being centered with respect to them. Usually, if not always, it connects with end-fields extending laterally along the ends, or inner portions of the ends, of the structures, and the central field is more or less centered with respect to these end areas. It is the combination of rectangular central and end-fields (in this terminology) which gives these courts the Capital I or Double T outline. The I may be considered to outline the fields only. When, as is usual in Middle America, the central field is rectangular and relatively narrow, and separated from end-fields only by lines (if separated at all), the term alley is retained as a more specific alternative for central field. The latter term allows for presence or absence of end-fields.


Figure 8.2 Isometric reconstruction: Structure R-11-1st-B (Units E, Da, Db, Bn, and Bs).

The end-field cannot be said to be surely rectangular, or to have any other particular form, unless it is known that, in addition to the ends of the ballcourt structures, other features marked its limits. Such additional definition of end-field peripheries could be obtained with mere lines, which might or might not survive in the courts as now found. It could also be obtained by fill retaining walls rising from the end-field, producing the sunken court effect of Blom, an effect which is very striking at Monte Alban. But this additional limitation would also be achieved by walls which descend instead of rise from the plane of the end-field surface. On Structure R-11 at Piedras Negras the end-fields were limited by combinations of rising and descending walls (Fig. 1.1). The exact role of the end-field in the playing of the game is not yet clear. Walls rising from it might have acted like back-stops in our tennis courts, or conceivably as playing surfaces against which to bounce the ball in the ancient Maya game. Walls descending from it could not have functioned in either of these ways. Hence a distinction between these two ways of limiting end-fields seems worth making.

If an end-field is completely or partly limited by walls rising from its surface, in addition to those of the ends of the ballcourt structures proper, it will be called enclosed or partly enclosed. If the additional limitation is wholly or partly by walls descending from the end-field level, the field will be called raised or partly raised, since it is above, or partly above, surrounding areas. Either type of field limitation, or combinations of them, can be said to produce delimited or partly delimited end-fields, as opposed to open end-fields. The latter term is proposed for examples such as Structure K-6 at Piedras Negras where considerable unobstructed level areas extend out from the ends of the ballcourt structures, without any apparent limits.

It should not be merely assumed that end playing surfaces may not have been marked off by lines or otherwise in open or large delimited end-fields.

Such an array of specific special terms for fields seems rather involved. An example of their use may help to justify them. The central field of our Structure R-11-1st-B is an alley (Fig. 8.2). It is not a large field as at Chichén Itzá, nor an oval one as may exist in the Southwest. The southerly end-field is partly delimited, being partly enclosed; the northerly one is completely delimited but is partly enclosed, partly raised; neither is completely enclosed and delimited as shown for Tenam Rosario by Blom. In each, prior to a possible slip of fill, end playing surface may have been marked by tops of delimiting walls of an earlier phase. If so, these were of similar proportions to the complete end-fields at Tenam Rosario. At Structure K-6-A both end-fields were open (Fig. 8.18). At Copán, one end-field seems to be open, the
other partly enclosed. A photograph of this incompletely published court suggests that part of one of its end-fields was differentiated from the rest as an end playing surface by special paving. Surviving features marking end playing surfaces on the Structure K-6 fields were not looked for, but should have been.

Inner
Of direction, i.e., toward either axis of the whole complex and away from its peripheries.

## Lines

Specialized perishable or imperishable elements defining lines on playing surfaces. Either paint or plaster is a perishable line-marking material possible in Middle America; broad stone lines, sometimes at least raised slightly above surrounding surfaces, have survived in some Maya courts, and painted ones are mentioned for Mexico by early sources. Axis lines may be longitudinal (long) or transverse (short); the physical drawing of both would divide the playing area into quarters. Whether an axis line is known to have been placed on the court itself, or is imagined for descriptive purposes, is left to the context. Inter-field lines, running transversely, may set end-fields apart from central fields; in the presence of both axis lines, the central field itself would then be completely marked off in quarters. If transverse lines are found, placed slightly in from the ends of the structures, they can be considered to limit the central field or alley, and still be inter-field lines. It seems desirable to consider that boundary lines may have delimited end playing surfaces, when this function is not discharged by walls. I do not think they have been looked for.

## Markers

Specialized elements marking particular points or small areas on playing surfaces. Presumably, like lines, these could have been painted, or made of perishable materials, and plaster markers have actually survived in one of the buried Copán ballcourts.

If this broad definition is accepted, and one imagines that axial and inter-field lines were all present on a single court, whether surviving or not, the surviving markers which have been found in Maya courts bear a relation to these lines. They have been found most commonly in the central field at intersection of long and short axes, and on the long axis, a little inside imaginary inter-field lines joining the extreme ends of the benches, as in Figure 8.1; and they have also been found on various of the surfaces of the structures, yet on the transverse axis line and at or near the ends of the structures, where they might be considered as on extensions of interfield lines. Under our definition it is proposed to include all specialized elements at the above positions. If this is done, such specifically


Figure 8.3 Isometric reconstruction: Structure R-11-2nd-A (Units H, G, and F). Rear of Structure R-11b in this phase.
different things as plain or carved flat rectangular or round panels, sculpture in the round, and stone rings are brought together in one class. This is an expansion over usage of the term to date. I think the following example justifies it. A ring at Chichén Itzá, a parrot-head at Copán, and a carved flat panel in Structure K-6 at Piedras Negras must each have had different effects on the movement of the ball, but each marks the center of a stop-surface in its respective court, and suggests that fundamentally the game was the same.

Having expanded the use of marker, modifying adjectives will be needed. Thus central and end alleymarker and a central apron-marker may be seen in Figure 8.1. In Figure 8.17 there is a central stop-surface marker, there a carved panel. The Chichén Itzá rings must remain rings, but they can sometimes be referred to conveniently as central stop-surface ring-markers, when making comparisons with other courts. The resulting terminology is less simple, but it more truly reflects the degree of complexity of the facts.

## Niches (of Ballcourts)

Features occurring in some Mexican end-field walls which, it has been supposed, may have figured in the play and scoring.

## Playing Surfaces

The surfaces of the fields, together with those inner surfaces of ballcourt structures (and, possibly, of end-field structures or walls?) on which it may be supposed the ball was intentionally rolled and/or bounced. The playing surfaces of the structure may vary in form, if Southwest
courts are considered, for there they may be curved, but in Middle America they were, typically at least, flat, and either level, sloping or vertical. For convenience, 90 degree slope will be used interchangeably with vertical.

## Stop-Surfaces

Surfaces supposed to have defined the extreme possible limits of play by insuring that the ball must, on striking one, stop an outward series of motions and move in an inner direction. If surfaces of end-field structures or walls were not playing surfaces, they might nevertheless have been stop-surfaces under this definition, functioning like the back-stop behind the playing surfaces of a modern tennis court. The stop-surface of a Middle American ballcourt structure was surely also a playing surface, yet it seems never to connect directly with the central field. Instead, directly or indirectly, it connects with the top of a bench (see Bench). If the bench-top is level, a sloping element may connect it with a vertical stop-surface as in Figure 8.1, or it may connect with a molding apparently functioning as a stop-surface as at Cobá. In some cases it may be impossible to say that the sloping surface was not the final outer or stop-surface. If high or steep enough, such surfaces would always turn the ball inward; on Piedras Negras Structure R-11 (Fig. 8.1) this is hardly the case.

## Aprons

For lack of a more satisfactory term we shall call sloping elements, rising from the backs of benches, aprons, whether a surface no. 4 is present or not. As used here, the difference between an apron-surface and a sloping
bench-top is primarily in position; the apron is surface no. 3 , the numeration proceeding outwardly from central field, while the bench-top is surface no. 2. Besides this, it seems probable that the slopes of aprons were always steeper than those of bench-tops (esp. Figures 8.6 and 8.19). But apron is probably not a suitable term for a very steeply sloping Surface No. 3, if such are reported.

The two ballcourts at Piedras Negras have been classified on the basis of the playing surfaces of their structures as level-bench and sloping-bench types or, more fully, as level-bench-top with apron and sloping-bench-top (Structures R-11 and K-6 respectively). Both types or sub-types, thus defined, seem to have wide distributions not confined to the Maya area.

## Ramp (of a Ballcourt Structure)

A bench-face of so gentle a slope that the ball could roll and a player could readily run onto the bench; conversely, the ball could roll down from the bench-top with little or no bouncing at the bottom, and a player could run down from the bench-top without jumping. This feature,
very marked in Structure R-11 (Figs. 8.6a and b), may have been linked with level bench-tops, and together they must have profoundly affected the manner of play, as compared either with sloping bench-tops with vertical faces or with level bench-tops with steeply sloping faces, as in the Great Court at Chichén Itzá. This must be true, I think, whether or not the rules permitted a player to pass between field and bench-top. In either case the ball must have done so.

It is not supposed that the above definitions are perfect, nor that all innovations will come into general use. But if they irritate others into providing better ones for the same or for other distinctions, they will serve a useful purpose. Help and criticism in framing them, without any responsibility for what is adopted, were received from A. V. Kidder, Tatiana Proskouriakoff, Harold S. Colton, Emil W. Haury, John C. McGregor and Kenneth MacGowan. Unfortunately sought-for criticisms from many others, in Mexico as well as in the United States, have not been received in time to be utilized, and I have had to depend on their publications.

# 2. Structure R-11: South Group Ballcourt Linton Satterthwaite 

## Preliminary Remarks

At the time of writing (1944) this court is of special interest as being the only Maya one of Blom's "early" stage yet published after considerable excavation. In most important respects it confirms the general picture which he gave for that type, but it adds to and also subtracts from his general picture. For instance, it is practically certain that here a fourth playing surface was present on the structure, without the stone rings found on the corresponding surface at Cobá; the partial enclosure of end-fields in a late phase seems non-essential; the bench faces were clearly ramps, and curved in vertical section.

This complex was described in our Piedras Negras Preliminary Paper No. 2, which is now superseded. Morley discusses one of what I now call apron-markers, supposed to be a re-used stela (Stela 45, Morley 1938:3:107-109). When first seen by the writer (Satterthwaite 1931) nothing was visible except some of the higher slabs veneering the aprons. But, as I was then unfamiliar with Blom's paper, the peculiar and symmetrical form of the debris contours, caused by the two benches, puzzled me. Ricketson had reproduced these faithfully on his map,
and later when Morley, then visiting the site, told me that Structure K-6 was a ballcourt, with a copy of the Ricketson map before us, I pointed out that if Structure K-6 was such, so was this. Morley and Ruppert agreed at once that this was probable, and Ruppert went down to the South Group and tested for alley-markers with a machete, finding solid stone just below the surface at the expected places. Mason laid these markers bare the next day. I recount all this to show how easily a ballcourt may be identified with little or no excavation, and to emphasize the service of Blom in merely opening his mind and interpreting what he saw without reference to the then current dogma that ballcourts must be Mexican or due to late Mexican influence. It is quite possible that other dogmas now prevent us from seeing other significant things. So let us examine the two courts here without preconceived assumptions that one type must be earlier than the other, and let us not assume that either type must have its origin here in the central Maya area, or must have it in Mexico or somewhere else. We must, however, look for evidence on these questions, and it is quite obvious that ballcourts can eventually profitably be used in working out inter-regional and chronological relationships. Acosta has pointed out some of the details
which must first be recovered and analyzed in more quantity for such a project.

Structures R-11a and R-11b, with central and endfields and limiting features, considered as a single complex, will be designated simply as Structure R-11. It lies on the easterly side of the corridor connecting East and South groups, which passes over the gently sloping crest of Hillock O (see site map). Its excavation was assigned to the writer in 1932, with labor which was entirely green and when he was only less so. Unburied constructions were in very bad condition except at and near their bases (Figs. 8.12 and 8.13). As a result of these factors there is an unnecessary lack of desired information. Some supplementary work was done in 1933 and again in 1939, but without sufficient study of existing notes to suggest elimination of all unnecessary lacunae. Too much time was spent on the badly disrupted tops of the ballcourt structures, too little at and below field level. However, it has been possible to assign a place in a believable reconstruction to nearly everything found; and in most cases, where doubt is greatest, the proof seems of little theoretical importance or else was beyond recovery.

## Unit Designations

A considerable number of parts of the whole complex must be considered separately in order to come to some idea of the time intervals represented by structural changes, and of the form of the complex at any one time. We follow
our standard practice of special unit letters for these in order to make it easy to refer from the text to the proper part of a drawing. The problem of handy designations is complicated by the presence of pairs of essentially alike features. The designations R-11a and R-11b on the site map refer to the respective ballcourt structures in a general sense; the context must determine whether, for example, R-11a means the northwesterly structure as it was in the beginning, or during some later phase or period. It denominates the whole northwesterly structure as of the phase under discussion. Thus Structure R-11a during the time when it was part of Structure R-11-2nd-B the whole complex as of the earliest phase of the earliest period, consisted of Units Ka and (we think) J; during the next phase, that of Structure R-11-2nd-A, Structure R-11a consisted of Unit Ka and J, with Unit I added (Fig. 8.6a). When the distinguishing small letters are omitted in the temporal designations, as in the above Structure R-11-2nd-B, the whole complex is connoted. Structure R-11-2nd-B" connotes not only the ballcourt structures R-11a and R-11b, but also the end- and central fields all as of the time of phase B of the 2 nd or earlier period.

The use of the small letters to distinguish between pairs of like features has been carried into the unit designations, "a" referring to the northwesterly, "b" to the southeasterly item of a pair; while " $n$ " and " s ," respectively, distinguish northeasterly and southwesterly end-fields and extensions to them.

Table 8.1 Structure R-11 Adopted Scheme of Temporal Sequences

| Str. R-11-2nd-B <br> (earliest phase) | Northerly and southerly end-fields <br> Ball-court structures <br> Rear platform (R-11a only) | Units Ls, Ln, M <br>  <br> Str. R-11-2nd-A |
| :--- | :--- | :--- |
|  | Rear platform extension (R-11a only) <br> Rear base-surface extension (R-11b only) <br> Partial destruction of rear stairway of prior period, R-11b |  |
|  | New R-11b rear stairway, reconstructed as compound <br> shouldered type. | Units J, J' |

Table 8.2 Structure 20 Stratification Table.

| $\begin{aligned} & \hline \text { Str. } \\ & \text { R-11 } \end{aligned}$ | $\begin{aligned} & \hline \text { Fig. } \\ & 8.1 \end{aligned}$ | $\begin{aligned} & \hline \text { Fig. } \\ & 8.3 \end{aligned}$ | Fig. $8.3-8.4$ | $\begin{aligned} & \text { Fig. } \\ & 8.5 \end{aligned}$ | Fig. $8.6 a$ | Fig. 8.6b | Fig. <br> 8.7 | $\begin{aligned} & \hline \text { Fig. } \\ & 8.8 \end{aligned}$ | $\begin{aligned} & \hline \text { Fig. } \\ & 8.9 \end{aligned}$ | Fig. $8.16$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $-2^{\text {nd }}-\mathrm{B}$ | $\begin{aligned} & \mathrm{Ka} \\ & \mathrm{~J} \end{aligned}$ | Ls | $\begin{aligned} & \hline \mathrm{Ls} \\ & \mathrm{~Kb}^{*} \end{aligned}$ |  |  | $\begin{aligned} & \mathrm{Ka} \\ & \mathrm{~J} \end{aligned}$ | Ls | Ls |  | Kb |
| $-2^{\text {nd }}-\mathrm{A}$ | I* | H | H <br> F | G | I |  |  | H | H |  |
| $-1^{\text {st }}-\mathrm{B}$ |  |  | Db | Db <br> C | $\begin{aligned} & \mathrm{E} \\ & \mathrm{Da*} \end{aligned}$ | Db <br> C | Bs |  | Db <br> Bs | R-12 |
| $1^{\text {st }}$ - A |  |  |  |  |  |  |  |  |  |  |

*Stratifications from J' behind I' and Kb behind F seen but not illustrated; J'-under-E-under-Da seen at late R-11a stair angle though merely reconstructed in Figure 8.6.

The main letters of the unit designations are chosen in our standard manner: in alphabetical order they either run through a group of units considered to be contemporary, or run backward in time, Unit A being considered the latest, Units Ls, Ln and M, the earliest.

## Temporal Sequence

It is not possible to prove that some of the units we have grouped together as contemporary in a single phase were actually contemporary, but three principal phases must be distinguished at both R-11a and R-11b. While digging was not so complete as it should have been for R-11a, the sequence-Ka behind J, or that of Unit E under Da can be considered as showing a mere sequence in contemporary constructions, but I' and J', and J' and E cannot be reasonably interpreted thus. For Structure R-11b, perfectly clear corners in the final southerly face, from base level up, showed that Unit Kb lay behind F , and F behind Db. While Unit C, a bench, was very likely contemporary with Db , against which it was built, there is little doubt that Unit A was an extension of this bench. We have given this latter minor item a phase of its own, making four as the probable minimum, distributing other units among the first three, utilizing stratigraphical controls where available, and the assumption that essentially similar units, paired symmetrically on either axis, were contemporary.

The tabulation [in Table 8.1] of these assignments is given for quick reference, and for the benefit of a reader who may want to check the drawings in detail, without following the detailed remarks which follow later, for each phase. It must also be remembered that elements of an early phase usually survive and form a part of the next later one, but only the new things are listed for the later phase.

Features not assigned in the [Table 19] scheme:
Probably after R-11-2nd-B:
Probable raising of central and at least parts of endfields by thickness of new floor.

Consequent probable burial of central fieldmarkers.

Masonry construction on top platform of R-11a.
At any time:
Burial of pots and cache objects in Unit Ls.
Curved addition to northerly bench-extension of Structure R-11a.

There is no physical evidence or theoretical basis which would prevent shifting the last two items under R-11-1st-B to the A phase and, so far as physical evidence goes, the same applies to Structure R-12. So it is quite possible that there were four phases, each involving a considerable amount of construction, instead of an
extremely minor fourth one, and that even then more phases would be necessary to represent the actual series of changes if we could be sure of them all. The degree of modification at the rears of the structures caused by Units Da and Db seems to justify the adopted division into 1 st and 2 nd periods, but it should be noted that only the unassigned supposed raising of the alley floor level, and possibly the end-field extensions, could have affected the manner of play, and then only in a minor manner.

The tabulation [Table 8.2] lists the stratifications available as controls, proceeding downward with advancing time under each figure where the situation is illustrated.

A careful analysis of blank spaces in [Table 8.2] might lead to bewilderment. Thus Figure 8.16 shows a cut through Structure R-12 to Unit Kb ; on the basis of our reconstruction in Figure 8.3, Unit G should appear between Kb and $\mathrm{R}-12$. Inexperienced digging is the probable answer, while Maya tearing out of the $G$ wall here is a possibility. They may have wanted the tabular stone and taken it from here, yet left the remnant on the other side of the Unit G stairway. Clear cases of partial demolition not required by the projected new design are known elsewhere at the site.

## Remarks on the Drawings

Certain observations on specific drawings are gathered together here to make the drawings more intelligible without recourse to the more detailed Discussion by Periods and Phases, following. But the latter should be consulted before relying on something seen in the drawings as a basis for important inference, and an effort is made to avoid repeating there what is given here.

The plan of Figure 8.10 is by Parris. Notes and drawings of the writer are basic to the others. Figure 8.3 was constructed by Proskouriakoff, and used by the writer in drawing the other isometric perspectives. As usual, on the sections, actually excavated portions only are hatched. In the case of the structure tops, in both perspectives and section, floors are shown in the same manner as if finishing plaster on them had survived, though it had not. But in this case the concrete was in good condition in the parts shown, its top very clear. Because of its special interest for dating purposes here, an occurrence of bedrock at or very close to the base of a wall is indicated as if it were an exposure of floor, but such areas are marked bedrock or Brk., an abbreviation for it.

Figure 8.1 reconstructs Structure R-11-2nd, that of the earliest period. Unit I (Phase A) is cut down from the top to expose the front of Unit J. If one eliminated Unit I and F entirely, and carried the step-terraced front of Unit J clear across the front, the drawing would completely represent R-11-2nd-B, the earliest phase, so far as we have reconstructed it. There may or may not
have been buildings or other constructions on the tops of the structures, of either perishable or imperishable materials. The stepped front of Unit J was seen in the side of J'-I', but the juncture would have been hidden by plaster, much of which survived on the side of Unit J. A cut-out is drawn through the rear of Unit J, wider than that actually dug, to expose a feature which may possibly argue for Unit J belonging to a separate phase, later than the structure proper. Remains of a probable stairway rising from Unit J were not sought, and in any case might easily not have been left by the Maya.

Figure 8.2 shows our idea of Structure R-11-1st as drawn from the same point of view. Attention is called to special doubt whether the quasi-tau shapes given the top components of Structure R-11a are correct or not. As to possible constructions on the ballcourt structure tops, see Discussion by Periods and Phases. There is no doubt about the existence of a stairway for Structure R-11a at this time, though it was badly disrupted, and little doubt that it was more or less broad-treaded, though this is not absolutely certain. Neither is it proved that the tops of retaining walls of Units Ls, Ln, and H still showed in this late period; a special dash-three-dots line is used here and in Figure 8.10 to indicate this doubt. In the 1933 report this line represented buried terraces, and it still does, with the proviso that it appears likely that they were not quite completely buried. But this is not absolutely proved.

A small addition to the rear of the northerly bench extension of Structure R-11a, as seen in Figure 8.1, gives it the curved form seen here. Inadvertently this was not assigned a unit designation. No such changes were encountered on Structure R-11b. Failure to note any difference in base level suggests that this addition predates the raising of the floor.

Figure 8.3 reconstructs the rear of Structure R11 b in Phase R-11-2nd-A. No evidence of the upper flight of steps survived, nor any positive evidence of the existence of two flights, nor of the broad-tread type of steps reconstructed as the lower flight. But the rather certain presence of shoulders (Unit G), flanked by a stepterrace (Unit F), as at Structure J-6, argues strongly for broad-tread steps here, possibly with sloping treads and risers. It is obvious that Unit F, so far as we really know, may have followed Unit G as a minor phase. A cut-out through Unit H shows the wall of Ls behind H , which was followed in only as far as the end of the structure (Unit Kb ). This Ls retaining wall, maintaining a level top, doubtless originally continued in until rising bedrock made it unnecessary. It will be clear from the drawing that an additional area had to be leveled up by Unit H to give the stair unit F, perhaps also G , a respectable surrounding base surface, so that H and F almost surely belong to this one phase, and follow that of Unit Ls.

Table 8.3 Structure R-1 1 Playing Alley Dimensions

|  | North <br> Alley | Central <br> Alley | South <br> Alley |
| :--- | :--- | :--- | :--- |
| Diameter | 0.5 | 0.5 | 0.5 |
| Thickness | 0.2 | 0.4 | 0.3 |

If the Units $H, F$ and $G$ were removed from the drawing, except for the upper flight of entirely reconstructed steps, and if this upper flight were then continued down to the base level, the drawing would represent the structure as we believe it was in the earlier Phase B of this period. A buried remnant of the northeasterly side wall for such a stairway was found projecting 1.9 m from the base of Unit Kb and surviving to a height of 1.5 m at the angle with Kb . This could have been the wall of a projecting platform, since it showed a very slight batter toward center, but this seems unlikely.

Figure 8.4 from the same point of view as Figure 8.3, reconstructs the rear of Structure R-11b in the final R-11 1st-A phase. A cut-out shows the wall of Unit Db based on floor material which raises its base level enough to permit it to pass over the same remnant of the side wall of the Unit G stairway shown in the previous figure.

Figure 8.5 at double scale, is a combination of sections and isometric perspective. The shoulder-forming terrace of Unit G and the wall of Unit Db are shown cut off in horizontal section and, at the left, in vertical section. Unit Db , thus cut down, is in two disconnected pieces, the better to show its relation to Unit G. The face of this latter, behind the steps, was a crude fill wall, its face about 20 cm behind the face of the exposed shoulderforming portion. When the steps were torn out by the Maya the stones of this shoulder were left terminating in a ragged but quite straight vertical line, showing that the stairway side wall was constructed first. Figure 8.5 gives a fuller representation of the surviving remnant of this stairway side wall, part of which appears in the cut-out of Figure 8.4. Unit Db passed over it, and formed a mere veneer-like layer where it lay against the shoulder $G$. A similar situation was noted in the nearby South Group Court, where Unit D of Structure R-9 lay against Unit E of that structure.

Figures 8.6a and 8.6b. Taken together the sections of these figures may be taken as truly representing a single cut through both structures, at a right angle to the long axis and at longitudinal center. This is not exactly along the transverse axis, due to marked parallelogram distortion of the plan (see Figure 8.10). The two sections were actually measured on lines running through the apron-markers at right angles to the long axis, and we have pretended that the distortion did not exist, thus bringing the central alley-marker into the picture in both
cases. Counting up from the benches, the second and third stones of the apron in Figure 8.6a are fragments of the apron-marker of Structure R-11a; the third, fourth and fifth stones in Figure 8.6b are fragments of the R-11b marker. The other stones are thinner irregular slabs such as may be seen in Figures 8.12 and 8.13.

The section of Figure 8.6b is composite in other respects since certain features were actually seen only to one side or the other of the section as drawn. An area of two or three square meters of alley floor concrete without finishing plaster but brushing to a good level surface, was seen along the base of the R-llb bench a little northeast of center. When this was recorded and its level taken, the rest of the alley floor had been broken up in following the bench slabs below it, a very careless procedure for which the writer is responsible. The section of floor and front or inner part of the bench used was actually 3.5 m northeast of center. The top only of the rear wall of Unit Kb was seen on the section line, but it was seen complete about 5.9 m southwest of the northeast corner (Fig. 8.16). This is only about 1.5 m from section line, due to parallelogram distortion. The rear profile of Unit Db was measured about 4 m , and of Unit C probably about 1.5 m southwest of section line. Again due to parallelogram distortion, the section line, at a right angle to the long axis, actually passed through Unit A, an extension of the Unit C shown.

These sections are the work of the writer, not of Parris. Section lines were established only with a Brunton compass, but errors on this score must be inconsequential. Checking with Parris' plan shows a maximum discrepancy of 40 cm in a single structure depth. Horizontal distances were carefully measured with tape and plumb line; vertical ones with tripod telescopic leveling instrument.

Figure 8.7 is a section on the long axis through the southerly end-field. It is of some theoretical importance to remark that the top of the Ls retaining wall has been reconstructed as if a few centimeters below the top level of the southerly alley-marker, but that the exact vertical relationship was not measured. The level shown is surely approximately correct. The exact levels of Structure R-7b components with respect to the marker were, however, determined, though data of various seasons and persons are utilized, The suggestion that the surface of Unit Bs was slightly below that of Ls is a matter of unproved inference, and presupposes that the surface of the secondary floor covering the alley-marker merged with the old Ls surface by the time the Ls retaining wall was reached. Being uncertain, our drawings suggest what is only an interesting possibility, that the original limitation of end-field area was maintained throughout. If the ballcourt ceased to be used as such by the time of the Bs unit, the reason for graphically calling attention to the possibility would disappear. The inference that at least
the top of the Unit Ls wall was not buried by a secondary floor is independently drawn from the noted fact that it was found at the surface; and that it was exposed throughout by merely scraping away leaves and a little humus. Contrastingly, the alley-marker was found under a layer of crushed stone as noted; so doubtless were the other two alley markers, though the nature of the material removed to expose their tops was not recorded.

The northwesterly step-terrace limiting Unit Ls, at a point only 3 m from Structure R-11a, had its base level 27 cm below the datum. The end-fields were certainly not perfectly level, and the Ls wall may be shown too high in this drawing.

Figures 8.8 and 8.9 are respectively on lines at a right angle to and parallel with the long axis, respectively a little southwest of and a little southeast of the juncture of Ls and H walls. Together they establish the sequence Ls-H-Bs.

Figure 8.10 is a partial copy of Parris' plan of the final period, R-11-1st, as published in the 1932 report. It is based on careful surveying with triangulation and check measurements with tape. The reconstruction of Figure 8.2 agrees with it except for some minor reconstructed details in the stairway of R-11a, which are uncertain anyway. The peculiar form on the top of this structure is a remnant of wall seen in Figure 8.2 and in section in Figure 8.6a. The dash-three-dots line shows the outer edge of Unit Ls, and of $\operatorname{Ln}$ and H , so far as those are known to have survived. The probability, which may however be questioned, that these were visible in this period, is discussed under Figure 8.7.

Attention is called to the apparent lack of the bench extension at the southeasterly end of Structure R-11a.

This end had nowhere survived to bench height, and it is possible that a secondary extension (using the word in the ordinary sense), like that on the other end but running all the way to the rear, prevented us from recognizing the plan of an original bench extension here. We failed to find a dividing line in the wall face, but did not trench in to make sure that the plan of this structure was never symmetrical. Absence of the dividing line is the basis for the absence of a reconstructed bench extension in this figure. Such absence is not absolutely conclusive. We cannot say positively that some stones of an original rear corner of a bench extension were not torn out, and that the new wall running further back was not bonded to it, thus masking the juncture. This certainly occurred at Structure J-22, where plaster, absent here, tells the story.

The numbers in the area of Unit Ls locate caches below its surface.

For a more complete picture of the relationship of this complex to the corridor and to neighboring structures, including a palace (R-7) and a sweat house ( $\mathrm{R}-13$ ), see Square R of the map of the site. It lies across the corridor from a temple (R-16), but the temple faces somewhat away from it.

## Discussion by Periods and Phases

## Structure R-11-2nd-B (earliest)

(See also Remarks on Figures 8.1, 8.3, 8.6, 8.10)
The contemporaneity of Units Ka and Kb is guaranteed by their ballcourt function, which is obvious from comparisons with courts with rings, such as at Cobá and Chichén Itzá, considered together with early


Figure 8.4 Isometric reconstruction: Structure R-11-1st-B Units Db and C; Structure R-12; Structure R-11-1st-A (Unit A), from same point of view as Fig. 8.3.

Spanish accounts. The conclusion that these units are contemporary with Units Ln and Ls, forming the endfields, cannot be absolutely proved because surface plaster did not survive. But it is a conclusion that can scarcely be avoided. In a search for other field markers, with negative results, large areas of the fields were excavated to a depth of about 30 cm . These areas included the entire central field or alley, a full-width extension of it along the long axis to the bounding wall of Unit Ln, and, except for small areas around a few scattered small trees, the entire southerly end-field, between the ballcourt structures and Structure R-7, from the northwesterly boundary of the field to a line about 26 m to the southeast. Since this operation disclosed no walls buried within Ln or Ls, but a continuous section of solid fill and floor material on the long axis from Ln to Ls walls, they must be taken as contemporary with each other. Part of this section is shown in Figure 8.7.

We should consider the possibility that they predate the structures. Figures 8.6 a and 8.6 b show sections through this same material, at a right angle to the long axis. If the area had been surfaced before construction of Unit Ka, the surface, or at the very least the crushed stone material of a floor should have been identifiable below the bench of Unit Ka (Fig. 8.6a). Instead, a solid fill, not of floor character, and with an irregular surface, rises below the pure rubble fill of the bench to a height greater than that of the final alley floor, finally giving way to bedrock which rises still higher. In the figure the solid fill is distinguished from the overlying rubble fill of the bench by differing hatching.

At a considerable number of points, side and rear walls of Unit Kb were noted as either on bedrock, or a few centimeters above bedrock. Units P and V were recorded as based on bedrock, as was Unit M. (Fig. 8.1). Both situations were found for the northerly end of Unit Kb in a check-up in 1939. Floor material was not seen to pass under these walls, even when a little above bedrock. Since indubitable limestone often has weathered to soft soil of a light brownish color, with no sharp line marking the transition, it is probable that both Units Ka and Kb were built on bedrock, undisturbed soil, or mixed soil and earth very likely to accumulate in leveling off the area. Probably this was accomplished with some cutting down of humps of bedrock, as well as with filling. The wall of Unit Ls, where followed to the base (on the long axis) was also noted as based on bedrock; that of Unit Ln was based on solid fill up to the point it reaches in Figure 8.10. From here southeastward it had completely disappeared, and rubble fill replaces the solid.

These factors lead to the conclusion that the structures and end-fields of this phase were contemporary, and were the first constructions at this spot. An ancient slip in the rubble fill, certainly placed on a hillside,
may account for the disappearance of the rest of the Ln wall; if not, it may have been torn out for building stone at the time this field was extended northward.

The Double T or Capital V form of fields, as reconstructed in Figure 8.1, thus seems well established as part of the original plan when construction here began.

There is no reason to doubt that the alley-markers date from the earliest phase, but in the absence of surviving surface plaster, this could not be proved. Neither can one say it is impossible that the apron-markers are later insertions.

The levels of the alley-markers call for an earlier alley surface, as does presence of crushed stone found over them. This early surface was nowhere actually identified, and in 1932 we speculated on the possibility that there was only one surface which dipped down around the markers. If rolling, the ball would then tend to come to rest at a marker. We have since concluded that this was fanciful. Several cases have been found, notably at Structure P-7, where several layers of finishing plaster marked off successive floors in protected places, but these disappeared completely in exposed places, leaving an apparently single deposit. One should here also allow for the personal equation. At the time I had little experience in following doubtful floors, and did not try to do so here. The reconstruction of a secondary floor surface is not only reasonable for the alley but necessary at the rear of Structure $\mathrm{R}-11 \mathrm{~b}$, where Unit Db is based on crushed stone floor material lying against and over the remnant of Unit G, which was based on bedrock (Fig. 8.5).

The sections of Figure 8.6a and 8.6b suggest that the original alley must have been about 75 cm less wide than the 4.3 m of the final period, when, we suppose, the added floor thickness extended the alley floor somewhat up the bench faces. If we call the original alley width 3.5 m we shall not be far wrong. Allowing 15 cm for secondary floor thickness, an approximation, this makes the bench heights, above floor level, that much greater in this earliest phase.


Figure 8.5 Isometric reconstruction: Structure R-11-2nd-A (Unit G; Structure R-11-1st-B (Unit Db).


Figure 8.6 a. Cross section: Structure R-11a (central field and markers; Units Ka, J, I, E, and Da) composite passing through central alley and apron markers; $b$. Cross section: Structure R-11b (central field and markers; Units $K b, D b$, and C) Composite passing through central alley and apron markers. All letters refer to units of construction described in text.

Unit JJ' was certainly constructed after Unit Ka (Figs. 8.1 and 8.6a). In Figure 8.1 its surface is cut out to show two projecting stones in the Ka wall, approximately at center. These are staggered horizontally about 45 cm . Vertically their tops are 70 cm apart, the lower about 40 cm above the base of the wall. They are about 15 cm wide by 10 cm thick, projecting, wide side up, about 20 cm . It seems probable that a stairway rose from Unit J to the top of Unit Ka, in which case the upper as well as the lower of these stones was buried in the time of Unit J. In our sequence scheme we have considered them as temporary climbing stones. An alternative is that they were to support stucco decoration, in which case Unit J would require a separate phase designation. Broken lines in Figure 8.1 show now little we know of Unit JJ'. It could be reconstructed along lines similar to the combination of Units G, H and I of Structure R-9.

It is supposed that a single-flight standard stairway connected the $\mathrm{R}-11 \mathrm{~b}$ structure top of this period (Unit $\mathrm{Kb})$ with base level to the rear. A remnant of the northerly side wall of the supposed stairway built against the rear of Kb was uncovered. It had been largely torn out by the Maya, and survived only to a height of 1.5 m , hence might possibly be part of a projecting platform similar to Unit J, but much higher. The southerly wall was not sought; assuming symmetry, and using reliable but not accurate measurements, stairway or platform occupied the middle third of the rear of Unit Kb.

There is thus fair evidence but not absolute proof that provision was made during this phase for easy ascent
to the tops of the structures, in each case from the rear. No evidence of buildings or other structures on the tops was found in this phase. This raises no presumption that such were absent, whether of perishable or imperishable materials. No finishing plaster was found on the tops, though the level surface of the concrete was easily made out. Under these conditions evidence of complete removal of masonry walls in later phases, such as is clear at Structures J-6, J-9 and J-11, would be very difficult to find, and was not sought for.

We cannot say, however, that the remnant of masonry wall, set flush with the front of the R-lla upper component (Figs. 8.2, 8.6a and 8.10), positively does not date from this earliest phase. Recollection of the writer, rather than a proper record, suggests it is not physically bound to Unit Ka, and merely rests on it.

Whatever the date of this construction, Figure 6a shows that a vertical stop-surface must have bounded the top of the apron at the center, whether or not we have correctly placed it forward of the one which survived. Figure 8.1 shows well enough that it must have extended along most of the top, though probably not clear to the ends.

There is no question but that the bench extensions step up about 15 cm just behind the line of the apron. This feature was well preserved at the south of Structure $\mathrm{R}-11 \mathrm{~b}$. One remarks in passing that the ball could not roll back onto this narrow shelf-like part of the extension. A field sketch suggests that the southerly bench extension is bonded to the main structure and there is no reason


Figure 8.7 Cross section: On long axis, southerly alley marker to Structure R-7b-2nd (marker, Units Ls and Bs).
to suspect that the extensions are secondary. However, the evidence for contemporaneity was not properly recorded. The unsettled question of whether Structure $\mathrm{R}-11$ a had a southerly bench extension is discussed under Remarks on Figure 8.10.

## R-11-2nd-A (See also Remarks on Figures 8.1, 8.4 and 8.5)

The postulated raising of the alley floor could have occurred during this phase, but if all field-floor raising pertains to one operation, then not until the R-11-lst-B phase. Otherwise, all changes assigned to this phase have to do with the rears of the structures, everything else remaining as before, so far as known.

Figure 8.1 tells all we know about Unit H'. Possibly if we knew its whole extent it would deserve a separate structure name. Figure 8.3, and Remarks on it, make further detailed discussion of Units H, F and G unnecessary. The figure shows a lamentable lack of imagination in digging. A very little time would probably confirm the reconstruction of this type of stairway beyond doubt. However, no other reconstruction using components known elsewhere at the site, will account for both Unit G and the known corner of Unit F, and it accounts very well for the broken-down condition of the shoulder near where we have placed its corner, and for its relatively large deviation from vertical. I think this reconstruction is quite probable, though not established with certainty.

Structure R-11-1st-B (See also Remarks on Figures 8.2, 8.4 and 8.5)
This phase, like that just before it, is marked by changes to the rear of each of the twin structures, but there were also changes at the ends of the complex, requiring large amounts of new fill. Special attention is again called to the speculative nature of the reconstructions, in showing the end-field extensions (Units Bn and Bs ) with surfaces slightly below the original end-fields. Data at hand would permit bringing these surfaces up to the old end-field walls at their tops. They suggest, but do not absolutely prove, that at least the tops of the old walls were left in view, in which case they may have continued to mark off
the same less extensive end-field areas as playing areas. However, interpreting thus, one must assume (without any surviving evidence) that the old limits were somehow indicated in a new way for that portion of the north field where the old wall had by this time, in one way or another, been destroyed.

It seems likely that the new alley floor was now laid, and it must have extended out onto the endfield areas, so that a complete blanking out of the old end-field limits, as well as of the alley-markers, would be natural at this time, if the old limits did not have to be preserved. If they were not, the Double-T field outline, as defined by imperishable materials, was changed drastically in proportions, and distorted largely beyond recognition. This will be very apparent if one traces the field outline from the map of the city, and then sketches in the old limits, at the proper scale, from Figure 10. Even so, painted or plaster lines could have been used. The surviving situation permits us to extend the supposed playing limits or to make them indefinite, but really gives us no sure ground for doing either.

The changes to the structures include a deepening rearward, which included the tops. It seems likely that buildings or subsidiary platforms, or both were now placed on these tops, if such did not survive from earlier phases. But they probably were not alike in materials. On Structure R-11a we found not only the masonry remnant shown in the figures, but a cap of debris 50 cm deep. Vault-indicating slabs were absent, but tabular stone, presumably from walls, was present. The surviving wall remnant stood 65 cm high. No rear or inside face could be made out, due possibly to faulty digging. On the top of Structure R-1lb the debris layer was about 30 cm deep, and included broken rock, rather than tabular wall stone; again there were no slabs. The situation suggests a small centered building on Structure R-11a, and a platform (less wallstone) on Structure R-11b. However, this interpretation is highly speculative. The debris layers are undoubtedly the reason for good preservation of floor concrete on the tops, in strong contrast to the situation at the other ballcourt, Structure K-6.


Figure 8.8-8.9 Cross section: Southerly end-field, Units Ls and $H$ (8). Southerly end-field, Units $H, D b$, and Bs (9).

The rearward extensions required new arrangements for reaching the tops. The stairway of Unit Da (Figs. 8.2 and 8.6a) is reconstructed as of somewhat broad tread merely on the basis of the height to be reached and the horizontal distance between the wall and bottom step, the latter step only being in position. In the case of Unit Db (Fig. 8.4) we thought a slight bulge in the debris contours indicated a centered stairway there, but it could not be found, and the narrow bench and its probable extension (Units C, A) establish absence of such a stairway well enough. This argues strongly for contemporaneity of Unit Db and Structure R-12, a very peculiar platform connecting with the nearby Structure R-13, a sweat house. Stair arrangements leading up from this may be imagined, but were not looked for.

In 1932 we considered that the retaining walls of the rearward extensions (Units Da and Db ) were vertical, and made a point of the contrast with the rear wall of Unit Kb , which was steeply sloping. In fact, the remnants of Units Da and Db as found were either vertical or leaning outward. But later experience has shown that steeply sloping walls may be pushed to either of these positions by internal pressure of the fill. Since no well-preserved vertical terrace walls of comparable height have been found at the site, we have abandoned the hypothesis of verticality here. The particular steep slope used in the figures is conjectural.

In this phase the court has become more like that of the West Group in that the stone alley-markers have almost certainly been blanked out, and also in that more extensive end-field areas could have been utilized in the game, though whether they were so utilized we do not know, in either case. From the point of view of the play, the structures themselves have remained unchanged throughout, except that raising the alley floor a little has reduced the effective height of the benches correspondingly. This makes them even less like the benches of the other court than before. Considering the amount of labor expended in this phase, relatively little more would have sufficed to modify the structure playing surfaces in the direction of the other type; instead, none of the structure changes affected the play except in a minor incidental way, and changes to the end-fields may not have affected it.

Structure R-11-1st-A (See also Remarks on Figures 8.2, 8.4 and 8.5)
Figure 8.5 shows that Unit A might be a short separate bench instead of an extension of Unit $C$, in which case the subdivision of this period into phases is not required. The southwesterly part had been torn out by unskillful digging before it was seen. This would be more likely to happen with an extension than with a separate bench. The function of an ordinary bench (as opposed to ballcourt benches) in this position is unknown. It may have no real connection with the ballcourt, but if an extension, marks the passage of another increment of time.

## Measurement

The solid-line portions of the plan of Figure 8.10 provide one of our best grounds for believing that structures were laid out with great care in linear measurement, but that as a result, an initially badly estimated right angle infected the whole plan (see under Structure K-6). Here a glance shows that Structures R-11a and R-11b follow a parallelogram rather than a true rectangular type of plan. Both may be approximately fitted into a single larger parallelogram, and if opposite corners of the benches were joined by lines, did so fit. More than this, the larger parallelogram containing the structures and alley, thus defined, dictated the directions of the walls of the endfield Unit Ls, and of Unit Ln so far as known, or vice versa. The distortion from presumably intended right angles is not, of course, absolutely constant in all units, but according to Parris' carefully surveyed plan, which first revealed it to us, the variation is no more than a degree. The distortion of depth lines is between about 5 and about 6 degrees from corresponding lines drawn at right angles to a bench face.

This distortion was unquestionably established in all major components in the earliest phase of the earliest or second period, but very stupidly only one of the two rear or outer corners of R-11b (which were both seen) was accurately located; those of R-11a for this period were not seen. However, it is only the rear or outer parts of the structures, and rear portions of the ends of the structures, which do not belong in the earliest phase.

A few dimensions, scaled from the full-size Parris drawing which represents a careful survey, will give a further idea of the degree of accuracy in linear measurements reflected in the actual construction. Transversely, measuring from the northwesterly corner of the southerly end-field along the line of the ends of the structure benches, at field level, 13.45 m brings us to the long axis, 13.7 m more to the edge of the original field-raising wall shown in dash-three-dots line. From the intersection of this line with the long axis to the inner corners of the benches scales almost exactly the same for each, 2.1 m , which means that the structures, and


Figure 8.10 Plan: Structure R-11-1st-A (final phase offinal period).
hence the alley, are very well centered transversely, with reference to the southerly end-field. Longitudinally, from the intersections of the lines joining the benches with the long axis, and measuring along the latter to the ends of Units Ls and Ln (dash-three-dots lines), expected equal measurements scale to 12.1 and 12.2 cm , respectively. Hence the structures were carefully centered in this direction also, and since they define the central field or alley, it may be said that the Double T form was constructed with great accuracy, except for the angular distortion, which is very marked.

In the phase or phases which accounted for the extensions of the end-fields, this longitudinal centering was not maintained. The northerly addition amounts to about 10 m , the southerly to only about 6 m . Parris drew the edge of Structure R-7 as departing somewhat from the parallelogram pattern, but this was largely reconstruction based on debris contour, and unreliable in this connection.

It goes without saying that the extensions of the structures themselves, always outward (to the rear), were doubtless laid off from what already existed, so that the parallelogram plan, once established, would be maintained through the final one, as we see it in Figure 8.10 .

The outermost alley-markers are just about where expected with reference to corners of the benches, but not as exactly as one might expect for short measurements. The center of the southerly one is 1 m , the northerly one 1.2 m in from lines joining the bench corners. The central marker is displaced about 20 cm south of center of the long axis of the alley. A perpendicular from its center almost exactly bisects the $\mathrm{R}-11 \mathrm{~b}$ bench face and therefore cuts off unequal segments of the R-11a bench, but perpendiculars through the other markers cut off unequal segments of each bench. One suspects that the longitudinal axis of the alley, on which all three lie with accuracy, was
carefully laid out, but that positions of the markers on it were selected with the eye only. The same remark applies to the apron-markers, that of R-11a being just about at the center of the apron (if there were bench extensions at both ends), while that of R-11b is about 50 cm north of center of the apron. Notwithstanding this, both apron-markers lie on opposite sides of a perpendicular through the central marker, as called for by the distortion of plan, though in the case of Structure R-11b, not so much as expected. As a result of these inaccuracies a narrow painted line joining the centers of the apron-markers and the center of the central alleymarker would not be quite straight. This circumstance is, perhaps, an argument against postulating such a line here, or against our identification of the apron-markers as such. On the other hand, a painted line through centers of alley-markers would be straight.

Table 8.4 Structure R-11 Apron Dimensions

|  | R-11a <br> Apron | R-11b |
| :--- | :--- | :--- |
| Apron |  |  |

The suggestion above, that alley-markers may have been located by use of a measured longitudinal axis line, but on this line with the eye only, may be discarded in favor of another suggested by Proskouriakoff. Positions on this line may have been measured from its intersections with the outer edges of the end-fields (i.e., of Units Ln and Ls). At such distances, differential stretching of a cord might account for the minor discrepancies noted, just as it might account for the 20 cm difference in short dimensions of the end-fields. Perhaps that is the answer to all small discrepancies in dimensions obviously intended to be equal. We had some difficulties of our own in this respect, when using metallic rather than steel tapes.

A few accurately determined levels at corresponding points where there was no reason to suspect appreciable settling may be noted. At approximately opposite points at the bases of the two aprons, the bench height differed by 7 cm ; heights of the tops proper of the structures were measured as exactly equal. The top of the southerly alley-marker was 5 cm below that of the center marker, and it was 22 cm above the base of the enclosing northwesterly wall of the southerly end-field, a few meters from Structure R-11a. More levels should have been taken. Those which we have suggest that they were determined with the eye only, and that the one exact equivalence noted is a matter of chance.

## Proportions

In the earliest phases (R-11-2nd) the alley width was about 19 percent of the alley length. With the raising of the floor this percentage was probably increased to about 24 percent.

Taking the distance between stop-surfaces, one of which is entirely reconstructed, as about 15.8 m , the alley originally occupied about 20 percent of the area between the stop-surfaces. But the benches are so ramp-like that players may have moved from alley to bench-tops. Taking the average distance between the bases of the aprons as 11.2 , the alley and benches together occupied about 70 percent of the area between the stop surfaces.

Considering the alley alone, it is much narrower in proportion to the short dimension of the R-11-2nd endfields than Mexican picture manuscripts would lead one to expect. Those reproduced by Blom suggest an alley about as wide as the shorter dimension of the end-field. This relationship is obtained here if alley and benches are considered together. The shorter dimensions of the two end-fields scale between $11.0-11.2 \mathrm{~m}$. These were clearly meant to be equal, and are very close to the distance between the bases of the aprons.

An equivalence may be noted for what it is worth: the distance between the outer or rear corners of the northerly bench extensions scales 18 m , the average length of the alley and benches. Still another possibly significant pair of scaled measurements is 15.9 m between centers of the end alley-markers, compared with the 15.8 $m$ between the stop-surfaces. This latter was pointed out to me by Proskouriakoff. If those markers were on transverse lines extending to the stop-surfaces, the area thus enclosed was a square, modified by parallelogram distortion.

## Markers - Sculptural Decoration

Field sketches of five stones are reproduced in Figure 8.11. Two of these (A and B, respectively on Structures $\mathrm{R}-11 \mathrm{a}$ and $\mathrm{R}-11 \mathrm{~b}$ ) we believe functioned as central apron-markers, and three ( $\mathrm{C}, \mathrm{D}$ and E ) were alley or central-field markers. Of these, C and D in Figure 8.11 were respectively northerly and southerly end alleymarkers, E the central alley-marker. It was our best judgment that the central alley-marker had never been sculptured, but that all the others were sculptured. This is quite certain for the R-11a apron-marker (Fig. 8.11, A), which has received the further designation Stela 45 on the theory that it is a re-used stela. This may be seen in situ in Figures 8.12 and 8.15. It is also certain that the northerly and southerly alley-markers were sculptured, and probable that the R-11b apron-marker was sculptured. No other stone sculpture and no stucco fragments were encountered. Painted decoration would have disappeared.


Figure 8.11 Drawings of markers: a. apron marker ("Stela" 45) of Structure R-11a; b. apron marker of Structure R-11b; c. northerly end alley marker(Miscellaneous Sculptured Stone); d. southerly end alley marker (Misc. S. S. 4);
e. unsculptured central alley marker.


Figure 8.12 Structure R-11a, playing surfaces of Structure R11a, looking west. Central alley and apron markers in situ. Alley at earliest floor level except at extreme left; note sloping veneer slabs and concrete bench top curving down toward observer.

The Structure R-11b apron-marker may be seen in situ in Figure 8.13, where its four fragments can be identified by comparison with the drawing (Fig. 8.11, B). If unbroken, it would have been very striking in the photograph, by reason of its large size, compared with other slabs on the slope, and because of its rounded top. The positions of the fragments indicated breakage after placement, presumably after abandonment. Unlike the ordinary surrounding veneer slabs, its edges were tooled, not rough-chipped only. Its bottom edge is curve- beveled, recalling somewhat similar treatment of probable vertical panel stones, such as "Lintel" 12, or Miscellaneous Sculpture Stone 13. In addition to these specializing factors, this stone was thicker than the ordinary slabs, and unlike them had weathered to an uneven surface such as one expects in badly eroded reliefs.

The above factors, together with a fairly accurate central position, lead us to consider it a marker, probably sculptured. Against this interpretation one must weigh the fact that the two apron-markers differ very greatly in form; and also that Stela 45 was apparently set flush with the general apron surface, and could have been hidden by plaster. The alternative is to believe that two differing stones, both very much larger and heavier than the normal slope-veneering stones, one sculptured, the other Probably so, merely happened to be used in central positions on the aprons and nowhere else, their surfaces hidden under the plaster of the slopes.

We must dispose of the question of possible panels functioning as markers at the ends of the aprons with the remark that no good evidence for or against their existence was found, or properly searched for. Such markers, if existent, were not of the long stela-like type of Figure 8.11, A. Such stones, if placed opposite the end alley-markers, would have been found in place. If at


Figure 8.13 Playing surfaces of Structure R-11b, looking south; apron and two alley markers in situ.
the extreme ends of the aprons they might have fallen to the end-fields, but scarcely could have broken to small unnoticed fragments. Such stones were certainly not placed at the extreme apron ends with their bases as close to bench level as in the known case. In three of the four possible cases, smooth slabs of ordinary thickness were still in these positions. More or less broken, these seemed to be larger than the average. One of them may be seen in Figure 8.12. It measured 1.2 m on the slope, 0.9 m in width. The others were 1.1 and 0.8 m high. Stela 45 was set with its base only 0.7 m from the bench, measuring on the apron slope.

However, end apron-markers of the Figure 8.11, B type might have existed in positions similar to that of the supposed central apron-marker on Structure R-11b which had its base about 1.1 m from the base of the apron. Veneering slabs were not in position at any extreme end, or opposite end alley-markers at this level. If broken, the special nature of their fragments could have been easily overlooked, since no special study of the nature of the debris in these areas was made.

Curiously, the central alley-marker differs from the others in several details. Its top seems not to have been sculptured. It is much thicker, and apparently bedrock had to be scooped out to get it at the correct level (see Figure 8.6a or 8.6b). In vertical section its sides are approximately straight but rather rough, while those of the other two are for the most part at least nicely worked, except toward the underside, and show a bulging tendency. They also seemed to be more truly circular than the cruder central marker.

The vestiges of sculpture are very disappointing and are, I think, sufficiently indicated in Figure 8.11. For the end alley-markers there was undoubtedly a central design with peripheral glyphs, though whether this
band formed a complete circle is at least doubtful. In the case of Stela 45, enough remains to indicate quite surely a double column of glyphs, with a narrow border, probably extending from top to bottom. Taking the four identifiable glyph blocks at the bottom and other identifiable glyph remnants and inter-glyph-block channel remnants into account, it seems probable that there were 14 blocks to each column, or else 12 in each, below a four-block introducing glyph, the latter being a possibility.

The top, sides, and back are nicely smoothed, the top slightly but definitely rounded. These factors, plus the all-glyph design recalling the four-column Stela 36, also with a rounded top and parallel sides, suggest an original stela, here re-used. Such an interpretation is now somewhat fortified by finding in fill at Structure R9 the fragments of an even smaller stone, unsculptured, with a top only slightly rounded like this one, but with non-parallel sides and a rather obvious butt suggesting vertical erection. On the other hand, Stela 45 has no plain butt whatever for vertical erection. In 1932 we supposed this had been broken off, as appeared probable, with the stone in position. But in 1933 it was taken out and has been left on the bench. The broken character of the base holds good only near the face; the bottom is elsewhere nicely worked and even somewhat rounded, like the top. A plain butt might have been removed for some unknown reason, perhaps to allow slight elevation of the inscribed portion only, above the apron face, though it seemed to be set flush. However, the bottom was completely hidden by the apron fill and its tooling at this time would seem meaningless; it probably never had a plain butt. If it did not have, it is very doubtful if it ever stood vertically and free, like a stela as ordinarily conceived.

A fair deduction from the facts presented seems to be that the term Stela 45, with quotation marks indicating doubt as to stela function, is a proper modification of the straightforward Stela 45 already used in print by Morley, while the hypothesis of reuse is fortified by the finished nature of the bottom. Such re-use, in turn, fortifies our central apron-marker interpretations for both structures. That for Structure R-11b, if sculptured, was a stone of the same general slab-character as a central structure- marker found in the other ballcourt, Structure K-6; the R-11a marker may differ so decidedly from it because of a desire to incorporate and preserve a pre-existing inscription.

Abandonment of a hypothesis that the alleymarkers may have been set in depressions in the alley floor, suggested in the 1932 report, has been noted elsewhere. Northerly and southerly alley markers have been designated Miscellaneous Sculptured Stones 5 and 4, respectively.

Maximum dimensions of the markers, in meters, are given in Tables 8.3 and 8.4.

In view of the possibility of use of end-fields, or parts of them, as playing surfaces, it was considered worthwhile to search for markers there. Excavation over a large area, made it practically certain that the three alley-markers were the only field ones, at least of imperishable materials. There were definitely no imperishable center markers on the benches, as found by Morley at Yaxchilan.

## Orientation

The long axis runs about 29 degrees east of true north. The short one runs about 35 (instead of 29) degrees north of west, because of parallelogram distortion of about 6 degrees. The general northeast and northwest orientation is the same as that to be seen as a general rule in the South, East and West Groups. All indications are that this general trend is due to application of the rectangular court and plaza idea to a broken natural terrain. For both this court and the West Group ballcourt (Structure K-6), the northeast-southwest line was chosen for the longer axis. This has no necessary symbolic significance. In each case this resulted in a good view of the playing surfaces, from vantage points on structures which may have been nearby at the time the court was laid out. Here, this could have been Structure R-7-2nd; in the West Group, one of the phases of Structure K-5. We have here no support for a theory that there was a special rule for orientation of ballcourts with respect to the cardinal points. Had it been desirable to run the long axis of Structure R-11-2nd-B toward true north and south, that could have been done with little or no extra labor.


Figure 8.14 Cut section through alley floor exposing veneer slabs of Structure R-11b bench face. Brush on final floor; note plaster of bench overriding slabs, which also appears at lower left in Fig. 8.13.


Figure 8.15 Apron marker (Stela 45), Structure R-11a in situ (trench at observer's left).

## Dating

Failure to find plaster or the crushed stone remains of concrete floors under any of the units of R-11-2nd-B leaves little doubt that it is the first masonry structure ever erected on this spot. The conclusion is supported by frequent instances in which walls of this phase seemed to rest directly on bedrock, while walls at later phases did not.

If Stela 45 was a re-used stone, as suggested by its dissimilarity to the other apron-marker and by the tooling of its bottom surface, the court surely does not date back to the very beginning of the site. There are inconclusive hints that the 2nd-B phase was, however, quite early. According to Morley, this stone exhibits early glyph-style characters, and if, after all, it is a reused stela, in proportions it is most like a unique plain one broken up and buried at Structure R-9. There are some grounds for thinking that the latter stone was fairly early. This stone therefore permits a fairly early date for this court.

Ceramic finds were pitifully few, and dating on that basis cannot be attempted here. However, a few suggestive facts may be noted. The caches in Positions 1 to 5 were in Unit Ls (R-11-2nd-B). The vessels at Position 3 are illustrated in Butler (1935, Plate VI.1-2). A sherd of what could be the twin of the mat-design bowl was taken from clay on bedrock below the well-preserved floor of the earliest Court I level on the Acropolis, which marked the first of six major construction periods there. Types
which seem to appear only in later constructional periods there, including lipped bowls and orange-bar decoration, were present here in Position 8 (see Object Table). These might be later than any of our ballcourt constructions; they at least suggest that the site of this structure was not abandoned before others. This of course is no proof that it was in use as part of a ballcourt down to the time of abandonment of the city. My impression is that the various phases of the court cannot be dated with the meager number of sherds recovered, and because of the uncertainty arising from lack of well preserved floors. But early and late sherds are present, and special excavation with such dating in mind might be successful. We can say this much: unless the caches in the Unit Ls part of the southerly playing field were late intrusive deposits of out-of-style bowls, the earliest phase probably goes back to a time within the period of Butler's Polychrome E. This is associated elsewhere with tripod flanged, bowls and plain slab feet.

## Function

The ballcourt function of Phase R-11-2nd-B cannot be doubted. However, the marked differences in disposal of playing surfaces, when compared with those of the other ballcourt, Structure K-6, cause one to wonder if it did not finally become obsolete as a ballcourt. If it did, the structures, certainly never removed, might have eventually been used as bases for buildings having nothing to do with the game. Most additions to the original form of these structures can be interpreted, if one wants to speculate as making them more like ordinary building substructures than they were before, as seen from outside the court proper. So I do not think the later forms should be taken as surely representing what one might call local "ballcourt architecture."

The marked differences in the approaches to the R11a and R-11b tops in the later phases may be mentioned in this connection, and also the difference in character of debris on the respective tops.

Table 8.5 Structure R-11 Average Dimension Table: Structures

| Structure | R-11-2nd | R-11-1st |
| :--- | :--- | :--- |
| Bench Height | $0.8^{*}$ | $0.7^{*}$ |
| Bench Depth | $3.8^{*}$ | $3.4^{*}$ |
| Bench-Face Height | 0.8 | 0.7 |
| Bench-Face Slope | $* *$ | Same |
| Bench-Top Slope | 0.0 | Same |
| Apron Height | $1.8^{*}$ | Same |
| Apron Depth | $1.5^{*}$ | Same |
| Apron Slope | 36 degrees | Same |

${ }^{*}$ Dimensions depending on reconstruction.
** Bench face curved in cross-section. Effect is of very gentle slope.

Table 8.6 Structure R-11 Average Dimension Table: Alley

| Alley | R-11-2nd | R-11-1st |
| :--- | :--- | :--- |
| Width <br> Length (equals <br> length of benches) | $3.5^{*}$ | $4.3^{*}$ |

Table 8.7 Structure R-11 Average Dimension Table: End Fields

| End Fields | R-11-2nd | R-11-1st |
| :--- | :--- | :--- |
| Short Dimension | 11.1 | 17.0 |
| Long Dimension | 27.1 | 21.0 |

Table 8.8 Structure R-11 Object Table (Operation S-1)

| Position | Sherds | Figurines | Cache Contents | Eccentric Obsidians | Remarks and Miscellaneous Objects |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | -16 | -16 | -16 |  | Cache was of bowl, eccentric obsidians |
| 2 | -18 |  |  |  | Cached bowls (two, polychrome) |
| 3 | -19 |  | -19 |  | Cached bowls (two, polychrome) |
| 4 | -20 |  |  |  | Cached bowl (possibly two) |
| 5 | -24 |  |  |  | Cached bowl |
| 6 |  |  |  | $\begin{aligned} & -50 \\ & -51 ? \end{aligned}$ | -7 (spindle whorl; -53 (bone) |
| 7 | -8; -9 |  |  |  |  |
| 8 | $\begin{aligned} & -6 \\ & -47 \end{aligned}$ | -44 |  |  | -41 (bone); -42 (hammerstone?); -45 (pottery disk); -46 (pottery rectangle); -48 (mano stone) |
| 9 | -40 |  |  |  | -40 (pottery object, obsidian, shells) |
| 10 | $\begin{aligned} & -28 ; \\ & 35 \end{aligned}$ | $\begin{aligned} & -25 ;-26 ; \\ & -27 ;-34 \end{aligned}$ |  |  | -29 (bone); -30, -31 and -36 (flint points); -32 (mano stone); -33 (flint and obsidian). Discarded red pebble, pumice stone. |
| 11 |  | -49 |  |  |  |
| 12 | $\begin{aligned} & -11 ; \\ & -12 ; \\ & -15 \end{aligned}$ | -11;-13 |  |  |  |
| 13 |  | -17 |  |  |  |
| 14 | -52 | $\begin{aligned} & -1 ;-2 ; \\ & -3 ; \\ & -4 ;-5 \end{aligned}$ |  |  | -23 and -37 (pottery disks); -38 (fragment of metate?); -43 point |

Note: Pottery disks are cut from sherds.
Key to Position Numbers
1-5-Horizontal positions indicated by nos. 1-5 in Figure 8.10. Vertical positions: 1, not noted; 2, in crushed stone floor material which rested on fill of Unit Ls; 3, same; 4. level not noted; 5, in floor material. Despite incompleteness of record, no reason to doubt all five positions are those of caches in Unit Ls, but proof lacking as to when made; cache at position 2 was surely of one bowl inverted over another. 6-In or below Unit Ka (center trench); sherds and spindle whorl may date with or before this unit. 7-In or on Unit Ls. 8-In or on Str. R-1la, top. 9—Same, northerly corner of Unit Da; probably a cache, hence probably in Unit Da. 10-In debris just right of Unit Da stairway wall, 30 cm above Unit E floor. 11 -In or on Str. R-11b, top. 12—In debris from Strs. R-1la, R-11b, or in or on Unit L. 13-In or on Unit Bs or Str. R-7b-1 ${ }^{\text {st }}$. 14 -At Str. R-11, precise location unknown or doubtful.

## Future Work

It would be of some interest to know whether either of the end-fields in the earlier 2nd period was originally raised on three, and not merely on the two known sides. If half of the rear face of Unit Ka were laid bare, the function of the projecting stones found at center might be determined; if others appeared and showed a pattern, stucco decoration would seem likely, and actual remnants of it might be found. Care in such an excavation might prove presence of cached pottery in the later addition, of which we already have uncertain evidence. To learn these things, several days and several workmen with equipment would be needed. On the other hand, a very little digging ought to confirm or disprove our reconstruction of a shouldered stairway in Figure 8.3. A small amount of digging, with care, following the walls of the early end-field Units Ln and Ls below Unit E might settle the interesting question whether the tops of the early end-fields disappeared in the next period. This last question would have some bearing on the interpretation of ballcourts elsewhere, and the answer should have been sought. The other unknowns mentioned do not seem important from this point of view. Accurate heights of the bases of playing surfaces at various points could be quickly secured with a leveling instrument, and should have been taken, for the same reasons mentioned under this heading in the description of Structure K-6 (Tables 8.5-8.7).


Figure 8.16 Trench through late fill and debris of R-11b and Structure R-12 to show earliest rear wall and remnant of stair sidewall of Structure R-11b (R-11-2nd-B phase).

## Masonry Notes

## Fills

Pure broken rock, Units Ka , Da . The rock is all small in the shallow fill under the bench and only there; rests partly on solid earth and stone layer which may have been accumulated in preliminary leveling of fields, and which forms base of the fill under bench (Fig. 8.6a). Pure broken rock also used in building up part of northerly end-field. Solid earth and stone fill used for Unit L, where seen. Excavation insufficient to reveal fill walls, if present.

Walls
Outer or rear walls of Units Ka and Kb known from satisfactory exposures (Fig. 8.16); for the most part of medium-sized tabularblocks, with chinking. Laid dry (unless mortar had leached out). Impression is one of well-made dry wall; remnant of plaster surface in place proves it was plastered. Dry-laid effect not seen elsewhere. Exposures of other well preserved sections of wall unsatisfactory. Tabular stone used throughout. Ends of Units Ka and Kb seemed to tend to use of longer stones.

## Concrete

Benches surfaced with thick layer of very hard concrete, for the most part well preserved. Concrete floors topping Units Ka and Kb also in good condition, better on Ka than on Kb , but those presumably topping Units Da and Db were disintegrated and remains not evident, presumably having percolated downward into the fills. Less durable type of concrete in later phase thus indicated. Crushed stone remains of concrete floors seen for Units L, H, B (base surfaces) and for Units I and E. No reason to doubt that all floors were concrete except possibly in some places where leveled bedrock may have been left exposed and served as floor-surface.

## Bench Faces

Concrete continuous with that of tops; at base plastered sloping veneer-facing of thin slabs on solid fill. If bench concrete had disintegrated, the stone-clad slope effect of Blom would have remained, but not to full bench height.

## Apron Faces

Sloping veneer of thin slabs; where seen in section (Unit Ka ), facing rested directly on pure broken rock fill.

## Plaster

Remnants seen at stair-angle of Unit Kb ; at junction of bench-top with apron face of Unit Ka, proving apron face was plastered; and on face formed by side of Units J' and I', extending across the line of juncture. All plaster noted was relatively thick; no fine finishing plaster noted as surviving. Note: In the section-drawings of this
ballcourt, solid lines over crushed-stone symbol indicate clearly recognizable surface of still hard concrete, but not finishing plaster on it. Finishing plaster would not be
expected to have survived anywhere on this structure, and the survival of some of the concrete in good condition is surprising in such exposed positions.

# 3. Structure K-6:The West Group Ballcourt 

Linton Satterthwaite

## Preliminary Remarks

The ballcourt function of Structure K-6 was apparently first suggested by Lothrop, his opinion being based on Ricketson's delineation of twin mounds (K-6a and K-6b). On the unpublished Ricketson map they were known as Structures XXXVII and XXXVIII. They were mere mounds then and when we first saw them, no masonry whatever being in evidence. An excavation had been made through the top of Structure K-6a. We later found a sherd at this court with the incised notation "CAR. INST. MAY 1921" and Ricketson's initials, and presumably the excavation was made by Morley and Ricketson. This cut was at center, and proceeded back from the bench-top.

In 1931 Mason determined the absence of alleymarkers; in 1932 the writer found the bench faces to be vertical. A short note recounting these facts was appended to Piedras Negras Preliminary Paper no. 2 [Chapter 2, this volume]. In 1933 the writer undertook what seemed at the time a reasonably thorough examination. The mounds were bushed, except for a tree or two (Fig. 8.23), and ends and all playing surfaces of the structure were followed in their entirety, or until they gave out. Structure K-6a was trenched at center to full depth, the top of the trench showing as a dark line in the figure. The surface of the alley and of a narrow strip along the ends of the structures was taken down below wall-base level, principally to make absolutely sure of the absence of stone markers in the alley.

## Unit Designations and Temporal Sequences

Three pairs of sequent constructional units make up the final structures, and define as many phases. For identification on the drawings these units are lettered $\mathrm{C}, \mathrm{B}$ and A , in order of time, with small letters attached to indicate whether on Structure K-6a or K-6b. The capital unit-letters correspond to the phase letters in the designations Structure K-6-C, Structure K-6-Bl' and Structure K-6-A. There were, without much question, at least two floor surfaces on the alley and adjacent parts of the open end-fields. The earliest ballcourt units ( Ca and Cb ) were almost certainly later than the earlier of these floors, and later than what seemed to be a remnant of some
earlier structure on it (Fig. 8.19a). Hence the earlier floor is considered to be a general plaza floor which was in use for some time before the ballcourt was built on it. We do not know whether the resurfacing occurred as part of the activity of ballcourt construction or not. It occurred after the bench faces (of Units Ca and Cb ) had been built, since they are based below its surface. But we neglected to ascertain its time relation to the later increments.

## Remarks on Drawings

Walls could be followed everywhere at field and alley level, but for the most part were in good condition only near this level. None stood to full original height. Stopsurfaces behind the bench could be followed except near the ends, but above the first course or so were in very bad condition. Hence there is little imagination needed in reconstructing the basic plan, but full reconstruction requires a good deal. All satisfactory parts of walls seemed to be vertical. But except for the rear of Unit Ca, the surviving height seen was too little to assure positively that there was no slope whatever, and even there a possibility of movement of a steeply-sloping wall to vertical position should be allowed for. However, this wall was seen at a corner (Fig. 8.24) as well as at center, and to fair heights. Everything noted indicates true verticality throughout.

Figure 8.17. The broken-line reconstruction illustrates a failure to follow the rear of at least one of the C units from a corner to center. The reconstructed rear projection, common enough on temples, must here be taken as a suggestion only. It accounts for the following facts. At all four corners a veneer-like secondary wall, about 30 cm thick, had been placed against the rear of the C unit, its end flush with the end of the C unit. These additions are labeled Ba and Bb in Figure 20. They were not properly investigated. But photographs of the two southerly rear corners show rather clearly that the division line between the C and B units does not quite reach the base level of the earlier, in either case. The secondary unit, Ba, was not found at center (Fig. 8.19a). But, according to the cross-section, the rear of Unit C at the section line was on a line joining the corners (above


Figure 8.17 Isometric reconstruction Phase C of West Group Ballcourt Structure K-6a at right, Structure K-6b at left, with alley between. At extreme right, alternative reconstruction of rear of Structure K-6a.
base level) formed by the additions. It is thus restored in Figure 8.18. Unfortunately, while corners were located by Parris with the instrument, location of the Unit C wall in the section depends only on a taped measurement by the writer.

Rear projections on temples probably reached here from the direction of the Petén. By way of hypothesis we might suppose this sloping bench type of ballcourt structure did likewise. It is therefore important not to use the suggested Petén-like rear projection as a satisfactorily established trait on this ballcourt. To discourage such use an alternative simple and possible reconstruction is suggested in part at the lower right in Figure 8.17. However, the main drawing presents a reasonable explanation of otherwise not understood facts.

For doubts as to the exact placement of the panelmarker in the stop-surface.

Figure 8.18. If Units Aa and Ab in this figure were removed and lines hidden by them supplied, this figure would show the supposed simplified form of the structures in Phase B. It is supposed that this consisted merely in blanking out the hypothetical rear projection of Phase C. In the final phase, Units Aa and Ab were added, and we show these as found, ruined except near the base. Whether they rose to full height or not could not be determined.

Figures 8.19a and 8.19b. Figure 8.22a is a composite cross-section. The bench face, the rear wall of Unit Ca and the early court floor are at center, and only here was the fill cut through, as indicated by hatching. The surface line and the section through the stop-surface wall and bench top were carefully measured on a line several meters southwest of center, where preservation was better. This fact may contribute in part to a difference of 23 cm in the maximum height of the bench here, as compared with that of the other structure (Fig. 8.19b). Despite this difference, total heights are reconstructed as identical. This seems required by the nearly identical maximum surviving heights of the rock fill behind the benches, though it results in a stop-surface slightly higher for Structure K-6a than for Structure K-6b.

In contrast to alley and playing surface sections, for which heights at short intervals were carefully taken, the early floor below Unit Ca is merely assumed as level. Unit Aa was seen near center (though undoubtedly carelessly dug through there); it is left hanging in the air since we do not know whether it was based on the early floor or on a later one.

The slope of the bench top used in the reconstructions accords with that of the indicated small remnant of concrete, which dropped 10 in 100 cm . A bench-face height of about 1.2 m results. The maximum surviving height, not at this part of the structure, was 84 cm . A


Figure 8.18 Isometric reconstruction, Phases B and A of West Group Ballcourt. Letters refer to constructional units described in text. Reconstruction of Phase A (Units Aa and $A b$ ) incomplete.


Figure 8.19 a. Cross section, Structure K-6a and alley (all phases); b. cross section Structure K-6b and alley (all phases).


Figure 8.20 Plan of West Group Ballcourt, Structure K-6a at top, K-6b below with alley between. Lettered units of all phases are shown.
gentle slope of something near that adopted is confirmed by the maximum surviving height of rock fill just behind the bench face. In the figure the top of the fill, i.e., of broken rock apparently in original position, is indicated by a wavy line limiting the hatching for Unit Ca. This line represents the situation in the same vertical plane as the surface line and the section through the concrete.

The same bench height is arbitrarily used in Figure 8.19 b , but the bench top reaches a point measured as 23 cm higher than the corresponding one in Figure 8.19a. The result is a slightly steeper slope in Figure 8.19b (Structure K-6b). Figure 8.19 b is not composite, and represents the situation as found at center only.

Rather than scaling bench dimensions from these sections it seems safe to say that they are both about 4.4 m deep, average about 1.9 m in total height, and that the average bench-face height was something over 84 cm , with the actual average height surely at least a meter and probably somewhat more. As reconstructed, the bench height is 1.2 m , the resulting slope only about 6 degrees. If the average bench height is taken as only a meter, the resulting slope would be about 11 degrees. Probably the intended slope was somewhere between these, and very likely it varied somewhat in different parts of the structures.

Figure 8.20. The plan shows walls of all phases, at or near base level of the element concerned. It is founded on points indicated by circles in Figure 8.21, which were carefully located by triangulation with instrument and check measurements, except that location of the exposed section of the rear wall of Unit Ca is based on taped measurement by the writer. Apart from this last item the plan is by Parris and considered to be quite accurate. The numbers 1 and 2 indicate the approximate locations, as found, of Miscellaneous Sculptured Stones 9 and 10, respectively.

Figure 8.21. This diagram is a projection, from Figure 8.20 , of Phase C points located by Parris. See under Measurement.


Figure 8.21 Diagram showing projection of points on Units Ca and Cb to illustrate parallelogram distortion. Line $A$-to- 3 is parallel to Line 2-to-4.

## Measurement

For the plan of Phase C included in Figure 8.20 Parris located 20 points with the instrument. Fifteen of these were at or close to field level, and of these, 13 were on the ends of the structures. In Figure 8.21 these 13 points are selected and shown as if projected to the left from Figure 8.20 , and are made the centers of small circlets. Of course they occur approximately on two lines, and to save space the two lines of points are brought closer together than in the plan of Figure 8.20. Otherwise Figure 8.21 preserves the correct relative positions of all points shown. Those given the numbers 1 to 8 in the figure are at corners, the rear or. outer ones (Points 1 to 4 ) being slightly above field level. Thus we avoid the somewhat doubtful question of whether during this phase the rear corners at field level were in line with the supposed central rear projection. In the diagram the outer or rear corner points (Points 1 and 3 , and 2 and 4 ) have been connected by straight lines.

If the Maya had laid out the structures perfectly and had then built exactly to the line, then with perfect surveying and drawing on our part the geometric figures 1-2-5-6 and 7-8-3-4 would be exact rectangles, and all points located would fall on lines 1 -to- 3 and 2 -to-4. The circlets are intended to aid one in noting discrepancies from this ideal situation. The structures are undoubtedly close to bedrock and there was no evidence of appreciable movement of any of these points, a factor that we shall therefore disregard. Of course the surveying and subsequent drawing were not so accurate as the most refined techniques might have made them, but were done carefully with the thought that conclusions might be drawn. Figures 8.20 and 8.21 probably present approximately true pictures of the Maya deviations from the ideal.

Both Points 5 and 6 (on Unit Ca) lie somewhere between 5 and 10 cm north of Lines 1 -to- 3 and 2-to-4, respectively. Point 7 and the unnumbered point between it and Point 3 (on Unit Cb ) lie about 5 cm south of Line 1 -to-3. The other unnumbered points lie too close to Lines 1 -to-3 or 2-to-4 to permit estimate of the amounts of discrepancy if any.

Line 3-to-A has been drawn through Point 3, parallel to Line 2 -to-4. It passes south of all the located points of the southerly series except that nearest Point 3. It brings out the fact that the figure 1-2-3-4 is not a perfect parallelogram. Considering Line 3-to-4 as a base, side 4-to- 2 makes an angle of about 93 degrees to this base, while side 3-to-I makes an angle of about 94 degrees to it. But the figure closely approximates parallelogram form, both divergences from the expected right angle being in the same direction.

Table 8.9 lists measurements, in meters, scaled from the original Parris plan, drawn at scale of 100 to 1. These figures were obtained without benefit of special equipment for great accuracy in reading.

Table 8.9 Structure K-6 Metric Dimensions

|  | Unit Ca |  | Unit |  | Alley |  | Units Ca-Cb | Ca-CB |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Cb |  |  |  | Outer Corners | Corners |
| Depth | 1-5 | 8.5 | 7-3 | 8.6 | 5-7 | 6.6 | 1-3 | 23.8 |
|  | 2-6 | 8.6 | 8-4 | 8.7 | 6-8 | 6.7 | 2-4 | 24.0 |
| Length | 1-2 | 21.2 | 7-8 | 21.5 | 5-6 | 21.2 | 1-2 | 21.2 |
|  | 5-6 | 21.2 | 3-4 | 21.5 | 7-8 | 21.5 | 3-4 | 21.5 |

On the basis of Table 8.9 , so long as we consider only one structure at a time, lines expected to be equal are so within a discrepancy limit of about 10 cm . This also holds good for the two structures considered together as to depth lines, but not as to lengths. The Ca unit benchface (Line 5-6) is 25 cm shorter than the Cb bench face (Line 7-8). The rear of the Ca unit does not compensate for this discrepancy but adds to it, Line 1-2 being the shortest length of all. This, when compared with the longest, Line 3-4, gives 35 cm as a maximum discrepancy from expected correspondence in linear measurement.

How much may eventually be deducible concerning the Maya method of laying out this court I do not know. What was learned concerning the facts is presented for what it is worth. A stumbling block is lack of any way of knowing how faithfully the actual builders may have followed lines laid down for them. It appears to me necessary to believe that at least cords were used to translate the length of an element, once established at one place, to other places where needed. Neither judging with the eye nor even pacing, seems a likely method of producing repeated correspondences within 10 cm of identity, some between lines as much as 22 m long. Differential stretching of such cords might account for some of the discrepancies noted. A shifting from one established line to another when stretching the cord for use at a third place might result in a final error greater than any single one.

Suppose Lines 3-to-4 and 4-to-8 were first established as the rear and one side of Unit Cb , by pacing or some other method, resulting in the obtuse angle of Figure 21. Then let two men stretch a cord from Point 3 to Point 4 ; let one then carry his end to Point 8 and let the other carry his end to the neighborhood of Point 7. If, drawing away till the cord was taut, he merely estimated the correct position for Point 7 by estimating a right angle to Line 8 -to- 4 , the resulting angle at Point 8 might be right, acute, or obtuse. The resulting angle at Point 3 would be acute, and Line 7 -to- 8 would equal Line 3 -to- 4 ; but only by chance would Line 7 -to- 3 be equal to Line 8 -to- 4 . It would seem natural for another pair of men to stretch a cord from Point 8 to Point 4, one end then being carried
to Point 3, the other to the neighborhood of Point 7. If the two men there then brought their cord-ends together, they would have Point 7 at the proper distances from Points 8 and 3, apart from small errors creeping into the process. This much geometrical construction must, it seems to me, be allowed to these Maya, in order to account for observed facts,

Such a process, with perfect linear measurements, must produce a figure with opposite angles equal. It would be a rectangle if the original angle was 90 degrees, a parallelogram if not. Since the linear measurements, if it is granted they were made, were quite obviously not perfect, the process would produce only approximations of perfect rectangles or perfect parallelograms. The latter we find here, as we did at the South Group Court. An occasional nearly perfect rectangle, resulting from nearly perfect estimate of the first angle, would not be unexpected.

The amount of distortion from the ideal rectangle must, with imperfect but reasonably accurate linear measurements of the sort just postulated, correspond by and large at all corners, but should not correspond exactly. As to direction, and approximately as to amount, the angular/error would everywhere be determined by the angle between the first two adjacent sides laid out. If this angle was judged with the eye, without benefit of geometrical construction, one would expect it to vary within limits from structure to structure, though all were intended to be truly rectangular. That is the situation when we compare the distortion here, 3 to 4 degrees, with that at the South Group Court, where it was 5 to 6 degrees. This difference in amount of parallelogram distortion, in structures of the same function, argues against the mere logical possibility that parallelogram plans were actually desired and purposely constructed.

Our tentative conclusion from the data here presented has been that parallelogram plans were inadvertently constructed as a result of estimating the first angle and thereafter controlling the plan with fairly accurate linear measurements. The latter, however, need not necessarily have involved use of standard units of linear measure. It is implied that a standard of length for each like element
was determined upon for the structure being laid out. This length could be recovered at any time by stretching a cord along the first such element constructed, or a cord might be knotted for this particular length for use wherever needed thereafter.

This bit of theorizing is inserted in a factual portion of the report by way of exception. It seemed wise to justify as far as possible the parallelogram principle which we use extensively in other reconstructions, without waiting for publication of sections of the report set aside for interpretation.

Cord measurement of the simple sort postulated could very easily be adapted for the purpose of getting the stop-surfaces one-half way to the rear of each structure. The plan of Phase C shows that they are so placed, within a few centimeters, if the supposed rear projection is disregarded. To accomplish this for Unit Ca , the structure having risen to full bench height, one had only to stretch a cord from Point 1 to Point 5, double and stretch along the wall from either Point 1 or Point 5. This would give the horizontal position of one end of the proposed stop-surface at field level. It could be translated to the proper level with a stone tied to a string, i.e., with a plumb line. And so for the other end. If the higher point was located above the lower by sighting without a plumb line, resulting errors would affect the plan very little.

Table 8.10 Structure K-6 Alley Dimensions

|  | North | South |
| :--- | :--- | :--- |
| Unit Ca | 6.5 | 6.6 |
| Alley | 6.7 | 6.6 |
| Unit Cb | 6.5 | 6.5 |

When we come to Phase A we find that the rear addition has been carried around each corner so as to leave a constant amount of the original ends still exposed at field level. A symmetrical arrangement is what one would expect, but the particular amount of old wall left exposed may possibly be significant, it is equal to the alley width. To obtain this distance one had only to stretch a cord between the bench corners and use the cord as the unit in measuring back along the ends from each corner. To check the degree of accuracy with which this may have been done in the latest phase, measurements scaled from the original Parris plan are listed below (Table 8.10). The alley widths at north and south ends are compared with lengths of those portions of Units Ca and Cb left exposed during Phase A (Table 8.10).

At the north, if the northerly alley-corner distance was taken as the unit there, the discrepancy is as high as 20 cm . But if the southerly distance ( 6.6 m ) was taken
as the unit, the cord knotted and the same cord-length used throughout, the maximum single error at this time comes out as minus 8 and plus 10 cm . We should remember that our own techniques of measuring what was built are subject to error, and builders in rather crude tabular masonry probably would not follow established lines with exact precision.

Unless Parris has made a bad blunder, the Maya were very careless during Phase A, at the north end of Structure K-6a. The amount of projection of Unit Aa is quite constant at three of the four ends of the structures, but differs sadly here.

No walls survived to the top edges. Accurate levels at the bases of stop-surfaces were taken at only one point for each, these differing by 23 cm in height. At neither was there any particular evidence of settling. Levels at various points of the other wall bases were not taken, so we cannot say whether this discrepancy, or part of it, was due to slight slopes in the original plaza floor. However, the maximum surviving heights of rock fill behind the stop-surfaces were identical (measured as 3.16 and 3.17 m above the same zero point at base of Unit Ca bench). The meager data available suggest that correspondences in level were not very accurate, except by chance.

## Proportions

Disregarding small discrepancies discussed under Measurement, and a probable central rear projection, the depth of the bench during Phase C was equal to the depth of the structure top proper. Using average values of 6.7 m and 21.3 m , respectively, the alley width was about 31 percent of alley length. Taking the average distance between stop-surfaces as 15.3 m , the alley occupied about 43 percent of the area between the structure stop-surfaces. During Phase A a rear modification encroached on the original ends, but left the latter still exposed in amounts each equal in depth to the alley width.

Table 8.11 Structure K-6 Average Dimensions Table: Structures

| Bench height | 1.9 |
| :--- | :--- |
| Bench depth | 4.4 |
| Bench-face height | $1.2 *$ |
| Bench-face slope | V |
| Bench-top slope | 6 degrees* |
| Stop-Surface Height | $2.9 *$ |
| Stop-Surface Slope | V |
| *Note: Starred dimensions are approximations |  |
| based on reconstruction. Bench top slope is possibly |  |
| somewhat greater but less than <br> means approximately vertical. |  |



Figure 8.22 Drawing of fragments of stop surface marker from Structure K-6 (Miscellaneous Sculptured Stone no. 10), with reconstruction in broken lines, after Proskouriakoff.

## Markers, Sculptural Decoration

As already indicated, the search for stone alley-markers was thorough, and negative in result. Since everywhere at field level the floor had disintegrated to mere crushed stone and earth, nothing can be said as to presence or absence of painted or plaster markers, or lines of perishable materials.

The panel illustrated by the reconstruction drawing of Figure 8.22 undoubtedly marked the center of the K-6b stop-surface, almost surely placed with its base 35 cm above the juncture of this surface and the bench. Here at center, and here only, the stop-surface survived with a level top for a length of about 1.9 m . The reason for this even-top survival was a course of slabs, 35 cm above the base, which acted as headers into the fill. Obviously this strengthening effect was not their only intended function, or they would have been found elsewhere than at center. They undoubtedly were placed here, partly if not entirely, to give an even level bearing for the marking stone. About 2 m from this line of slabs the wall was noted as surviving to a height of 60 cm . Such slabs were not seen elsewhere in this wall, or in the corresponding one on Structure K-6a, the center there having been torn out by a prior excavation.

The marker is known as Miscellaneous Sculptured Stone no. 10. The fragments were found lying face down on the bench, at the position marked 2 in Figure 8.20, in front of the slab construction. They were seen in position by the writer when summoned by Benjamin Aguirre, one of our sharpest-eyed workmen, who noted that they were sculptured. Six fragments were then present, most of the immediate area having been already cleared. An extensive search in recently dumped material from this general location failed to yield more fragments. We have every reason to suppose that all fragments were here, but that most of those not found were plain, and one or two others so broken and weathered that the missing pieces were consigned to the dump. Once removed they probably could not have been identified without matching hundreds of fragments against what was found. The problem was similar to that of isolating the sherds of one plain pottery vessel from a pile of hundreds of sherds. Only a few attempts at actual fitting were made.

In view of this experience it is obvious that remains of broken-up markers from the ends, or from near the ends, of the stop-surfaces may have gone entirely unsuspected. As at Structure R-11, here we have no evidence that such endmarkers existed, but the negative evidence means little.

Table 8.12 Structure K-6 Average Dimensions Table: Alley

| Width | 6.7 |
| :--- | :--- |
| Length (equals length of benches) | 21.3 |

The fact that a companion central panel on Structure K-6a was not found also means nothing, considering the poor condition and extremely flat relief of this one, and considering also that any other workman might have missed it. If the special slab-construction for the support of such a stone on the K-6a structure existed, it was destroyed by the prior excavation. So, I think, symmetrically placed center panels, at least, are to be assumed as probable for each structure, since they are twins in other respects.

The stone, as reconstructed on an assumption of symmetrical placement of the two carved figures, measured 1.4 m in length. The height was 69 to 70 cm , thickness 9.5 to 10.5 cm . The top edge was slightly rounded in cross-section, the bottom not, which confirms the supposed vertical placement. The rounding of the top edge suggests that this was somehow left exposed; but remnants of white plaster on the face all but prove the contrary. A surviving patch of this plaster ended on a straight horizontal line at the bottom of the patch. It here turned out to a ragged edge, as if it were the base of a broken-off plaster band or molding which ran across the top of the face of the stone. This was so placed as to indicate a failure to follow the quasi-rounded outline of the upper corner of the stone, as seen from the front. This evidence indicates a molding here about 8 cm wide, which presumably turned vertically down the sides, and perhaps turned at the bottom to run immediately below the feet of the figures. Here at the bottom the molding could have been affixed to the supporting wall. In Figures 8.17 and 8.18 this stone is restored to its obvious place
without these plaster modifications, which, after all, are somewhat speculative. However, there is a probability that when in use the figures were seen as in a rectangular plaster frame. It is also quite possible that the stone was set in from the general face of the stop-surface. In other words, the slabs may have floored a shallow niche, with the panel-stone at the back of the niche. Something of this sort might account for the presence of a line of slabs with a total length of 1.9 m , though the panel-stone was probably somewhat shorter. This again is speculative. Alternative possibilities are suggested against the time when such details of many courts may be definitely known. Intelligent choices may then be possible.

Figure 8.22 is a reconstruction of the design by Proskouriakoff. This was made from full-scale drawings and rubbings by the writer, from photographs, and also with the fragments themselves as checks. They have been bonded together, and the whole stone reconstructed, with plaster. But the missing parts of the figures, reconstructed in the drawing, have not been indicated in the plaster. This piece, now (1944) in the University Museum on loan, will eventually go to Guatemala. Its field and University Museum catalogue numbers are W-7-9 and L-39-239, respectively.

While certainly not in good condition, there is little doubt that surviving surfaces, except for the figures, were plain. Hence there was no ball between the figures, unless it was quite high up in a missing area. If the suggested plaster molding is added there will be little room behind the figures for anything else, though it is perhaps only an intelligent guess that a completely plain background existed. This un-Maya-like plain background may have been compensated by surrounding stucco-work.

The technique of the carving is also somewhat unusual. Nothing stands out beyond the general plane of the surface of the stone. Very shallow relief was obtained by cutting into it. With cross-lighting a silhouette effect

Table 8.13 Structure K-6 Object Table (Operation W-7)

| Position | Sculpture | Sherds | Figurines | Mod. Frag. | Miscellaneous |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | W-7-4 |  |  |  |  |
| 2 | W-7-9 |  |  |  |  |
| 3 |  |  |  |  | W-7-5; -6 (manos) <br> W-7-8 (small greenstone celt) |
| 4 |  | $\begin{aligned} & \text { W-7-3; } \\ & \text { W-7-10 } \end{aligned}$ | $\begin{aligned} & \mathrm{W}-7-12 \text { to } 17 \text {; } \\ & \text { W-7-19; } \\ & \text { W-7-20 } \end{aligned}$ | W-7-18 |  |
| 5 |  |  |  |  | W-7-1; -2 (human teeth and bones: Burial 4) |
| Key to Position Numbers: 1—On end field surface, probably fallen from Unit Ca, possibly from Unit Aa (see plan); 2 -On Unit Cb , fallen to bench top from stop surface (see plan, Figure 8.20); 3-From alley, probably fallen from positions on or in benches of Units Ca and Cb ; 4—Specific locations not given; probably fallen from position on or in the structures. Noted as "in debris;" 5-From alley, at approximate center; probably a subfloor cist burial. |  |  |  |  |  |

results at the peripheries of the design, where a deep cut is made at right angles to the stone. From this depth (about 5 mm ) the figures are worked out in shallow relief, with the original surface as the limiting factor. Figure 8.22 makes no attempt to indicate the silhouette effect. This drawing, made with great care, and for the first time reconstructing missing parts with broken lines, is intended to supersede an earlier one by M. Louise Baker. That was published in Satterthwaite 1933c; and Morley (1938:3:84) published a similar drawing, based on it. The Baker drawing, not made from the original stone, indicates the lines of deep cutting which outline the figures.

The style amounts to an insetting of the design so that its highest relief elements are flush with the general surface. Speculating, one is tempted to wonder if this may not have had a special purpose. If the large rubber ball was expected to strike the panel, the presence of the design could not have affected its course appreciably. But if the design projected from the background, its presence might on occasion have affected the angle at which the ball rebounded from the panel. Such a speculation is not meant to be taken seriously at present. But if, eventually, a correlation between ballcourts and this style of carving should emerge, it might then have some value.

## Burial

In testing for a central alley-marker in 1931, Mason encountered some stone slabs, probably from a disrupted cist, and human remains listed as Burial 4 in our records. These included portions of skull bones, jaws, humeri, and 21 teeth, apparently of an adult. Levels with respect to structure walls were not taken and floor surfaces had not survived here (or elsewhere), but there can be little doubt that this was an interment below the alley floor, at or close to its center. Despite the absence of alley-markers, special interest in the center of the alley is indicated, though such a burial could have no direct effect on the play.

## Orientation

The long sides run about 35 degrees east of true north. A glance at the map shows the very prominent position of this court in a main plaza, which was richly supplied with sculpture in the final period. The precise orientation is obviously intended to agree in general with those of neighboring structures, and the ballcourt has been centered before the important temple Structure K-5. That pyramid and basal platform exhibit several periods, and a parallelogram distortion of their own not followed by the pyramid stairways. It is therefore difficult to say how accurate was the centering of the ballcourt with respect to it.

In 1939 Godfrey located the four corners of the ballcourt alley with reference to the two inner outsets (next to and on either side of the stairway) of the K-5-

3rd lower pyramid terrace. His drawing shows that the axis of the alley almost exactly bisects a line joining the outsets, and therefore the base of the pyramid, on which they are symmetrically placed with little error. The alley axis is apparently at a true right angle to that line.

However, this is probably coincidence. The description of Structure K-5 will show that as one moves up and back from the lowest terrace, the center of each component shifts or probably shifted so as to stay over the axis of the parallelogram formed by the lowest. The centers of temple buildings and altars reflect this process of progressive displacement, as seen from the plaza. The stairway, as known from the phase of K-5-2nd on, makes a fairly good right angle with the front of the pyramid, but its base is shifted well over a meter from a centered position at that level, so that when seen from the plaza, the stairway led straight up to the building, despite the displacement of the latter. It is the stairway and the building in some period, rather than the extreme corners or the outsets of the pyramid, with which one would expect an alignment to be sought. With respect to these, from the 2nd phase of Structure K-5 on, the ballcourt is well over a meter too far southeast for perfect centering.

## Dating

Floor material, that is, a layer of crushed stone and earth, without a surviving plaster finish, and not in hard condition, was followed below the Unit Ca bench face, and thence all the way back to the rear wall of this unit. About half-way back in this trench we passed over what appeared to be a remnant of an early wall. This is shown in Figure 8.19a, which also illustrates the fact that floor material rose 5 cm or more higher in the alley than below the structure. It is fairly obvious that the ballcourt was built on a plaza floor which had already been in use for some time, and that then or later there was a resurfacing. But the dividing line between the two surfaces could not be detected.

The court is placed in front of, and fairly close to, the temple Structure K-5, as we have noted, and the excavations there show four main periods of building activity. The latest includes erection of Stela 38 and 39, dated by Morley at 9.12.5.0.0 and 9.12.10.0.0. It is thus quite evident that this end of the West Group plaza was in architectural use a considerable time before those dates, and it is at least probable that the floor below Unit Ca goes well back in the city's history. We failed to penetrate it deeply for still earlier surfaces. So about all that this permits is the conclusion that the ballcourt is not the earliest construction on this spot. It might nevertheless have been quite early.

However, we have a clue in Miscellaneous Sculptured Stone no. 9, which Morley (1938:3:82-83) called Throne


Figure 8.23 General view of West Group Ballcourt, from south to west. Structure K-6a at observers left, Structure K-6b at observer's right; Stela 39, at base of temple Structure K-5-1 st shows through trees in background. Aside from bench tops, structure tops are untouched, except for bushing, and for trench through Structure K-6a.

2 , and dates at $9.11 \cdot 10.0 .0$ with one question mark. The stone is a fragment, probably from a throne. Possibly it is from a throne once in place in Structure J-12 on the Acropolis. It would fit there very nicely if reconstructed to a length of about 2 m . A slab of about the depth of this one was almost surely removed from Structure J12 during rebuilding operations there. If Miscellaneous Sculptured Stone 9 is part of that, it came here after the sixth and last major period of Acropolis activity had been begun. However, 2 m seems a considerable length for the thickness and depth of the fragment (11.5 and 65 cm respectively). However this may be, if Morley's reading is correct and the date a contemporary one, the fragment came here after 9.11.10.0.0.

The fragment is thought to be from the seat of a combination bench-and-leg throne. This interpretation stands, whether it is from Structure J-12 or not. The reasons are that it shows part of an inscription on one edge, the adjacent edge, at a right angle, being plain; the inscription turns a somewhat rounded corner and doubtless proceeded across a mostly missing front; the glyphs show that the stone must have been placed horizontally, as in known thrones; the back edge is rough-tooled only, as expected for the postulated type of throne.

Morley's drawing of the inscription (1938:3:83) does not reveal the fact that a hand and winged Cauac sign, and a bird head, which occupy the surviving portion of the front edge, are well preserved, while all the glyphs
on the end are badly weathered. Nor does it show that a deep groove has been cut or weathered across the end, the long side of the fragment, but not across the short front portion. These factors suggest what is obvious anyway, that the fragment was here set with its long edge in the face of a wall. Once placed in such a position, the hand and bird signs would be buried in mortar and thus protected. The form of this stone will be illustrated in describing Structure J-12, where the possibility of its coming from that structure will be discussed.

Being satisfied that the fragment was used as building material here, one would like to be sure in which phase of construction it was used. Unfortunately it was not seen in situ by myself, but it was found by the same reliable workman who discovered the marker. Instead of calling me he set it aside until I should pay him a visit, which happened an hour or so later. There is no reason to doubt his account. It lay flat on the southerly end-field, about at the position marked 1 in Figure 20. It was noted at the time, from the workman's description, that it was found about 1 m from the Unit Ca wall, about 1.5 m forward of the termination of Unit Aa. The long sculptured edge was parallel with the Unit Ca wall and facing it, the glyphs upside down. This I think is a very likely position if the stone had been placed fairly high in the Unit Ca wall (here about 1.5 m high) and the upper part of that wall had fallen outward as a unit. Momentarily continued cohesion of stones below it might have caused the upper ones to move outward as well as downward, as if on a pivot; they
would, in such case, tend to land on their edges, and some might have rolled over on what had been their upper surfaces. Thus the originally exposed edge might come to face the wall. Barring some interfering force, that edge would tend to remain parallel to its original position. That a part of the upper portion of the wall did fall out, instead of disintegrating a stone or two at a time, is indicated by what remained. At this point it was found leaning sharply outward. The uppermost remaining stones, if loosened, would fall on their edges (Fig. 8.23).

If we attempt to derive the stone from the Unit $A$ a construction we must account for fifty percent more of horizontal motion from a height which may not have been any greater, though of this we are not sure. The fact that it landed with long edge parallel to the Ca unit must then be laid to chance. This is certainly not impossible.

We cannot claim certainty, but such probabilities as exist indicate that the original structures, labeled K-6-C, rather than the secondary changes of Phase A, date from after the break-up of this monument; that is, accepting Morley's question-marked reading, from after 9.11.10.0.0.

A further circumstance is noted for what it is worth. Surviving concrete remnants of the bench-tops were soft. Concrete had completely disappeared at more exposed parts of these tops and everywhere on the exposed tops behind the benches. The complete disappearance of crushed stone where exposed and underlain by pure rock fill recalls the situation on the later additions to Structure R-11. But it is in strong contrast to the preservation at equally exposed parts of the earlier R-11 units.

## Function

The fact that the structures are twins, their symmetrical placement to form the alley, and their benches, leave no doubt as to the ballcourt function, just as in the case of Structure R-11 in its earliest phase at least. Here as there the secondary changes do not affect the inner playing surfaces. But here the same known changes are all made to both structures. Therefore the presumption seems reasonable that they were considered appropriate to a still-functioning ballcourt. One is therefore led to suggest that similar changes be looked for at courts of other sites, though of course they may be only expressions of local ideas.

In considering whether the additions of Phases B and A were merely esthetic in purpose, the following factors may be noted. It is difficult to see any other reason for the changes of Phase B, provided we are correct in our reconstruction of them. If the additions of Phase A rose full height, no appreciable further esthetic change resulted, as seen from the rear, but the area at the top was considerably enhanced. As seen
from the ends, the change is asymmetrical for each structure, but symmetrical when looking at them as a pair. If the last additions did not rise to full height, they amounted to provision of terracing at the rear, and a carrying of the terraces somewhat around the ends. Such an arrangement would mark a departure from the apparently severely plain design of Phase B. If the Phase A additions rose to full height, they added materially to the depths of the tops, but there is no sign here, as there was at Structure R-11, that this might be to give more space for subsidiary platforms or buildings on the tops.


Figure 8.24 Southerly outer corner of Unit Ca exposed by cutting through debris of Unit Aa, lowest stones of which remain in foreground.

The figures on the marking panel confirm the ballcourt function, although the ball seems to have been absent, and they seem to be dancing with some tasseled round object in the hand, perhaps a rattle, rather than playing ball. That they are ballplayers is a reasonably certain deduction. Their comparative nakedness, the thick heavy belt, and the knee-pad indicate it. It appears to me that the arrangement of the loin-cloth contributes to the ballplayer interpretation. Fortunately it is quite clear that we are presented with front and rear views of the same articles of dress (Fig. 8.22). From the two together we can deduce that beneath the belt the cloth was drawn very tightly around the waist. It was pulled up tightly between the legs. If the ends were allowed to hang down as flaps, which seems probable but not certain, these were kept short. All these details seem suitable for a participant in this strenuous game, though I do not know of historical accounts stating that the loin-cloth was specially adjusted for the game. These accounts do, however, make it clear that various special articles of dress were worn for protective purposes.

## Future Work

If at the site again I would measure at short intervals the exact heights of bases of all playing surface walls. Failure to do so has not, I am sure, resulted in a significantly false picture in our drawings. But if it were found that there is a consistent and considerable slope from one end of the alley to the other, this would be worth knowing. Assuming that the now disrupted or disintegrated alley surface conformed, it would slow or speed a rolling ball, depending on its direction. If, on the other hand, the alley was found to be level with tolerable accuracy, and this turned out to be true generally of ballcourts elsewhere, we might conclude that the Maya had some way of more or less accurately leveling large surfaces, perhaps by trial and error with water poured into channels in preliminary surfaces, and took the trouble to use it for ballcourts.

The presence or absence of the rear projection in Figure 8.17 could be determined with very little work. A pit should be sunk to bedrock. If this showed a crosssection. similar to that found near Altar 1, only about 40 m distant, the evidence against an early dating of this court would be augmented.

Any attempt to connect this court stratigraphically with the stela of Structure K-5-lst would probably fail, because of rising bedrock and lack of plaster-surface survival. Terracing just east of Structure K-6b (see site map), if followed in both directions with suitable additional trenching, might yield some relative dating information as between the ballcourt and Structure K5 , but it probably would not help in dating the court in terms of the Maya Long Count (Tables 8.12, 8.13).

## Masonry Notes

## Fills

Determined satisfactorily only for the cross-section of Unit Ca . Here the fill was pure broken rock, uninterrupted, from bottom to top, by floors or working surfaces. Fill walls were not encountered, but they were not carefully looked for and could have been easily missed.

## Walls

Tabular stone throughout. Little more can be said of the badly fallen walls of the A units. Exposures of B units suggest a preponderance of small slabs in some parts, but a more block-like character elsewhere. Specialized larger corner stones, including a long block, may be seen in Figure 8.25. Here there is a distinct suggestion of in-and-out bonding.

## Concrete

None survived in good condition, but the surface of concrete bench-tops could be followed near the stopsurfaces. Crushed stone remains found everywhere at field level, but had completely disappeared from main structure tops.

## Plaster

None found surviving except the remnant on the marker panel; presumed to have covered all surfaces (Table 8.13).


Figure 8.25 Corresponding corner of Unit Cb and lowest stones of Unit Ab. Note in this figure and in Figure 8.24 that corners of units Ca and Cb fail to reach base surfaces; stones of Units Ba and Bb may be seen in situ.

# 1. Recognition of Sweathouses at Piedras Negras: Diagnostic Traits and Terminology, Linton Satterthwaite 

## Preliminary Remarks

The practice of building special structures of one sort or another for sweating is widespread among aboriginals and peoples of Western culture in at least the northerly portions of both Old and New Worlds. It must have a considerable antiquity in various regions, and it seems clear from documentary sources that the sweathouse belonged in catalogs of Precolumbian traits within Mayan as well as non-Mayan regions of Mesoamerica.

Unfortunately the really early historical accounts of sweat bathing in Mesoamerica, so far as known to the writer, give little information as to the actual structures used, and the best do not refer to regions where Maya or other Mayan languages were spoken, lowland or highland. They describe what might have been introduced into the Mayan regions by non-Mayan speakers, perhaps in comparatively late pre-conquest times.

Though no adequate study of the distribution of sweathouses seems to be available, a cursory search suggests that they are today in use among Mesoamerican Indians of many different cultural and linguistic affinities, including highland Mayan-speakers of Guatemala, but not by groups further east and south. This being the apparent modern situation one might reason that sweat-bathing in Mayan regions (perhaps excepting the Huaxteca) was introduced in Postclassical times, and that the ruins of such buildings are not to be expected at a Classical lowland site such as Piedras Negras, nor on early horizons in the Guatemala highlands.

When we began excavations, what little was known of actual ruined sweathouses at other sites tended to support this view. Nevertheless the buildings of eight mounds described in the immediately subsequent sections of this report are now considered to show that this functional type was present and important at the local time of abandonment. Findings in one of the mounds also show that, by that time, the type had had a fairly long history here.

## Plan of Presentation

In order to justify the foregoing conclusions specific traits must be isolated and defined, and in doing this comparisons
must be made and a minimum use of documentary and other source material is necessary. On the other hand, the buildings themselves can be most easily described as wholes on the assumption that the reader is familiar with special terms for, and functional interpretations of, specific details. Accordingly the mound-by-mound descriptions appear in subsequent sections, while this present section may be regarded as an introduction to them, and at the same time as a summary of sweathouse data at the site, though comparisons are not limited to the site nor to ancient times.

Included here is a sub-section Sources in which a Bibliographical Note covers published material referred to in the text only by author's name and year, but with page references for other than short articles. That by Cresson (1938) is similar to this introductory section which may be regarded as an expansion of Cresson's paper, necessary if we are to recognize the full range of modern survivals of ancient traits and, conversely, if we are to understand the full range of variation in ancient sweathouse-indicating traits. Also under Sources data are presented respecting three modern sweathouses of highland Guatemala, unpublished heretofore, and unknown to Cresson. Quotations are also supplied from certain important published sources unlikely to be found except in large or specialized North American libraries.

In order to get a picture of what separable traits may surely combine to form sweathouses, the modern and historical data are first analyzed, and traits are isolated. Terms are adopted for them under four chief headings, as indicated in the Table of Contents. Then, turning to the Piedras Negras structures, various additional features are discussed in a similar manner.

Having determined on a long list of traits which seem to pertain to sweathouses, some ancient, some modern, and some both, their linkages into complexes are stated in tabular form as a basis for our conclusion that sweatbathing played an important role at Piedras Negras.

Before passing to detailed mound-by-mound descriptions, the matter of recognizing new examples of sweathouses before excavation is discussed. Also included is a review of the present known archaeological
distribution of the type, in more detail than as noted above.

Though frequently referred to in this introductory section, figures illustrating the Piedras Negras sweathouses are grouped at the ends of the respective sections in which they are described and discussed in detail. It is supposed that a reader with a general interest only will make use of these illustrations, paying scant attention to the accompanying texts. However, the potential importance of the type is thought to justify recording and often discussing all known details. In Section No. 2 these are given for Structure N1 , the simplest of the two sweathouses which are more or less completely known, this being the one where the sweatroom was excavated with some idea of what to expect. The next section deals with six other structures which can be identified as sweathouses, but each are very incompletely known. The final section deals with the more complex of the two well-known buildings, Structure P-7-1st-A, and with partial reconstructions of earlier sweathouses on the same spot. In the latter, inferences are founded on what has been learned at the other mounds. The somewhat involved textual discussion dealing with the early periods and phases at Structure P-7 is felt to be necessary to justify the sequence visually summarized in Figures 9.41-9.46, since this sequence is the chief basis for concluding that sweathouses went through a considerable period of local development. Two confusing factors were operative at Structure P-7, destruction by ancient Maya and probably by modern wood-cutters on the one hand, and on the other hand failure to excavate more fully below the latest building, due to lack of time.

## Note

Probably the first valid recognition of ancient Maya sweathouses is to be credited to Morley, though one need not accept all his identifications. The evidence for use of the interiors of certain bench-like constructions at Quiriguá as sweatrooms is at least equivocal (Morley 1935), and I am sure that an examination of them will convince anyone that they were not designed expressly for that purpose. Before this, Lothrop had suggested the sweathouse function for the diminutive post-Classical shrines of the East Coast of Yucatan (Lothrop 1924). There seems to be no positive and convincing evidence of such a function for these, when all circumstances are considered. The case is otherwise with two post-Classical T-shaped buildings at Chichén Itzá. Ruppert (1935) gives the plan of one of them. Morley first diagnosed these as sweathouses because both included a small chamber with vaulted ceiling springing from a level abnormally close to the floor, while that one of the two buildings which was sufficiently preserved showed ventilating holes. When he showed these buildings to the writer in 1935 it was agreed that the small chamber of Structure P-7-1st-A at Piedras Negras probably was a sweatroom, since, like one of the Chichén Itzá
structures at least, it contained a sunken area, and its vaulted ceiling also sprang from abnormally low walls, and especially because, though ventilators seemed to have been absent, there was good evidence of some sort of fireplace within. It was agreed that we should investigate in other suspected mounds at Piedras Negras, and that the unexcavated T-shaped building at Chichén Itzá ought to be explored. The sweathouse function of the latter was confirmed by excavation by Ruppert in 1936 (Cresson 1938; Morley 1936).

The Piedras Negras building which thus first seemed to be a sweathouse, Structure P-7-1st-A, had previously been misinterpreted. The sweatroom was entirely within an enclosing large building, a double-range affair with very wide spans roofed by semivaulting in which beam-and-mortar construction is combined with vaulting. To account for what he saw without excavation Maler postulated an enclosing building of eight instead of three rooms (Maler 1903). The mistake was noted by Mason (Mason, Satterthwaite and Butler 1934) but in the same article the writer confused matters by comparing the small chamber to the East Coast shrines; then, suspecting a sweathouse but being over-cautious, he called the building "Type X" (Satterthwaite 1936), though Mason had reviewed the question in a semi-popular article (Mason 1935). Cresson's subsequent study of modern examples removed the need for a non-functional designation. It is fair to note that both Mason and Cresson made good use of Arreola (1920). Arreola's modern sweathouse can be more fully understood if Gamio's account, which illustrates the same example, is utilized (Gamio 1922).

## Sources

## Note

Satterthwaite here provides of listing of bibliographic references pertaining to the Mesoamerican sweathouse. These have been included in the References at the end of the volume. Ed.

## Additional Modern Data

Besides the above publications, some of which deal with modern sweathouses, use will be made of my own notes on three modern examples in the highlands of Guatemala, seen in 1937. These notes are inserted here, as a logical place under Sources. For anyone approaching the subject of sweathouses for the first time a prior reading of the quotations which come next in order is recommended.

## Aguacatán

Figure 9.1 presents the physical features from sketches and measurements, and Figure 9.7 is a photograph. Little specific information could be obtained other than that this is a sweathouse; that is, I was led to it on asking to


Figure 9.1 Isometric section and drawings: sweat house at Aguacatán, Guatemala. a. modern sweat house at Aguacatán, Guatemala; isometric drawing combined with cross section; b. isometric drawing of firebox and steam screen; c. cross section including protective roof.


Fig. 2

Figure 9.2 Modern sweat house at Tepoztlán, Mexico, based on Cresson (1938) (isometric drawing combined with cross section; stones at $D$ form extra fireplace for heating water; drain at $C$ reaches narrow, low doorway.
see a baño de sudor. The olla shown in the drawing was in places indicated, with water in it. The large mass outside the door (Fig. 9.7) is a carrying-net of corn husks, and loose husks lie on the ground before the doorway and in it; four husks lay on the bench (Fig. 9.1a) and were rayed into ribbon-like strips, except at the base. (Two of these were separately photographed.) The larger olla outside the door was smoke-blackened. My informant, a representative of the local police force, said that the husks were for beating or fanning the body, that the users wash with water afterward, and that the water runs out the door. The floor sloped down toward the outside. In the doorway, it was damp, if not elsewhere also. The use of water in quantity, and not for merely making steam, is thus indicated. My informant evidently was as not a local man and said he did not use the sweathouse. I cannot guarantee that he was not answering leading questions. The inside of the room was thoroughly sooty, the bench clean. There was ash in the slab construction labeled B,
and the irregular stones ( B ") piled loose on its top ( B ') were fist-size and larger, and were fire-blackened.

La Farge and Byers (1931) note sweathouses on the other side of the Cuchumatan range, somewhat to the west of Aguacatán, and report that sometimes a permanent slab oven is built at the back, inside. One suspects that oven was a construction like this, and apparently it is not universal.

## Chichicastenango no. 1

This is represented in Figure 9.4. The sweatroom (B) is entirely indoors, in a room (A') probably not intended for it originally, since it partly encroaches on one of two niches in a wall. In the drawing the imaginary horizontal cut to show the simple-rectangular plan of the sweatroom is lowered at one point, in order to make visible some tiles (B") set upright in the floor within he room. These are behind an opening in the wall ( $\mathrm{B}^{\prime}$ ), to one side of the doorway. There was a small hole or ventilator in the roof, which is not shown in the figure. I quote in full my notes


Figure 9.3 Modern sweat house at San Martín de los Pirámides, near Teotihuacán, Mexico, after Arreola (1920), showing sunken passage outside steam room (perspective drawing, not to scale).
bearing on use, obtained from a willing informant. I am no ethnologist and leading questions may have affected the replies, particularly the idea that the enclosing room is a place for rest, an idea already in my mind.

Informant: María Ventura Méndez, mother of owner, Octavio Pérez. Bath is placed in a large room; this is for use to rest and cool off after the bath, before leaving; about one-half hour in bath, about one-half hour outside. There is always somebody outside; water is put on the hot tiles, inside, for steam; assistant outside closes door with petate (mat) or manga vieja and closes ventilator with grass (zacate); the patient scoops down hot air (sic) onto her body with bunches of leaves (two kinds); informant makes it clear this is to increase heat to get hot air down; before leaving sweatroom, they wash themselves with a little water from same bowl and a cloth; very little (water) used in this. The enclosing room contains nothing else and informant says it is for use as indicated above.

I have little doubt that a fire was built around the upright roofing tiles (B"), or between them and the opening (B'), but I failed to note location of the fire. The draft probably proceeded inward through the opening, and out through a ventilator in the roof and/or the door. Failure to show any sort of fireplace on my plan makes it fairly certain that this consisted of nothing more than rough stones, if that. The maximum inside height of the room was 1.5 m , the room being arched, possibly domed. Since the walls are recorded as one brick thick, and this thickness is given as about 30 cm , it is certain that they are of adobe brick, but I failed to note construction of the roof. A cross section sketch shows it somewhat thinner than the walls, with a small ventilator fairly high up in the roof, its interior orifice close to maximum height, though not at center. The depression indicated in the figure is described in my notes
as a little drain about 5 cm deep and 10 cm wide, cut into the hard dirt floor. Boards ( C and $\mathrm{C}^{\prime}$ ) keep the user out of the mud, and are arranged in the figure as on a sketch plan made on the spot. Since those at the back are specifically labeled boards and not bench, I have no doubt they lay on the floor as shown, though my notes do not say so, or show them in cross section.


Figure 9.4 Modern sweat house No. 1 at Chichicastenango, Guatemala (isometric drawing combined with cross section showing plan); steam-screen of roofing tiles at $B$ ".

## Chichicastenango No. 2

Shown in the photograph (Fig. 9.6). This was the sweathouse of a neighbor. No information was gathered concerning it. One sees an opening corresponding to B ' in Sweathouse No. 1, but it is filled with three stones.

A well-defined smudge above these suggests that a fire was built inside, behind this opening, and that the draft was outward, between the stones. I include this merely to suggest a possible reversal of the direction of the draft, as compared with Mexican examples in which the draft is led horizontally through an opening in the sweatroom wall, and probably also as compared with the neighboring Sweathouse No. 1. Wide variation in methods of heating and filling the room with steam seems indicated in this single neighborhood of one highland Maya town.

## Early Post-Conquest Accounts

The purpose of the ancient sweathouse was apparently a curative one, a matter of health; but the cure was partly magico-religious in character. Because of the latter factor, though modern examples are placed in dwelling-house areas as adjuncts of the home, their presence in ancient main ceremonial areas such as those at Piedras Negras is not surprising.


Figure 9.5 Modern sweat house No. 1 at Milpa Alta, Mexico (isometric drawing combined with cross sections, based on Cresson 1938); note sink at B', stones as fire screen at C'.

The following extracts will, I think, justify the proposition that sweat-bathing in this area was a matter of cure by ceremonial as well as by physical means, and that a considerable body of traditional lore probably governed its particular uses. They also show that bathing with water was a practice associated with the sweathouse.

## Landa (Maya)

Speaking of Maya women, Landa says: "They took baths very often in cold water, like men ... all naked in the well where they went for water for this purpose. Besides this they had the habit of bathing in warm water and by the fire, but this was seldom and rather on account of health than of cleanliness" (Tozzer 1941). Tozzer says of
this passage that it "seems to refer both to the warm bath which some of the present Mayas prefer and to the vapor or sweat bath used in many parts of the New World for therapeutic and religious purposes."

## Motul Dictionary

This defines zumpul-ché as bath for women after childbirth and other sick persons to cast out the cold that they have in their bodies (Mason 1935).

## Sahagún (Aztec)

Translating from the 1938 edition, we have the following sixteenth century testimony of this important authority: "In this land they use baths for many things and, to make the bath called temazcalli useful for the sick, one heats it very well, and with good wood which does not make smoke. It is useful primarily for the convalescents from some sicknesses, in order that they may more quickly recover; it is useful also for pregnant women near to childbirth, because there the midwives perform beneficial acts (las hacen ciertos beneficios) in order that they may bear better. They are useful also for recovery of recently delivered (women), and to purify the milk; all the sick receive benefits in these baths, especially those who have little vigor (nervios encogidos) and also those who purge themselves repeatedly (se purgan después de purgados); also for those who fall down, or from a height, or were beaten, or maltreated ... Likewise it is useful to those afflicted with itch or pustules; there they wash themselves, and after washing they apply medicines suitable to those infirmities; for these it is necessary that the bath be very hot."


Figure 9.6 Modern sweat house No. 2 at Chichicastenango, Guatemala, showing smoked area above opening plugged with stones.

Elsewhere Sahagún paraphrases a midwife, addressing the parents of a pregnant woman: "address yourself to the mother of the gods, who is she of the medicines and curers, and is mother of us all, she called Yoalticitl, who has power and authority over the temazcales which are called Xochicalli, in which place this goddess sees secret things," and answering, the parents say "and put her in the bath which is the flower of our señor whom we call Temazcalli, where is and where cures and helps the grandmother who is the goddess of the temazcalli named Yoalticitl" (Book 6, Chapter 17). In pregnancies the midwife had her duties within the bath and, "after coming out, she would touch the abdomen, and would do this many times, though outside the bath, and this they called palpar a secas; and because it is customary to strike bathers with maize leaves boiled in the water of the bath itself, sometimes the midwife would order this not to be done, when the pregnant woman was bathing."


Figure 9.7 Modern sweat house at Aguacatán, Guatemala, showing protective roof, water jars and bundle of corn husks.

It seems quite clear that in ancient times in Mexico the temazcalli was a place of curing where heat was important, and that bathing with water was practiced, along with ceremonial invocations to a special deity. There is a hint that the water was heated more or less, depending on what was to be cured.

## Codex Magliabecchiano (Aztec)

The gloss describing the bath-house pictured in Codex Magliabecchiano (reproduced by Arreola and also by Mason and by Cresson) is freely translated by Mason as follows:"This is a picture of the baths (baños) of the Indians which they call temaxcalli. At the door is an Indian who
was the mediator for illnesses. When an ill person took a bath he offered incense, which they term copal, to this idol, and stained his skin black in veneration to the idol who was called Tezcatlipoca and was one of their major gods. Many Indians, men or women, stark naked, took these baths and committed nasty and vile sins within." This picture and the statement are apparently assignable to the sixteenth century.

They do not require us to believe that the preColumbian temaxcalli involved steam-bathing, as does the modern one, any more than do the quoted passages from Sahagún or of Landa. The picture shows water within the bath chamber, a bundle of firewood, a man with faggots in his hand, and what we shall call a fire chamber built against the bath chamber. This is round and domed at the top, suggesting Spanish influence at work, though presumably not long after the Conquest. The fire chamber has an opening at the bottom from which flames issue, and an opening at the top, from which neither flames nor smoke emerge, suggesting by the contrast that it has been closed. Tongues rising from it and from the bath chamber are interpreted by Arreola, with apparent justification, as indications of heat. The fire chamber corresponds in all essential respects to that illustrated and described by Clavigero and (apart from the opening at the top) to round varieties reported in presentday Mexico, where steam is produced.

## Terms Sweatroom, Bathroom, Steamroom

Unless a Conquest-time source can be found definitely mentioning the use of steam, since this is not used universally in the modern sweating complex north of Mesoamerica, it seems advisable to use sweatroom rather than Cresson's steamroom, as a more inclusive and less definite term, and not to apply steamroom to an ancient chamber until actual evidence of use of steam is considered conclusive. Similarly the modern Mesoamerican sweatrooms (of the steamroom sort) seem also to be bathrooms, where bathing in water is customary. Very probably the ancient sweatrooms were steamrooms and bathrooms, but archaeologists should look for evidence of such use, and, in adopting terms, not merely assume that the modern complex stretches back beyond the Conquest with no significant change.

## Later Accounts

## Clavigero (Mexico)

Arreola reproduces Clavigero's illustrations of a domeshaped sweathouse, and quotes from his account of it. The following quotations are from Cullen's English translation, in which the Italian ipocausto is translated as "vapor bath."
"Among the means which the Mexicans employed for the preservation of health, that of the bath was very
frequent. They bathed themselves extremely often, even many times in the same day in the natural water of rivers, lakes, ditches and ponds. Experience has taught the Spaniards the climate ... The Mexicans, and other nations of Anahuac, made little less use of the bath temazcalli. Although in all its circumstances it is deserving of particular mention in the history of Mexico, none of the historians of that kingdom have described it ... The temazcalli, or Mexican vapor-bath, is usually built of raw bricks. The form of it is similar to that of ovens for baking bread, but with this difference, that the pavement $\ldots$ is a little convex, and lower than the surface of the earth ... Its greatest diameter is about eight feet, and its greatest height six. The entrance ... is wide enough to allow a man to creep in. In the place opposite to the entrance there is a furnace (fornello) of stone or raw bricks, with its mouth outwards to receive the fire, and a hole above to carry off the smoke. The part which unites the furnace to the bath, and which is about two feet and a half square, is shut with a dry stone tetzontli or some other stone porous like it. In the upper part of the vault there is an air hole, like that of the furnace. This is the usual structure of the temazcalli, of which we have subjoined a figure; but there are others that are without vault or furnace, mere little square chambers, yet well covered and defended from air."

Cresson's Sweathouse No. 2 at Milpa Alta (his Figure 4) is round and dome-shaped, but the others are rectangular, and the rectangular form was presumably the only one in Precolumbian times. It may be noted that his rectangular examples, like the round one, show the furnace attached to the sweathouse proper. But Clavigero refers to rectangular examples without a special furnace. He seems to imply that something like our modern Guatemala highland examples existed in Mexico a century and a half ago.

Clavigero's remarks on the use of the bath seem to apply specifically to his illustrated round type, but many details presumably might apply to either type. The lack of a furnace does not preclude presence of a fire, and stones heated by it. "When any person goes to bathe, he first lays a mat within the temazcalli, a pitcher of water, and a bunch of herbs, or leaves of maize. He then causes a fire to be made in the furnace, which is kept burning, until the stones which join the temazcalli and furnace are quite hot. The person who is to take the bath enters commonly naked, and generally accompanied for the sake of convenience, or on account of infirmity, by one of his domestics. As soon as he enters, he shuts the entrance close, but leaves the air-hole at top a little time open, to let out any smoke which may have been introduced through the chinks of the stone; when it is all out he likewise stops, up the air-hole. He then throws water upon the hot stones, from which immediately arises a thick steam to the top of the temazcalli. While the sick
person lies upon a mat, the domestic drives the vapor downwards, and gently beats the sick person, particularly on the ailing part, with the bunch of herbs, which are dipped for a little while in the water of the pitcher, which has become a little warm. The sick person immediately falls into a soft and copious sweat, which is increased or diminished at pleasure, according as the case requires. When the evacuation desired is obtained, the vapor is let off, the entrance is cleared, and the sick person clothes himself, or is transported on the mat to his chamber; as the entrance to the bath is usually within some chamber of his habitation." A little later on it is stated that "when a very copious sweat is desired, the sick person is raised up and held in the vapor; as he sweats the more, the nearer he is to it." Evidently a steam-cloud was formed which did not reach all the way down to the floor.

We are told that this type of bath has been used regularly in several disorders, particularly fevers occasioned by costiveness. The Indian women use it commonly after child-birth, and also those persons who have been stung or wounded by any poisonous animal ... the temazcalli is so common that in every place inhabited by the Indians there are many of them."

## Stoll's Account for Highland Guatemala

Translating Stoll, we have the following for a region closer to our site, though more distant from it in time than was Clavigero's.
"Besides ordinary river bathing, the Indian steam bath called tuh in Quiché or temazcal (temazcalli) in Mexican, played in olden times, as today, an important role in Indian hygiene. In all of the numerous villages which still maintain Indian customs, one finds usually bake-oven-like (Backofenformige), dome-shaped buildings, the diameter and height of which amount to several feet. They are built of stone or mud bricks; the entrance opening is so small that a human being can just crawl through. In the interior opposite the entrance are a few stones serving as a hearth (Herd), where fire is lit, the smoke of which escapes through a hole located in the dome. Three plates filled with water are placed simultaneously on the hearth (Ofen), two of them on the side of the fire so that the water may be heated, the third, however, at some distance from it so that the water may not become too hot. When the fire has burned down, one or several persons crawl naked into the temazcal. They extinguish the coals with water and thereby develop steam which fills the oven (Ofen), since its escape has been prevented by the closing of the entrance opening and of the hole in the dome. The bathers carry with them thin twigs of just any (kind of) plant which they dip into the plates of hot water and with which they then beat themselves or one another in order to stimulate the breaking out of sweat. In this steambath they remain approximately twenty minutes. The
described procedure is the one common to the Pokonchí Indians of Tactic, but I do not believe that considerable variations of the same occur elsewhere."
"At present this steam bath is principally used against cramps (calambres), rheumatic pains, fever, and other illnesses, but the Indians use it very frequently without being sick at all. In olden times it was the custom for the recently delivered woman with her newly born baby to take a steam-bath on the fourth day after delivery. For this reason, newly delivered women were called ah-tuh in Cakchiquel. The tuh is usually a dome-shaped building, but square sweat-ovens with flat roofs occur, such as the one from Tactic shown in Figure 3" (Stoll 1886:162163).

## Particular Modern Traits:Terms

## Drainage and Entrance Arrangements

The following items of interest can be gleaned from examples discussed by Cresson and Arreola. Arreola's drawing (Fig. 9.3) labels our sunken passage desague, a drain; and Cresson tells us that a narrow channel (labeled C in Figure 9.2) carries the water at Tepoztlán, i.e., it is a drain. He also found a drainage passage at Milpa Alta. But for his Milpa Alta example no. 1 he shows a sunken area within the steamroom and its doorway, without outlet to the outside, which he calls a drain or sink-hole for water, its lowest level consisting of dirt through which water can seep (Fig. 9.5). There are evidently a variety of arrangements for carrying off surplus water, and one could guess that the patient is actually bathed in the steamroom with water, as well as in the steam. This Cresson found to be the case at Milpa Alta. Speaking of Sweathouse 1 there, he says the sink-hole "is necessary, not to carry off water used in making steam, but because the person ... also washes himself with hot water and soap."

Arreola's photograph shows the patient entering on hands and knees: her back is above the level of the top of the doorway, if anything, though she is kneeling in the desague. I think it is fair to deduce that this is a sunken passage as well as a drain, functioning to make ingress and egress easier.

We may deduce from Gamio that the doorway in Figure 9.3 is about 70 cm high. In Figure 9.2 the door scales to about that height. Here the lowering of the floor in the doorway (below the inside floor level), and for a short distance further in, presumably has the same function: it not only carries water from within to the drain proper, but provides a sunken area which must facilitate use of the very low doorway. This would not be so, if the lowered area were not full doorway width, or nearly so. I think, therefore, that we should distinguish
between drain and sunken passage but must remember that the latter may also operate as a drain. Where, as at Piedras Negras, a sunken passage reaches to the place of an interior fire, it would presumably also be useful in keeping ashes off the floor proper. In effect it then cuts the floor into two bench-like parts.

Cresson described the example of Figure 9.2 as having a very shallow sunken passage which extends just inside the door. Where the sunken area in the doorway extends only a little beyond the walls of the sweatroom, in either or both directions, I think we might better speak of a sunken doorway, and by, "sunken passage" imply that one is taken a considerable distance inside (or outside) the sweatroom, at the lower level. But if we have the sunken passage, we automatically have the sunken doorway. We must make fine distinctions if we want to make comparisons of maximum value, and if we want to know as exactly as possible the range of variations to look for while digging.

In Figure 9.5 there are two levels in the sunken area, the lower (B') being the sink-hole described by Cresson. This I think we can better call merely a sink. It might have been provided with a hole to an underground drain. Such an arrangement would be by no means unlikely to occur to an ancient Maya architect, and the hole part of Cresson's term might be needed for an actual hole. The sink here, it seems to me, occupied only the area B'; it certainly may be considered as cut into the bottom of a sunken passage, which otherwise would have its level at B" throughout. The sink, surely, by its added depth, makes passage through the doorway easier, and it is curious that it does not extend all the way to the front. In Cresson's second Milpa Alta sweathouse, not illustrated here, the sink is a square sunken area of less width than the sunken passage, it is definitely a feature distinct from the passage itself.

In the Guatemala case of Figure 9.4, the floor is of earth, and this slopes down toward the front, presumably for drainage. Boards are laid in the entrance and across the back (C, C'), presumably to keep the patient out of the mud. There was a narrow depression leading out of one side of the doorway, indicated in the figure. This may doubtless be styled a drain, designed to minimize mud at the approach to the door. No such depression was noted at Aguacatán (Fig. 9.1), but the floor there also sloped forward. A drain cut in mere earth would be impermanent, and its presence or absence might depend on individual care in keeping it open.

Clavigero's floor was a little below ground level and his sketch suggests a sunken doorway, which would not, however, have acted as a drain. The floor was somewhat convex, perhaps to drain the water to the peripheries, and thence to the sunken doorway acting as a sink.

From these examples we can conclude that neither the permanently constructed open drain, the sink, not the sunken passage are essential features; but when present
they appear to be valid sweat-bath criteria, since they are found with sweat-baths and have useful functions there. The absence of all three does not necessarily preclude attention to drainage, which may be by a mere slope to the door.

## Drain, Sink, Sunken Doorway, Sunken Passage

I will use drain (open or covered can be added if necessary) for a sloping channel obviously intended for draining off water, when this is evidently the only function (Figs. 9.2 and 9.4). Sink will be applied to a small area in which water would collect, or could seep, or be otherwise carried downward (Fig. 9.5). Sunken doorway will apply to the sinking of the doorway area below the level of the sweatroom floor (Fig. 9.5). If the sunken area extends an appreciable distance inside the room and/or through an area outside it, so that one may walk a step or two in it after passing the doorway, it will be called a sunken passage, a feature necessarily accompanied by a sunken doorway (Figs. 9.3 and 9.9).

## Peripheral Down-Slope

Definite slopes of floors toward doorways are fairly characteristic in temples and palaces at Piedras Negras, and doubtless elsewhere; presumably they were for drainage of rain water blown in through the doorways. Such a slope, as noted in the Aguacatán sweathouse, ought not to be considered as indicating the sweathouse function, though, with a small low single doorway it might be considered to confirm it. It is too general a trait in ancient Maya buildings to have function-indicating value. However, a convex floor, as indicated by Clavigero, would be unexpected in ancient Maya buildings.

Peripheral Down-Slope is suggested to connote such a floor in a round room, or in a rectangular room where there are noticeable slopes downward to the bases of all the walls, or to some of them. The connotation is that water would collect or run out along the walls, rather than spread out and remain on those parts of the floor where a patient would lie, or run off across those parts.

Such slopes may have been present at Piedras Negras in Structure P-7-2nd-F. See Figure 9.48, where the upper of four buried floors curves smoothly down in a direction away from the sunken passage, and probably to the base of a since removed (or largely removed) wall (Unit 22? in the figure). The final floor in this same figure shows a reversal of direction in this down-slope, which certainly cannot be considered a sweathouse essential.

## Heating and Steam Producing Arrangements

## Draft Holes

Cresson uses "ventilator" for holes in the sweatroom wall which help to let out the smoke. These are labeled respiradero on Arreola's drawing (Fig. 9.3); that is, vent,
breathing hole. Since ventilator is already in use in the archaeological literature for much larger vents, I shall here call them draft holes, which does not preclude a ventilating function, but emphasizes their small size and the consequent fact that they can easily be closed. It is quite clear from the accounts that during the heating process these holes, when present, assist in creating a good draft at the fire, and in the right direction. A sweatroom must be one of the most ill-ventilated rooms imaginable, when occupied, and it is quite clear that the holes are used as ventilators in the ordinary sense, that is, to clear out foul air, for a short time only. Cresson's investigation showed conclusively that these openings are not essential in the Mexican region studied, and I also found that they may or may not be present in the Guatemala highlands.

## Steam Screen

Gamio's account makes it clear that the room is ready for use when smoke (and of course hot air) has passed for some time from the fire through a screen (cortina) of stones and out through the doorway and the draft holes; it has by then heated the screen of stones and the walls of the room. If I understand him correctly, water is now sprinkled on the hot walls by agitating wet leaves, which produces steam (vapor) and hot water; as the temperature drops, "from time to time a little water is thrown on the curtain of tezontle (a particular porous stone) where the heat has been conserved, so that it is immediately transformed into steam."

All of Cresson's examples provide the equivalent of this cortina. This may be nothing more fixed and permanent than a collection of rough stones on the floor of an opening connecting the steamroom with the fire, as in Figure 9.5. Using screen for Gamio's cortina, and meaning thereby any arrangement of stones or other non-inflammable elements such that flames, smoke or hot air must pass over and more or less through them, I have adopted here the term steam-screen. The implication is that such an arrangement functions to store up heat for use in producing steam after the patient enters and the fire has died down.

Cresson notes the possibility that a steam-screen may consist of neatly placed stones more or less filling an opening in the sweatroom wall. We see this in the Guatemalan example of Figure 9.6, where the draft apparently is outward through it. Presumably such a definitely screen-like arrangement, such as this, is what suggested the term cortina to Gamio. The screen here may be said to be a vertical one. Cresson contributed a variant in which the stones are held as a horizontal layer above the fire and not to one side of it. The steam-screen is supported by slabs leaning together and presumably without a tight fit, and forming a sort of upper chamber in the fire chamber (B" in Figure 9.2). Perhaps the
supporting slabs should be considered as part of the screen.

Note in this figure that the fire chamber is based at a level lower than the sweatroom floor, so that the connecting opening A' (which we shall call a flue) can receive hot gases after they have passed through the screen. They must enter the sweatroom, just as in the simpler arrangement of Figure 9.5, at floor level, presumably at the level of the patient.

The horizontal arrangement of the steam-screen appears again at Aguacatán, but this time inside the steamroom (Fig. 9.1). There is no fire chamber other than the steamroom itself (A); but the stones (B") are supported on a box-like construction of stone slabs (B), open at the front and semi-open at the top ( $\mathrm{B}^{\prime}$ ), on which the stones forming the steam-screen are piled. The steam is thus generated above floor level. However, recalling Clavigero's note on varying distance of the patient from the ceiling, note that here a wooden bench (C) is provided for the patient. The steam is generated at the patient's level, as in the other cases when he lies on the floor.

## Fire chamber

Cresson used "fire chamber" for the hornilla or "furnace" of the Mexican writers, who are referring to special constructions attached to the steamroom, and he used the same term for fire-containing constructions inside the Piedras Negras examples, which we had reconstructed with closed tops. I think a distinction will be useful here. I shall use fire chamber where the construction, round or rectangular, has a roof or top of its own, closed except (possibly) for a draft hole. This would include feature B in Figure 9.2, which has two levels and a horizontal steamscreen, as well as simpler round or rectangular variants with the steam-screen at one side (as in Figure 9.5).

## Firebox

In Figure 9.1, the Aguacatán steam-screen is held horizontally over the fire, in this respect as in Figure 9.2; yet, apart from the steamroom itself, there is nothing which can properly be called a chamber. I should like to term this whole slab construction, drawn separately in Figure 9.1 b, a partly covered firebox, or a firebox with partly open top. in the figure, the firebox is labeled $B$, the top BI and the fire-screen on it B".

The reason for a term which does not include the top is a practical one: in ruins one may, as at Piedras Negras, encounter the lower elements but be unable to say whether there was a solid top, making the firebox part of a fire chamber, or whether there was a partly open top through which the flames and hot gases could pass (as here at Aguacatán), or whether it had a top at all. A firebox, then, as we shall use the term, is a fire-containing stone or masonry construction of vertical or more or-less
vertical surfaces, open or with an opening at the front or at one side. Obviously, unless it is in fact part of a fire chamber, it would have to be inside the sweatroom to be effective for heating that room itself, something the Middle Americans seem to have considered essential.

If placed inside, after the fire has died down steam could be made by sprinkling the coals and the insides of the firebox. If there is a partly open top, this also would become very hot and could function, along with a steam-screen placed on it, to store up heat for steam production.

One may reason that a solid top on an inside firebox, forming a fire chamber, would reduce the total area of really hot surface available for this purpose. On the other hand, it would throw the heat forward through the opening and perhaps result in a more even heating of the sweatroom walls. I do not see how one can be sure, without more evidence than has been collected here, whether fire chambers, with the solid top, may or may not occur inside the sweatroom; but the Aguacatán example shows definitely that interior fireboxes with open tops and fire-screen may occur.

Here, I think, is a good illustration of the need for a precise terminology, even if a clumsy and prolix one. La Farge and Byers (1931) tell us that in the Jacaltenango region "sometimes a permanent slab oven is built at the back, inside." Stoll speaks of a "few stones" successively as a Herd and as an Ofen, while still later an often refers to the sweatroom or sweathouse as a whole. One would like-to know whether these interior fire containing arrangements correspond precisely to the Aguacatán example or not, but one can hardly be sure. Lacking evidence that complete fire chambers (with solid tops) may occur inside sweatrooms at Piedras Negras, in reconstructions we have assumed partly open tops in all our figures except Figure 9.47, where a complete interior fire chamber is alternatively suggested.

Neither a firebox or fire chamber seems a necessity in the highland area. La Farge and Byers note the slab oven as sometimes occurring; obviously it may be absent. Lothrop (1928) speaks of a "pile of stones" in sweathouses at Zutugil villages. These are inside and are heated in a fire. Apparently the fire itself is inside, but no special arrangement for it is noted.

## Fireplace

In Figure 9.4, modern roofing tiles, set on end (B") apparently serve, like Lothrop's pile of stones, as steam producers. The tiles are probably set in or next to a mere fireplace, which can be taken as the minimum requirement in or near any sweathouse. If there is not at least a fireplace there can be no sweathouse. More than this, the fire chamber, firebox or fireplace of a sweathouse should show evidence of large and continued fires,
something more than smoked surfaces and burned areas which could result from burning incense. These latter occur in temples at Piedras Negras, but (usually at least) on the column altars only.

## Extra Fireplace

I think it is obvious that if warm or hot water is desired it could be heated in the same fire as that which heats the sweathouse. Gamio indicates this at Teotihuacan. It would be a simple matter to heat water in the olla of Figure 9.1 by placing it on the firebox or on the stones of an ordinary fireplace. Of course, this particular olla may be the third one, mentioned by Stoll as at some distance from the fire. There were others outside (Fig. 9.7). However, at both Milpa Alta and Tepoztlán, Cresson found special outside fireplaces, apart from the fire chambers, for heating water. At the latter site this is indicated as D in Figure 9.2. Presumably this occurs when the fire chamber is so designed that ollas of water cannot be conveniently placed in it; such a fire chamber design might add to efficiency for its primary purpose. However this may be, I think there is no particular reason for expecting an extra fireplace for heating water when there is already a fireplace or a firebox in the steamroom, and none was noted with Guatemala examples. In the case of Figure 9.4, the enclosing room was definitely noted as containing nothing but the steamroom.

## Cold-Air Entrance or Flue

If the exterior opening of an exterior fire chamber is in a fairly thick wall and is fairly small (as in Figure 9.5), it may serve a double purpose. It is a means of access to the fire, which must be built and fed; but once this is started, it will tend to establish a horizontal current in the entering cold air. In the cited example this would appear to be of some importance. In any case, this entrance functions as a coldair entrance, and if one wishes to claim that arrangements have been made to give direction to the entering current, it might perhaps be called a cold-air flue. In Figure 9.4, the small opening $\mathrm{B}^{\prime}$ is presumably designed for feeding the fire and to assure a good draft at the presumed fire behind it. If so, although it is in the sweatroom wall itself, it is also a cold-air entrance, perhaps a cold-air flue. Webster defines "flue" as "an enclosed passageway for establishing and directing a current of air, gases, etc.; an air passage."

## Hot-Air Entrance or Flue

In Figure 9.2, it must be that when the sweathouse is ready for use, water is sprinkled on the steam-screen B through the opening A'. The small size of the opening, relative to the thickness of the wall, must make this difficult, rather than easy. However, the smallness must result in delivering the steam in the room at floor level, and as it enters, it must be moving horizontally. While
the heating is in progress, this opening must deliver hot air, smoke and combustion gases in the same manner. It is certainly a hot-air entrance, perhaps a hot-air flue, during the heating process, though later it may function as a steam entrance or flue. One may speculate as to whether a small hot-air entrance like this is due to European influence. One is tempted to compare it with the smoke pipe of a modern central heating furnace, which leads to the chimney, and consider that the sweatroom functions, while being heated, as a chimney. But the absence of ventilators and the lowness of the single opening, the doorway, makes such a comparison seem very forced. Certainly, this small opening, whether merely a hot-air entrance or a flue, contrasts strongly with the situation in Figure 9.5.There, the fire chamber (C) may be considered an extension of the sweatroom itself, and there is no special opening or entrance connecting them.

## Heat and Steam Retaining Arrangements

## Smallness and Lowness of Sweatroom

From the quoted accounts, and especially from Gamio's description of steam-making, it appears that the walls of the sweatroom itself are required to be heated. Obviously, the smaller the cubic capacity of the room, the greater the sweating effect for a given amount of heat and of steam produced, and Middle American sweatrooms may be expected to be smaller than would be suitable for ordinary occupancy. Since, archaeologically, one is likely to know the ground-plan but not the entire cross section, it is desirable to consider two components, so to speak, of smallness. Applying that term to what can be known from the ground plan alone, it will serve our purpose to consider whether a given room exhibits both smallness and lowness, or perhaps only one of these characteristics. The modern examples of Figures 9.1 to 9.7 all show both of these characters. With these two terms we can admit that Morley's supposed sweatrooms at Quiriguá are exceedingly low, but not so small as we should expect for this function.

## Narrowness and Lowness of Single Doorway

In all the modern cases the sweatroom doorway is much lower than what can be considered normal for rooms to be entered by adults. This may be inevitable, because of the lowness of the ceiling of the room, but apparently the doorway may be somewhat lower than thus required (Figs. 9.1 and 9.3). Abnormal lowness, whatever may be the immediate reason for it, is worth distinguishing as a separate trait, because in a ruin the door height but not the ceiling height may be known. For comparisons, where the aperture is not everywhere the same height, as in Figure 9.5, the minimum is taken.

One may know the width but not the height of the doorway, and therefore narrowness will be used here in a similar sense, that is, a narrow doorway is one abnormally narrow in comparison with the general run of doorways intended for use by adult people. It may not be narrow in relation to its own height.

In classifying for these traits a normal standard of comparison is implied, and, without general knowledge of all kinds of buildings at a site, modern or ancient, there may be border-line cases. In the trait table covering modern and ancient sweatrooms, the highest doorway classified as being low is 1.3 m in height (a figure possibly too high by 20 cm ); and door widths are considered not to be narrow, i.e., abnormally narrow, if 80 cm or more in width. However, a maximum width of 1 m in the Piedras Negras sweathouse series is in fact abnormally narrow by comparison with the usual exterior doorways of local temples and palaces, and very narrow interior doorways occur in some palaces. Narrowness of a doorway suggests a sweatroom only if it may have been combined with lowness, and when there are no other doorways.

## Limits of Size

In order to get some preliminary idea of variations in the sizes of sweatrooms and their doorways, available dimensions from our short modern series are given [in Table 9.1], along with corresponding ones for the three ancient Piedras Negras examples for which we have the room dimensions. The doorway dimensions for San Martin are according to Gamio, and those for Tepoztlán and Milpa Alta 1 are scaled from Cresson's published drawings.

The difficulty of heating a sweatroom must have varied with the area enclosed by its walls, other factors being equal, and so I have arranged the rows of dimensions in the order of increasing interior area. The ancient examples are thus thrown to the bottom of the tabulation. Within modern
and ancient groups considered separately there is wide variation in area covered. As between the groups, the smallest of the ancient series is decidedly larger than the largest of the modern series, while the largest ancient example is three times the size of the largest of the modern series.

These differences in size, as measured by interior area, are sufficient to justify a demand for clear evidence that the ancient rooms were sweatrooms, and the question arises as to whether we should call them small. The intermediate position of Structure P-7-1st is pertinent in this connection. The evidence that it served the same function as the largest of the series, Structure $\mathrm{N}-1-1$ st, is so convincing that, we believe, we can safely stretch the degree of smallness shown by the modern examples so as to include all three of these ancient ones, classifying them also as small. We must remember, however, that "smallness" alone is no sufficient sweathouse indicator.

The proper connotation of smallness in this connection is that the room is not too large to be heated successfully for sweating. The modern examples in our series are in temperate highland country, the ancient ones in the tropical lowlands where larger rooms could presumably be properly heated with the same amount of fuel. Moreover, fuel and ready labor to gather it were undoubtedly more plentiful at ancient Piedras Negras. If necessary, presumably more fuel was burned in the ancient structures, and presumably they are larger in order to accommodate more persons at one time. Being hard by temples, palaces, ball courts and monuments, these ancient buildings probably had to serve many patients being ministered to by special priests on particular days of trade and ceremony. There is no reason to expect them to be so extremely small as the modern privately owned ones near dwellings. It is quite likely that smaller ones also existed in the peripheral areas of the site, and in tributary villages, for use of permanent residents.

Table 9.1 Metric Dimensions for Archaeological and Ethnographic Sweat Houses

|  | Sweat-Room <br> (Interior) Length | Depth | Max. <br> Height | Area <br> (sq. m.) | Doorway <br> Width | Doorway <br> Height |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: |
| Modern |  |  |  |  |  |  |
| San Martin Teotihuacan | 1.6 | 1.8 | 1.1 | 2.9 | 0.5 | 0.7 |
| Tepoztlán | 1.8 | 1.8 | 1.5 | 3.1 | 0.5 | 0.6 |
| Chichicastenango 1 | 2.0 | 2.0 | 1.1 | 3.6 | 0.5 | 0.6 |
| Milpa Alta 1 | 2.4 | 2.1 | 1.2 | 4.9 | 1.0 | 0.6 |
| Aguacatán |  |  |  |  |  | 0.9 |
| Ancient Piedras Negras | 3.3 | 2.2 | 2.7 | 7.3 | 0.8 | 1.1 |
| Str. P-7-1st-B | 4.0 | 3.0 | $?$ | 11.8 | 0.8 | $?$ |
| Str. J-17 | 4.8 | 3.3 | $?$ | 15.6 | 0.7 | 1.0 |
| Str. N-1-1st-B |  |  |  |  |  |  |

Table 9.2 Comparative Trait Table of Ethnographic Sweat Houses

|  | $\begin{aligned} & \hline \text { Agua } \\ & \text { catán } \end{aligned}$ | Chichicaste nango | Tepoztlán | Milpa Alta I | San <br> Martin |
| :---: | :---: | :---: | :---: | :---: | :---: |
| A |  |  |  |  |  |
| Drain* |  | X | X |  |  |
| Sink* |  |  |  | X |  |
| Sunken Doorway* |  |  | X | X | X |
| Sunken Passage* |  |  |  | X | X |
| Peripheral Slopes* |  |  |  |  |  |
| Plaster Passage Drain* |  |  |  |  |  |
| B |  |  |  |  |  |
| Draft Hole* |  | X |  |  | X |
| Steam-Screen* | X | X | X | X | X |
| Fire Chamber* |  |  | X | X | X |
| Firebox* | X |  |  |  |  |
| Fireplace* |  |  |  |  |  |
| Extra Fireplace* |  |  | X | X |  |
| Cold Air Entrance* |  | X | X | X | X |
| Hot Air Entrance* |  |  | X |  | X |
| Sherd Wall* |  |  |  |  |  |
| Sunken Firebox |  |  |  |  |  |
| Firebox Sill |  |  |  |  |  |
| C |  |  |  |  |  |
| Smallness of Room* | X | X | X | X | X |
| Lowness of Room* | X | X | X | X | X |
| Narrowness of Doorway* |  | X | X | X | X |
| Lowness of Doorway* | X | X | X | X | X |
| Sweat Room Door Sill Curtain Holders* |  |  |  |  |  |
|  |  |  |  |  |  |
| Air-Tight Ceiling* | X | X | X | X | X |
| Vaulted, Low Walls* |  |  |  |  |  |
| Semi-Vaulted, Low Walls* |  |  |  |  |  |
| Flat Ceiling* |  |  |  |  |  |
| D |  |  |  |  |  |
| Bench in Sweat-Room | X |  |  |  |  |
| Niche in Façade |  |  | X |  |  |
| Protective Roof | X |  | X |  |  |
| Enclosing Building |  | X |  | X |  |
| Large Stone Lintel |  |  |  |  |  |
| On-End Construction |  |  |  |  |  |
| Bench in Enclosing |  |  |  |  |  |
| Building |  |  |  |  |  |
| Note: Certain presence of trait several phases the symbol is repe only); many blank spaces indicata suitable for sweathouse function. | symboli <br> ted after <br> e lack of | some physical rined symbol, not known or | symbolized dicating a f nce of the trat | where a single pearance (Str arred traits co | ent serve 1 and $P$ - <br> ed clearl |

Such little data as we have on the heights of the ancient rooms suggest that at the center of the rooms they were not so low as the modern ones, but there is good evidence that a limit on the ceiling-height was in the architect's mind. This also would affect the problem of heating.

Apparently the single ancient doorway could be somewhat higher and wider than in any in our small modern
series, but not very much so. The higher Piedras Negras doorways were sunken, and secondary lessening of the amount of the sinking eventually reduced the heights. As a working hypothesis we can assume that the above tabulation covers or nearly covers the full range of the dimensions to be expected in ancient private or public sweathouses, though knowledge of ancient private ones is for the future.

## Air-Tight Ceiling

Chambers for sweating, with or without steam, must be designed so as to prevent escape of hot air or steam through the roof. Skins or textiles on wooden frames are sufficient, but in masonry sweatrooms of Middle America it is a safe assumption that the roof and hence the ceiling will be of masonry, or else at least a ceiling of plastic material such as adobe will be provided, as in certain modern examples considered here. In the trait list airtight ceiling covers any modern variety of such a ceiling, without differentiating one method of construction from another, and without considering small openings which could be easily closed. At Piedras Negras separate trait status is accorded to three sorts of roof which provided, or may have provided, air-tight ceilings for sweatrooms. Of these, the vaulted and semivaulted roofs on low walls not only provided low ceilings, but presumably they provided airtight ones, In some cases we suspect entirely flat ceilings for the sweatroom though this has not been proved. Because these rooms were in enclosing buildings the originally plastic material supported by the roofbeams might have been adobe rather than lime-concrete. With any of these known or suspected roof-types the ceiling would be air-tight unless special openings were provided.

## Miscellaneous Traits

## Benches in the Sweatroom

It is evident that a bench inside the sweatroom might be intended to keep the patient nearer the ceiling and the steam collected there. Remembering Clavigero's remark on varying the patient's height, one might expect movable benches of perishable materials to be used; these would not be found archaeologically. The wooden bench in Figure 9.1 is permanently fixed. Perhaps, therefore, masonry benches in the sweatroom should be considered as a possibility, though I do not know of any. Besides increasing the severity of sweating (for a given room), they might, one would think, make it easier for the ministrations of the attendant. Sunken passages at Piedras Negras produce a bench-like effect by dividing the floor into two parts, raised above the passage floor. In the example of Figure 9.9 a patient might lie at full length close to the edge of the bench thus formed; but in other cases, for instance in Figure 9.46 or 9.57 , the space near the passage is too confined for this.

## Exterior Niche

The Codex Magliabecchiano drawing shows a face over the sweatroom doorway, presumably of a deity. While Cresson describes small niches in the steamroom wall as used for holding soap (as in Figure 9.2), one suspects a niche might anciently have functioned for holding objects
of religious veneration; a modern example seems to be shown in Figure 9.3, where a cross may be seen above the doorway. Niches in the façade of a supposed sweatroom may perhaps be considered as contributing evidence of that function, and we find them in the one Piedras Negras example in which the façade is known above doorway height. They are placed on either side of the doorway, too high to be easily reached (Fig. 9.62). Any thing which may have been placed in them was apparently movable.

## Protective Roof

Where the ceiling of the sweatroom is of adobe, there may result an exposed adobe roof-surface, as in Figure 9.1. Where there is much rain such a surface is unsuitable for unprotected exposure to the weather. Instead of laying a weather-resistant roof-surface directly on it, a separate roof may be provided. In the cited example this is of tile, and it is in part independently supported. Completely separate roofs of thatch are shown by Stoll (1886) for the Pokomchi, by Blom and La Farge (1927) for the Tzeltal, and by La Farge and Byers (1931) in the Cuchumatan mountains.

Where this additional roof is little larger than is necessary to prevent erosion of the sweatroom below it, I will call it a protective roof. In the case of the Tzeltal sweathouse just mentioned, the roof is entirely supported on its own posts, and overhangs the sweatroom somewhat on all sides. If the size of that roof should be greatly increased, it would still protect the sweatroom, but it would be reasonable to suppose that it then had some additional function, whether or not it was provided with walls. The roofed area could be said to enclose the area of the sweatroom. Enclosing Buildings need to be distinguished from mere protective roofs, since they seem to have been characteristic at ancient Piedras Negras, even where a known vaulted-masonry roof of the sweatroom itself could easily have been weather-proofed with polished plaster.

## Enclosing Building

In considering this feature as a separable trait, we may first try to get some notion of what its function may be. The modern sweathouses appear to be adjuncts of dwellings. Clavigero (1817) says: "The desired evacuation being achieved, steam is let out, the door is opened and the patient appears; or if not, they carry him out on the mat or on the mattress to a piece (of furniture?) nearby, since always there would be some habitation in the neighborhood of the bath." Gamio tells us that the cure is not completed with the bath; "on coming out (the patient) is clothed completely and then she is bound, putting a great quantity of cloths called muñecos on the abdomen. All these operations proceed alternating with prayers and persinados which give a certain religious aspect
to this custom. But the series of trials (ajetreos) of which the recently delivered is the object does not end here: to prevent that the blood se coma al estómago, and to avoid also mal de ojo or some infirmity of this sort, it is necessary to take a regular quantity of mezcal with salt" (translating Gamio 1922.) Another more elaborate medicine is prepared, which the patient "takes to supplement the effects of the bath and which has the virtue of giving force and vigor."

The point sought to be made by the above quotations is that part of the curative complex is (and probably was anciently) performed outside the bath. During the good weather post-bath ministrations could theoretically be administered out of doors, but unless the patient was taken to a nearby dwelling a roofed area adjacent to the sweatroom would surely be convenient. This actually occurs in Cresson's Sweathouse 1 at Milpa Alta, where walls in addition to those of the sweatroom itself provide a sort of small room, open at one end; while Sweathouse 1 at Chichicastenango is placed entirely within a room of the dwelling. Originally that room was probably not meant to contain the sweatroom, since the latter blanks out the lower part of a niche in its wall, but it seems to be actually used in connection with sweat-bathing only.

In the above two modern examples the sweatrooms are partly or entirely surrounded by what we shall call enclosing buildings. In order to allow for a wide variety of designs which may provide for the same basic function, it will be useful to define this term somewhat loosely. As used here the enclosing building may be partly or wholly defined by outer walls, and may or may not be cut up into one or more rooms (Figs. 9.9, 9.25 and 9.46); or it may consist of no more than a roof with supporting elements, as was probably the case in the structure of Figure 9.8. The minimum connotation of the term is that the enclosing building provides a roof continuous with that of a small room, or one which covers that of the small room; and that this roof covers one or more areas adjacent to the small room, these areas being large enough for activities outside the small room, though near it.

Thus defined, the term is broad enough to include the open front galleries which give a T-shape to the Chichén Itzá sweathouses, and to include a possible reconstruction of rooms at the sides of the sweatroom in Figure 9.27, leaving the door of the sweatroom opening out-of-doors. One imagines, however, that there was usually, if not always, a roofed area in front of the sweatroom.

Needless to say, ancient enclosing buildings thus defined did not always serve sweathouses. The term is equally applicable to temples at some sites, notably at Uaxactun and Palenque, where the main temple room encloses a miniature building best called a sanctuary or shrine. It happens that at Piedras Negras both temples
and palaces have been thoroughly sampled, and here all known enclosing buildings seem to have been integral parts of sweathouses.

# Additional Traits at Piedras Negras: Terms 

Drainage and Entrance Arrangements

## Plaster Passage Drain

The shallow depression in Figure 9.4 shows that drainage provisions may be very rudimentary, yet present. If this depression had been in a plaster floor, it would have been permanent. In the earliest phase of the earliest period of Structure P-7 at Piedras Negras, a similar depression in plaster was found in front of the probable remnant of a firebox. Though approximately as wide as the sunken passages which later overlay it, its depth (about 5 cm ) is too slight to justify classifying it as a sunken passage. It slopes appreciably downward toward the outside of the probable sweatroom, as evidenced by Unit 34x in Figure 9.57. A part of one side of this depression is indicated in the figures as $34^{\prime}$.

This we shall call a plaster passage drain, connoting thereby that it was probably full doorway width, and, being in the plaster only, it is very shallow, relatively permanent, sloping, and so placed that it will drain off water. Unlike a sunken passage, it is too shallow to be of any appreciable use in entering the doorway or in sweeping out ashes. The fact that it is here probably full doorway width is no argument against drainage function, I think, since a flat surface in the doorway would seem to be desirable; passage is inserted in the term to distinguish it from the narrow drain of Figure 9.4.

## Heating and Steam-Producing Arrangements

## SherdWall

This is a wall of potsherds laid in mortar. In the one sure case, it forms the rear wall of the firebox and slopes outward somewhat, like a very steep half-vault ( $\mathrm{H}^{\prime \prime}$ in Figures 9.11 and 9.12). Here it is quite thick, but one suspects that sherd walls may have sometimes formed a thinner, veneer-like element (reconstructed in front of $6^{\prime \prime}$, and rising from 6' in Figure 9.57). The sherds are thick ones for the most part, with rims of rim-sherds selected for exposure in the face.

Three functions, each entirely compatible with sweathouse function, suggest themselves. This feature may be merely to protect the stonework behind, which here is of necessity limestone. This seems unlikely to be the real purpose, as the sides of the same firebox are

Table 9.3 Comparative Trait Table of Archaeological Sweathouses (N-1, S-19, J-17, O-4, S-2, S-4)

|  | $\mathrm{N}-1-2 \mathrm{nd}$ | N-1-1st-B | N-1-1st-A | S-19 | J-17 | 0-4 | S-2 | S-4 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A |  |  |  |  |  |  |  |  |
| Drain* |  |  |  |  |  |  |  |  |
| Sink* |  |  |  |  |  |  | X |  |
| Sunken Doorway* |  |  | X |  | X | X |  | X |
| Sunken Passage* | P | X | X | X | X | X |  | X |
| Peripheral Slopes* |  |  |  |  |  |  |  |  |
| Plaster Passage Drain* |  |  |  |  |  |  |  |  |
| B |  |  |  |  |  |  |  |  |
| Draft Hole* |  |  |  |  |  |  |  |  |
| Steam-Screen* |  |  |  |  |  |  |  |  |
| Fire Chamber* |  |  |  |  |  |  |  |  |
| Firebox* | P |  | X |  | P |  | X |  |
| Fireplace* |  |  |  |  |  |  |  |  |
| Extra Fireplace* |  |  |  |  |  |  |  |  |
| Cold Air Entrance* |  |  |  |  |  |  |  |  |
| Hot Air Entrance* |  |  |  |  |  |  |  |  |
| Sherd Wall* |  |  |  |  | P |  | P |  |
| Sunken Firebox |  | X | X |  | P |  | X |  |
| Firebox Sill | P | X |  |  |  |  |  |  |
| C |  |  |  |  |  |  |  |  |
| Smallness of Room* |  | X | X | X | X | X | X | X |
| Lowness of Room* |  | X | X |  |  |  |  |  |
| Narrowness of Doorway* |  | X | X |  | X | X |  |  |
| Lowness of Doorway* |  |  | X | X |  | X | X |  |
| Sweatroom Door Sill |  | X | X |  |  |  |  |  |
| Curtain Holders* |  |  |  |  |  |  |  |  |
| Air-Tight Ceiling* |  |  |  |  |  |  |  |  |
| Vaulted, Low Walls* |  |  |  |  |  |  |  |  |
| Semi-Vaulted, Low Walls* |  | X | X |  |  |  |  |  |
| Flat Ceiling* |  |  |  |  |  |  |  |  |
| D |  |  |  |  |  |  |  |  |
| Bench in Sweatroom |  |  |  |  |  |  |  |  |
| Niche in Façade |  |  |  |  |  |  |  |  |
| Protective Roof |  |  |  |  |  |  |  |  |
| Enclosing Building |  | X | X | P | P | P | P | P |
| Large Stone Lintel |  | X | X | X | X | X | X | X |
| On-End Construction |  | X | X |  |  |  | X |  |
| Bench in Enclosing Building |  |  | X |  | P |  |  |  |

Note: Certain presence of trait is symbolized by $X$; some physical evidence for it symbolized by $P$; where a single element served several phases the symbol is repeated after the underlined symbol, underlining indicating a first appearance (Strs. N-1 and P-7 only); many blank spaces indicate lack of evidence, not known or probable absence of the trait; starred traits considered clearly suitable for sweathouse function.
not lined with or formed of sherd walls, and as a result were very badly cracked and calcined. The slope might be to throw heat forward, and it might be that limestone walls, considered sufficiently durable if vertical, would soon actually fall if sloping. A third possibility is that this wall is for steam production. One imagines that sherds might store more heat than limestone; if so, selection
of this special material may correspond to the apparent insistence on a special type of volcanic stone in modern Mexico for steam-screens.

Sunken Firebox
One in which the floor of the box, on which the fire is built, is below floor level of the sweatroom. This is the

Table 9.4 Comparative Trait Table of Archaeological Sweathouses (R-13, P-7)

|  | R-13 | P-7-4th-B | P-7-4th-A | P-7-3rd | P-7-2nd-F | P-7-2nd-E |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A |  |  |  |  |  |  |
| Drain* |  |  |  |  |  |  |
| Sink* |  |  |  |  |  |  |
| Sunken Doorway* |  |  |  |  | P | P |
| Sunken Passage* | X |  |  | X | X | X |
| Peripheral Slopes* |  |  |  |  |  |  |
| Plaster Passage Drain* |  | X |  |  |  |  |
| B |  |  |  |  |  |  |
| Draft Hole* |  |  |  |  |  |  |
| Steam-Screen* |  |  |  |  |  |  |
| Fire Chamber* |  |  |  |  |  |  |
| Firebox* |  | P | P | P | P | P |
| Fireplace* |  |  |  |  |  |  |
| Extra Fireplace* |  |  |  |  |  |  |
| Cold Air Entrance* |  |  |  |  |  |  |
| Hot Air Entrance* |  |  |  |  |  |  |
| Sherd Wall* |  |  |  |  |  |  |
| Sunken Firebox |  |  |  |  | P | P |
| Firebox Sill |  |  |  | P |  |  |
| C |  |  |  |  |  |  |
| Smallness of Room* | X | P | P |  | P | P |
| Lowness of Room* |  |  |  |  |  |  |
| Narrowness of Doorway* |  |  |  |  |  |  |
| Lowness of Doorway | X |  |  |  |  |  |
| Sweatroom Door Sill |  |  |  |  |  |  |
| Curtain Holders |  |  |  |  |  |  |
| Air-Tight Ceiling* |  |  |  |  |  |  |
| Vaulted, Low Walls* |  |  |  |  |  |  |
| Semi-Vaulted, Low Walls* |  |  |  |  |  |  |
| Flat Ceiling* |  |  |  |  |  |  |
| D |  |  |  |  |  |  |
| Bench in Sweatroom |  |  |  |  |  |  |
| Niche in Façade |  |  |  |  |  |  |
| Protective Roof |  |  |  |  |  |  |
| Enclosing Building | P | P | P |  | P | P |
| Large Stone Lintel | X |  |  |  |  |  |
| On-End Construction |  |  |  |  |  |  |
| Bench in Enclosing Building |  |  |  |  |  |  |

Note: Certain presence of trait is symbolized by $X$; some physical evidence for it symbolized by $P$; where a single element served several phases the symbol is repeated after the underlined symbol, underlining indicating a first appearance (Strs. N-1 and P-7 only); many blank spaces indicate lack of evidence, not known or probable absence of the trait; starred traits considered clearly suitable for sweathouse function.
arrangement in the three fireboxes examined ( $\mathrm{H}^{\prime}$ in Figure 9.10, E' in Figure 9.34, 6' in Figure 9.57). A reasonable postulated function for this detail is that it would make it easier to keep the floor space occupied by the patient clear of ashes; when, as here, it is associated with a sink or sunken passage, draft to the fire would perhaps be increased.

Firebox Sill
In two of the above cases, although sunk below general floor level, the firebox floor was originally above the sunken passage level, with a sill at the opening to the firebox (Figs. 9.11 and 9.57). Feeding or fanning the fire would be a little more convenient, since the operator could be lower with reference to the fire and hence in
a stratum of air cooler and less dense with smoke than otherwise.

Sweatroom Door Sill
In both the above cases, the postulated advantage was nullified later by raising the sunken passage level to firebox floor height, with provision of a new sill at the doorway (B in Figure 9.11; 1 in Figure 9.57). This had the effect of reducing the height of the doorway. Why this should be done is a matter of mere speculation. If, as we believe, there were no ventilators, the change would presumably reduce the rate at which warm air passed out the top of the doorway and cold air in at the bottom. Perhaps it would tend to absorption, by the walls and ceiling, of a higher percentage of the heat produced, and so reduce the necessary amount of woodcutting with stone tools. This would be a factor of more importance to the ancient than to the modern Maya.

## Heating and Steam-Retaining Arrangements

## Curtain Holders, Apparent Absence

In sweatrooms, of all places, one would expect arrangements for closing the doorway. Curtain holders, in the form of depressions crossed by slender stones, and similar devices which survive if the wall survives, are known at other sites, but have never been found here. The sculpture on "Lintel" 3 suggests that curtains were, or might be, hung on the outside of palace doorways, supported from holes in the medial molding. No such holes were in the molding of the supposed sweatroom of Structure P-7, where they would have survived. Some other method of closing the doorway may be presumed, but it might be well to be on the lookout for curtain holders in ancient Maya sweat houses.

## Vaulted Ceiling with Low Wall

The vaulted type of ceiling is not used by modern Mayan peoples, but was common among the ancient ones. It seems ill-suited for sweatroom construction because there is a structural limit to the flatness of its slopes, hence a minimum height to which the half-vaults must rise before the gap between them can be bridged with capstones. Presence of ordinary vaulting, with capstones, may, therefore, be thought to weigh against sweatroom function. Two factors may tend to minimize this disadvantage. The maximum ceiling (capstone) height can be reduced below what is normal by abnormally low walls below the vault spring. Besides this, the cubic amount of enclosed space can be reduced by half-vaults sloping in from all four sides instead of merely from two. Both of these mitigating factors are present in the supposed steamroom of Structure P-7-1st, the only one encountered with ordinary vaulting.

There was, undoubtedly, a certain amount of space at the top of this room which, because of its height, would contain hot air and later steam which would have little effect on a patient, unless fanned down with a good deal of effort. I have made an approximate calculation of the enclosed space above the vault-spring of this room, which, on the average, was about 72 cm above the floor. If a steam cloud filled this space, with its bottom at vaultspring level, its volume would be about 6.9 cubic meters, the area of its bottom about 7.1 m . This means that the bottom of the steam cloud would be at the same level as with a flat ceiling with walls about a meter higher, that is, a total of 1.7 m .

This latter height, which cannot be determined from one cross section only, is what should be compared with heights of known sweathouses with flat or nearly flat ceilings. For comparison with the Aguacatán example, we may take the height of the walls there, 1.2 m and add one half of the additional height to the ceiling at center, getting a comparable figure of 1.3 m . In order to produce a low-lying cloud of steam at a given height above the floor, the P-7 chamber would require the average thickness of the cloud to be about 42 cm more, per unit of floor area.

## Semivaulted Ceiling with LowWall

Semivaulted has been applied by us where wooden beams, instead of capstones, bridge the gap between the halfvaults, forming a beam-and-mortar element in the roof. It could cover protected beam-and-adobe vault-supported roofs, if such existed. Existence of this combination of the two roof types is considered established on the enclosing building of Structure P-7, where it seems to have been adopted to permit a wider span than would be feasible with complete vaults, the material of the roof being limeconcrete.

Such a roof could also be used to permit a lower ceiling with a given span, and so would appear suitable for steamroom construction; and it might combine this effect with a span wider than seemed possible with complete vaulting, or with beams only. We have reconstructed it in Figure 9.35, because the span there is probably somewhat wider than in the other figures on the same page, and about the same as in Figure 9.10. The span in Figure 9.10 is somewhat greater than in any known complete vault at the site. In addition, the soffit slopes in this structure are very steep. The vault-spring is illdefined, but the existence of the slopes was quite certain; it is equally certain that they were not carried up to form a completely vaulted ceiling, which would have left more débris than was found. We have considered that presence of the slopes rules out the logical possibility of a thatch roof. Walls only 50 cm high (in the room of Figure 9.10) obviously indicate that lowness was desired.

Table 9.5 Comparative Trait Table of Archaeological Sweathouses (P-7)

|  | P-7-2nd-D | P-7-2nd-C | P-7-2nd-B | P-7-2nd-A | P-7-1st-B | P-7-1st-A |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A |  |  |  |  |  |  |
| Drain* |  |  |  |  |  |  |
| Sink* |  |  |  |  |  |  |
| Sunken Doorway* | P | P | P | P | X | X |
| Sunken Passage* | X | X | X | X | X | X |
| Peripheral Slopes* |  |  |  |  |  |  |
| Plaster Passage Drain* |  |  |  |  |  |  |
| B |  |  |  |  |  |  |
| Draft Hole* |  |  |  |  |  |  |
| Steam-Screen* |  |  |  |  |  |  |
| Fire Chamber* |  |  |  |  |  |  |
| Firebox* | ? | P | P | P | X | X |
| Fireplace* |  |  |  |  |  |  |
| Extra Fireplace* |  |  |  |  |  |  |
| Cold Air Entrance* |  |  |  |  |  |  |
| Hot Air Entrance* |  |  |  |  |  |  |
| Sherd Wall* |  |  |  |  |  | P |
| Sunken Firebox | P | P | P | P | X | X |
| Firebox Sill |  |  |  |  |  |  |
| C |  |  |  |  |  |  |
| Smallness of Room* | P | P | P | P | X | X |
| Lowness of Room* |  |  |  |  | X | X |
| Narrowness of Doorway* |  |  |  |  | X | X |
| Lowness of Doorway* |  |  |  |  | X | X |
| Sweatroom Door Sill |  |  |  |  |  | X |
| Curtain Holders* |  |  |  |  |  |  |
| Air-Tight Ceiling* |  |  |  |  |  |  |
| Vaulted, Low Walls* |  |  |  |  | X | X |
| Semi-Vaulted, Low Walls* |  |  |  |  |  |  |
| Flat Ceiling* |  |  |  |  |  |  |
| D |  |  |  |  |  |  |
| Bench in Sweatroom |  |  |  |  |  |  |
| Niche in Façade |  |  |  |  | X | X |
| Protective Roof |  |  |  |  |  |  |
| Enclosing Building | P | P | P | P | X | X |
| Large Stone Lintel |  |  |  |  | X | X |
| On-End Construction |  |  |  |  | X | X |
| Bench in Enclosing Building |  |  | P |  | X | X |

Note: Certain presence of trait is symbolized by $X$, some physical evidence for it symbolized by $P$; where a single element served several phases the symbol is repeated after the underlined symbol, underlining indicating a first appearance (Strs. N-1 and P-7 only); many blank spaces indicate lack of evidence, not known or probable absence of the trait; starred traits considered clearly suitable for sweathouse function.

## Flat Ceiling

This type of ancient Maya roof seems obviously the most suitable to sweatroom construction, provided the span is not too great without semivaults. It has been restored on five of our examples, without ignoring any available data, but could not be positively proved, However, in all cases
postulated as sweatrooms, except for Structure P-7, the roof was certainly not completely vaulted, which leaves either semivaulting or beam-and-mortar roofs as the only reasonable alternatives.

Independently of the calculation respecting a hypothetical steam cloud in the Structure P-7 room, flat
or semivaulted ceilings had been reconstructed for the others at 2 m above the floor. There is nothing precise in this reconstructed height, as it is based on debris depth only. The true height might be something more, but also it might be a good deal less. In all cases, including the vaulted one, it can be said, roughly, that the Piedras Negras rooms were, in effect, probably substantially higher as well as larger than that at Aguacatán.

Considering that the Piedras Negras rooms cover a larger area and possess much larger fireboxes (presumably they were designed for at least two patients at a time), this amount of extra height does not seem unlikely. In the non-vaulted or semivaulted examples it would permit attendants to pass freely about while erect, and there is no presumption that the ancient Maya ruling class was content with such tiny bake oven-like rooms as are the present Indians.

One may doubt whether these larger and higher rooms could be made as hot as the smaller modern types, but there is little doubt that, with their large fireboxes and possibly fire-screens as well, they could be more or less filled with steam for a considerable period of time. Disregarding space occupied by part of the firebox and probably by several persons, the enclosed space above floor level was never more than, roughly, 30 cubic meters (for the semivaulted Structure N-1 as reconstructed). It may always have been considerably less. This probably extreme figure is about four times the cubic content of the Aguacatán example, which I calculate roughly at 6.9 cubic meters. Fireboxes which may easily have been arranged to store four times as much heat as that at Aguacatán were probably capable, I think, of keeping up steam in the largest Piedras Negras example for the same length of time.

## Miscellaneous Traits

## Large Stone Lintels

These may be mentioned as a local characteristic tending to confirm the placement of our supposed sweathouses in one group. Without exception, the sweatroom doorway was bridged by a heavy stone lintel, a feature entirely absent in palaces, and present in one temple only.

## On End Construction

The entire front of the firebox in Structure N-1 (Fig. 9.16) up to the level of a lintel over its opening, consisted of slab-like massive stones set on end. In Structure P7 both jambs of the door-like firebox opening were of single, large stones set on end (Fig. 9.64); and in Structure S-2 this was the case with one of the two sides of the corners of the opening (Fig. 9.34). This on-end sort of construction is thus found in all three of the fireboxes known, but is completely unknown elsewhere at the site,
unless we equate it with sloping veneer on one ball court and one terrace.

## Benches in the Enclosing Building

These occur in the two enclosing buildings in which they have been properly searched for (Figs. 9.9 and 9.46 illustrating Strs. N-1 and P-7-1st-A), and probably in a third, where some half-hearted trenching was done (Fig. 9.26). In Structure P-7-1st two of the benches seem to have been thrones, of the type found in palaces at this site. Those in Structure N-1 seem suitable for post-bathing ministrations, but we have no real evidence as to their function.

## Sweathouse Identification at Piedras Negras

Having analyzed out a large number of traits in modern, and in ancient Piedras Negras sweathouses, their various known combinations into complexes are now presented in the [Comparative Trait] Table [Tables 9.2-9.5]. The process of trait analysis has been pushed to the limit, principally with the objective of maximum usefulness as a guide in future excavations. For some of these traits it is their linkages into complexes which make them valid function-indicators.

To facilitate recognition of such combinations as seem to be valid primary or secondary sweathouse criteria, the traits are grouped in the table as follows:
A. Traits clearly suitable for drainage of a room (other than a mere sloping floor), and others associated with them.
B. Traits clearly suitable for heat and/or steamproduction, and others associated with them.
C. Traits clearly suitable for heat and/or steam retention, and others associated with them (including possibilities which should be looked for though apparently absent in the series covered by the table).
D. Miscellaneous traits associated with those listed under $\mathrm{A}, \mathrm{B}$ or C .

Those traits considered to be "clearly suitable" in providing for the function implied by the letters A, B or C, are starred. If a building shows enough starred traits in each of the lettered groups to convince one that drainage, heat production, and heat retention were the objectives, it is convenient to say that it exhibits an "ABC" complex. Among the five selected modern examples, four show this "ABC" complex, while that at Aguacatán shows only a "BC" complex. This series of modern examples is very small, but it is widely distributed geographically. We can probably safely assume that ancient Maya sweathouses should show the "BC" complex as a minimum. This would include Morley's Chichén Itzá examples, but rule out his Quiriguá ones, as well as East Coast shrines.

Table 9.6 Summary Tabulation of the ABCYZ Complex

| N |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Phases |  |  |  |  |  |  |
| 4 | N-1-1st-B \& A; P-7-1st-B\&A | A* | B* | C* | Y* | Z* |
| 1 | S-2 | A* | B* | C* | Y* | ? |
| 2 | J-17; P-7-2nd-A | A* | ? | C* | Y* | ? |
| 3 | O-4; S-4; R-13 | A*; | B | C | Y* | ? |
| 6 | P-7-4th-B; P-7-2nd-F, -E, -D, -C, -B | A* | B | C | Y* | ? |
| 1 | S-19 | A* | ? | C | Y* | ? |
| 1 | P-7-3rd | A* | B | ? | ? | ? |
| 1 | P-7-4th-A |  | B | C | Y* | ? |
| 1 | N-1-2nd | A | B |  |  |  |

In the tables, the presence of traits establishing these complexes in the modern examples is indicated by the letter "x" which signifies its presence without any guessing or inference. In one case, at Sweathouse 1 at Chichicastenango, the presence of the enclosing building is thus indicated in Group D, though it is a room apparently first built for some other purpose. That is apparently not the case with Sweathouse 1 at Milpa Alta. Let us represent this particular miscellaneous trait by the letter "Z," in view of its importance in ancient examples. We have, then, among the modern ones, the complexes $\mathrm{ABC}, \mathrm{ABCZ}$ and BC .

Turning to those boxes of the tables which cover ancient structures at Piedras Negras, we may first consider those mounds and phases where the evidence is most satisfactory, i.e., those columns where there are " $x$ 's" only, or where a " p " for merely some physical evidence does not affect the certainty of provision for drainage and heat production and retention (i.e., where the "p's" do not affect the certainty of complex ABC). We find this complex, clearly proved by adequate physical evidence, in five columns, those applicable to the one known phase of Structure S-2 and to the last two phases of Structure $\mathrm{N}-1$ and of Structure P-7. Complex ABC is thus surely present at three of the eight mounds, and in five of the twenty phases.

The particular drainage and heat-producing arrangements listed respectively under "A" and " $B$ " are unsuited to aboriginal dwellings and are known to be absent in local temples and palaces, near which we find these mounds. Some of the features starred under "C," such as smallness of room, have been found in such ancient ceremonial buildings. This we find in the temple, Structure J-4-1st-A, and in the palace, Structure J-6-1st. In the latter case the vaulted roof also springs from very low walls. But in neither of these cases is the doorway narrow or, so far as known, low, features
which undoubtedly were essential for heat or steam retention. So, disregarding the extra phases, we can not only say that at three of the eight mounds we have the ABC complex; we can also say that none of the separable complete linkages of traits justifying any of the separate constituents of this complex are found in temples or palaces, The latter are defined by what seem adequate criteria of their own.

We can be doubly sure, then, that the ABC complex in three of our eight mounds served the same function as it does elsewhere today, since even its separate parts cannot be reasonably assigned to other ancient functional types of building.

Two of these three sweathouses, Structures N-1 and P-7 (in the latest two phases of each) were certainly placed in enclosing buildings, and showed the Complex ABCZ. Much more than at Milpa Alta, where we have the most satisfactory ABCZ complex, it is here clear that the enclosing building was important, and was especially designed for use with the sweatroom (Figs. 9.8, 9.9 and 9.46). This "Trait Z" was evidently firmly linked to sweathouses at Piedras Negras, since it is unknown for local temples or palaces. The enclosing building stands on the same platform which supports the sweatroom, so the platform can be described as oversize with respect to the sweatroom, though it is not oversize with respect to the enclosing building. In all phases at all mounds covered by the table, we either have an enclosing building, or else a building platform which was oversize with respect to a small masonry-walled room. Let us represent the known enclosing buildings together with their platforms by YZ, and use Y alone for those platforms which are surely oversize with respect to the sweatroom, and which theoretically may have been actually oversize because enclosing buildings have not been proved for them. Our three best-established sweathouses then show the complex ABCYZ or ABCY , with a probability that all three could
be properly symbolized by the full ABCYZ. Trait Y, the separately considered oversize platform, is just as absent from temples and palaces as is the combination YZ. So a linkage of either Y or YZ with $\mathrm{A}, \mathrm{B}$ or C is a satisfactory secondary sweathouse indicator (Tables 9.2 to 9.5).

We now turn to those columns of the tables which cover earlier and less well-known phases at Mounds N-1 and P-7, as well as single phases at five other mounds, where digging was less extensive. Here we encounter many blank spaces, which may mean nothing more than lack of recovered physical evidence; and there are a good many P's, which mean that some physical evidence for a given trait was present, though it would not be convincing if considered in isolation. In the row pertaining to enclosing buildings, this evidence is the certain presence of the oversize building platform, so for the P's in this particular row we can substitute Trait Y as sure. Making this substitution, the complete tables are summarized below in terms of the ABCYZ complex, the group letter being set down where any physical evidence for a trait of that group was noted. Since this leaves the reader in the dark as to where the physical evidence may be weak, stars are now applied to the group letters where the physical evidence is sufficient to be convincing. The various phases are grouped in descending order with respect to the fullness of such evidence (Table 9.6).

The question-marks in this summary tabulation indicate entire absence of observed physical evidence. Those in the second column (B, for heat-production traits) are entirely due to a decision to stop digging at the mounds concerned when the sunken passage had been linked to a narrow low doorway in a small room on a platform which was oversize with respect to that room. The question marks in the third column ( C , for heat retention) in each case reflect less than a complete search for remnants of a sweatroom which probably had been torn down by the Maya to make way for a new one. Lack of physical evidence in this column automatically calls for question marks in the fourth and fifth columns. Sizes are such that, in these two cases, Y? and YZ would belong in these columns if we had physical evidence of the small rooms called for by the AB complex. It is clear that if we had full physical evidence, it would eliminate the theoretical doubts as to the complex ABCY (and probably as to complex ABCYZ ) in all phases of all mounds except one; in that, special drainage arrangements were apparently lacking, and the complex BCY (probably BCYZ ) applies. This single case (P-7-4th-A) is very early at its mound, but not the earliest, which shows the only example of the plaster passage drain.

Our conclusion is that in all known phases of the eight mounds, sweating and bathing with water were the primary functions. Sweating was provided for by special masonry arrangements for a fire within a small masonry
room designed to retain the heat. This was placed on a building platform oversize with respect to the sweatroom itself. The platform certainly served an enclosing building in the late phases at two mounds, and probably did likewise in all phases at all mounds. Special provision for drainage of the sweatroom was characteristic, and probably universal after an early period of indecision in this regard.

## Mound Interpretation

## Orientation

I have not attempted to assemble data on orientation of modern sweathouses. So far as one can now tell, the orientation of ancient ones followed the prevailing plan for neighboring structures. Ruppert's figures show that one of the two sweathouses at Chichén Itzá faces northwest like the nearby Caracol, while more intimately associated buildings face southeast; the other (Structure 3 in Square E3) faces east, and is next to Structure 4 facing south (Ruppert 1935). At Piedras Negras these buildings may face northwest, southwest, northeast or southeast. Presumably, if attention to the cardinal points entered in to ancient Maya sweat-bathing, it did not require special orientation of the building itself. Orientations will probably not help in recognizing ruined sweathouses.

## Mound Form

The sweatroom being small, and not very long in relation to its depth, it is likely to leave a small distinguishable squarish or roundish mound. This alone is not a sufficient function-indicator, as proved by examination of Structures K-1 and K-3 at Piedras Negras. But here at least, if the small mound is centered on remains of a relatively long, low platform, toward the rear if the platform is also relatively deep, the probability is that it is the ruin of a sweatroom which had been supplied with an enclosing building. Illustrations of this mound type are supplied by Structures N-1, S-2 and S-4, as depicted by Parris before excavation (second edition of map, Morley 1938, Pl. 202). Of course, if enough visible wall survives, or contours suffice to prove that the centered mound is the ruin of a small and not long room, so much the better. These two situations obtained at Structures O-4 and R13 when Parris drew them.

If one observes a ruined platform without any clearly distinguishable additional small mound centered upon it, it would not be safe to say it is not the ruin of a sweathouse. The sweatroom may often have been built of perishable materials in ancient times, so far as we yet know. Moreover at Structure J-17 the sweatroom is so large in relation to its thin masonry walls, probably without even semivaulting, that the central mound, if present at all, must have been very slight. We did not record a

Table 9.7 Scheme of Temporal Sequences (Structure N-1)

| Str. N-1-2nd(earliest) | Building platform, probably with sunken <br> passage | Unit M |
| :--- | :--- | :--- |
|  | Firebox sill <br> Piers of enclosing building (postulated <br> without physical <br> evidence: sweatroom, some <br> wooden posts, thatched roof) <br> Sweatroom walls | Unit L |
| Str. N-1-1st-B | Firebox with new sill, remnant of its rear wall <br> Sherd wall in firebox | Units H, H', K |
| Str. N-1-1st-A (latest) | Masonry rear and side walls of enclosing <br> building, probably base-walls <br> Benches | Unit H" |
|  | Raising of passage floor in sweatroom <br> Low supplementary platform, stepped-front | Unit A |

longitudinal section here, and we excavated before Parris drew his map. Caution in deciding that one does not have a sweathouse is indicated in another case, that of Structure S-19. Here the sweatroom mound was conspicuous. But the platform immediately adjoins another, and it required a carefully controlled longitudinal debris profile to show that the mound was centered between humps presumably representing ruined end-walls of an enclosing building.

It is reasonably clear, I think, that absence of small, squarish, centered mounds on oversize platforms on maps of sites in other parts of the Classical Maya area is
no sure guarantee that sweathouses were confined to the Usumacinta region. Where this type of mound is known, however, it appears to be a fairly sure sweathouse indicator. However, in using this criterion, the dimensions and proportions of the supposed sweatroom mound must be considered. The known ancient sweatrooms are somewhat longer than deep, but not much longer. Thus there is little reason to suspect that Structure O-3 is a sweathouse, because the debris indicates a relatively long narrow room, similar to the excavated Structure F-3 (see map, Figure 1.1).

Table 9.8 Scheme of Temporal Sequences (Structure N-1)

| $\begin{aligned} & \hline \text { Str. } \\ & \mathrm{N}-1 \end{aligned}$ | Fig. 9.10b | $\begin{aligned} & \text { Fig. } \\ & 9.10 \mathrm{~b} \end{aligned}$ | $\begin{aligned} & \text { Fig. } \\ & 9.10 \mathrm{~b} \end{aligned}$ | $\begin{aligned} & \text { Fig. } \\ & 9.10 \mathrm{~b} \end{aligned}$ | $\begin{aligned} & \text { Fig. } \\ & 9.10 \mathrm{c} \end{aligned}$ | $\begin{aligned} & \text { Fig. } \\ & 9.11 \end{aligned}$ | $\begin{aligned} & \text { Fig. } \\ & 9.11 \end{aligned}$ | $\begin{aligned} & \hline \text { Fig. } \\ & 9.11 \end{aligned}$ | $\begin{aligned} & \hline \text { Fig. } \\ & 9.12 \end{aligned}$ | Fig. 9.13a | Fig. $9.13 \mathrm{a}$ | Fig. $9.13 \mathrm{a}$ | Fig. 9.13a | * |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $-2^{\text {nd }}$ | M | M |  | M | M | M |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | L |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | J |  | J |  |  |
| $-1^{\text {st }}$ - ${ }^{\text {d }}$ |  |  |  |  |  |  |  |  | K |  |  |  |  |  |
|  |  |  | I |  |  |  |  | I |  |  |  | I |  |  |
|  |  |  |  | H |  |  |  |  |  |  |  |  |  | H |
|  |  |  |  |  |  | $\mathrm{H}^{\prime}$ | $\mathrm{H}^{\prime}$ |  |  |  |  |  |  | $\mathrm{H}^{\prime}$ |
| $-1^{\text {st }}$ - A |  |  |  |  |  |  |  | $\mathrm{H}^{\prime \prime}$ | $\mathrm{H}^{\prime \prime}$ |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | G | G |  | G |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | F |  |
|  |  |  |  |  |  |  |  |  |  |  | E |  |  |  |
|  |  | D | D |  |  |  |  |  |  |  |  | D |  |  |
|  |  |  |  |  |  |  |  |  |  | C |  |  |  |  |
|  |  |  |  |  |  | B | B |  |  |  |  |  |  |  |
|  | A |  |  |  | A |  |  |  |  |  |  |  |  |  |

*Not illustrated: Jamb of firebox (H) rests on sill ( $H^{\prime}$ ).

Locations at a Site
It may be said of the Chichén Itzá sweathouses, and of most of the eight known Piedras Negras ones, that they are in somewhat retired positions, but closely associated with major buildings. At neither site is there reason to doubt that these sweathouses formed parts of ceremonial architectural complexes. One of the Piedras Negras examples, Structure $\mathrm{N}-1$, is the main center of interest at one end of a plaza serving temples and palaces, and containing a ball court and carved stela and altars. This is in sharp contrast to the humbler and smaller modern examples, which seem to belong with dwellings.

One supposes that proper examination of peripheral areas, characterized by low mounds, will show ancient dwellings there, and it seems likely that if sweathouses occur in the ceremonial center, they will appear in more modest form in the house-mound zones also. At Piedras Negras this may be confidently predicted on the basis of mound-form in two such zones (Strs. N-7 and K-23 on map, Figure 1.1). In these two mounds, not excavated, the supposed sweatroom mounds are about the size expected, the platforms shorter than most known bases for enclosing buildings of sweathouses. But the platforms (as indicated by the debris) are not much shorter than this component during the earlier periods of Structure P-7 (Figs. 9.41-9.43). The larger and more imposingly placed enclosing buildings may have evolved from a smaller variety which never went out of use in dwelling areas.

The mound-form of Structure O-29 suggests that it be added to the eight examples of large sweathouses as of time of abandonment. It is hard by the East Group Plaza, and quite close to Structure O-4, though at a lower level than the latter, facing on a ravine. It is closely associated with only one other mound, a low platform without the supposed sweatroom mound on it. The latter might be a dwelling, but we know nothing about it, apart from its approximate dimensions. There also appears to be a possibility that a sweathouse was present as part of what we have designated Structure P-6, though the map does not show a special hump of debris which raises the question.

## Distribution Elsewhere in the Maya Area

It is not improbable that in ancient times sweat-bathing was practiced in two contexts at the same sites in comparatively large structures of a public or semi-public nature, within the ceremonial precincts, and in less elaborate buildings (or even in temporary constructions) near the dwellings. Failure thus far to investigate "housemounds" is a sufficient cause for ignorance of probable simpler types at ancient sites, corresponding more closely to modern ones; and scanty attention to low mounds within the ceremonial parts of most sites may
account for the present lack of evidence for presence of the more elaborate variety. With the latter established on a Mexican-influenced and on a classical Maya horizon in the Maya lowlands, and with the modern practice extending into the Mayan highlands, there seems little ground for presuming a restricted distribution of sweatbathing within the ancient Maya lowlands. It should be searched for wherever one digs, allowing perhaps for the possibility that some regions may have failed to adopt the more elaborate large type. The present evidence for a general distribution in Maya country is scanty, and of uneven quality. Most of what little I have collected has been referred to under Preliminary Remarks, and is covered in more detail here.

## East Coast Yucatan(?)

Lothrop (1924) notes that some of the East Coast shrines have only one doorway and could have served as sweathouses. Smallness and lowness in this district do not necessarily connote the sweathouse function, since these characteristics occur with four-door structures which, as he notes, could not very well have imprisoned the heat. Until some additional evidence is found, it appears necessary to allow for the suggestion respecting one-door shrines, but to consider it very doubtful. For instance, as shown in Lothrop (1924), the placement of the shrine of Structure 1 at Tancah corresponds quite closely to that of the large upper building of the Castillo at Tulum, presumably a temple, certainly not a sweathouse, though the Tancah shrine is exceedingly small and low, and has but one doorway. This is no lower than is required by the miniature scale of the building. The same source shows that Structure 3 at Xelha has a single low doorway, less than two feet high. This shrine is on a low platform, as are the supposed Piedras Negras sweathouses. But the interior dimensions seem too small even for a sweathouse. They scale to something close to 0.9 m by 1.3 m .

One other east coast shrine may be cited as an example. This is Structure IX at Coba, for which Pollock gives full data (Pollock 1932). It is small and low, interior dimensions being 1.2 by 1.6 m , with a maximum height of 1.4 m to capstone of the vault. The single doorway is 58 cm wide, its height restored as about 50 cm . Thus it could serve the sweathouse purpose. But much of the floor space is occupied by a low rectangular altar, and absence of evidence of fire is specifically noted.

We have seen that modern sweatrooms may be placed indoors, and one should not assume a priori that anciently they could not have been placed in pyramidsupported temples. At Uaxactun we find an indoor structure in this position, which is small in all dimensions and has a single small low doorway. But again, the actual dimensions are too small for the sweathouse function. Smith gives the doorway as 53 cm wide and 60 cm high,
which is reasonable for such a purpose; but the interior dimensions of the tiny room are only 0.6 m by 1.3 m by 0.6 m high (Smith 1937).

I think it is fair to conclude that mere smallness and lowness of a building and of its single doorway, indoors or out, are not safe positive criteria for sweathouse identification, unless accompanied by other criteria. One of these must be evidence of fire, more extensive than burning of incense.

## Quiriguá(?)

Morley has seemed to identify two hollow benches in Structures 2 and 3 at this site as probable sweatrooms. The only evidence is the finding of smoke-blackened boulders in one of them by Morris (Morley 1935). The assumption is that these were heated outside and then introduced for steam-making purposes. I submit that this is not enough. In 1937, I crawled into what I believe is the bench of Structure 3 referred to. The entrance, according to my measurements, is about 55 cm wide by 60 cm high, which agrees well enough with modern sweathouse doorways. But one enters a long passage or chamber of the same slight width as the doorway. This, scaling from the published plan, is about 10 feet ( 3 m ) long (and 1 m high as measured by me). At the interior end it turns a corner and leads shortly to a tiny chamber 0.9 m by 1.5 m by 1.2 m high, through a doorway 0.5 m wide and 0.6 $m$ high.

Either of the doorways agrees well enough with known steamroom doorways, but the dimensions of neither of these chambers seem to fit the picture. More than this, the outer chamber or passage is too long for efficient steam saturation. The inner chamber could not be more inconveniently arranged for passing hot stones in from the outside, to say nothing of getting a really sick person to and from it. I submit that archaeological existence of sweathouses in the Motagua drainage is not established by these two hollow benches at Quiriguá, extremely interesting as they are. After all, Morley says only that "both constructions had originally served the same purpose, probably as sweat-baths." It would be difficult indeed to prove that any given confined place was never used for the purpose.

## Chichén Itzá

Morley's two sweathouse identifications at this site rest on firmer foundations (Morley 1936). Excavated by Ruppert and as yet unpublished, Cresson notes with permission the presence of the sunken passage and fire chamber, built onto the sweatroom as in his Mexican cases (Cresson 1938). Unlike them, the fireplace opens only into the sweatroom. When Morley showed these two to me he pointed out abnormally low walls and, in the only example well enough preserved to show it, the low single
doorway and ventilators. Interior arrangements were not then uncovered. Tozzer has suggested that the structure at the cenote may have been a sweathouse (Tozzer 1941). It is, apparently, so much destroyed that definite proof could hardly be expected.

## El Chile

The existence of a sweathouse at this Middle Usumacinta site, between Piedras Negras and Yaxchilan, is to be strongly suspected. On pausing there in 1934, I noted a small and apparently isolated building, which seemed to be partly submerged below the surface of the ground. The front showed a doorway 50 cm wide, capped by a stone lintel 12 cm thick. This is not particularly thick, but its length, 1.1 m , qualifies it as larger than necessary for the narrow doorway. Its under side was only 35 cm above the ground, and about 80 cm below the ruined top of the front wall, My estimate on the spot was that the outside dimensions were about 4.8 m length by about 4 $m$ depth. The depth of the lintel, 70 cm , suggests interior dimensions of about 3.4 m by 2.6 m , which compares with an average of 3.5 by 2.2 for our Structure P-7. The debris at El Chile suggested a fallen vault, but this was very uncertain. I thought no more of this structure until 1937 when Pollock, on seeing our Structure P-7, then considered to be a sweathouse, opined that he had seen a structure of similar function at El Chile. I have no doubt that it was the same building referred to in my notes, and that it was a sweathouse. Since the bottom of the doorway lies somewhere below the present surface, where wash from higher ground is indicated, remains of a non-vaulted enclosing building may be completely buried.

Anyone desiring to visit this site would be advised to ask that he be taken to a spot on the left bank known as Palo Blanco, where a species of opening in the bank will lead him directly to it. Maler's name El Chile ought to be retained, but he took it from the site of a montería some distance upstream, already abandoned in his time.

## Guatemala Highlands

Shook has excavated a possible sweathouse on the Pacific slope of Guatemala, shown by the ceramics to be contemporary with a site called El Paraiso, which was occupied during Late Classic and post-Classic times (Shook 1947). So far as known to the writer no such archaeological evidence for the antiquity of the trait has been encountered in the highlands proper, but apparently Mayan words suggest that the sweathouse is no recent importation there.

The following apparently non-Nahua words apply to modern baths with steam, in Mayan-speaking country on the southern periphery of the Initial Series area, that of our site: Tzeltal, pus (Blom and LaFarge 1927); Jacalteca i'ka (La Farge and Byers 1931); Pocomchi tuh (Stoll
1886). The Diccionario Pokomchi-Castellano in the Berendt Collection of this Museum applies tuh to an hornilla where se bañan y toman baños calientos, which seems to take the sweathouse in the northern Guatemala highlands well
back in time. It seems to me that the variety of terms, paralleling the variety of Mayan languages, also argues for some antiquity of the sweat-bathing custom there. A search in linguistic material might enlarge the list.

## 2. Structure N-1, Linton Satterthwaite

## Preliminary Remarks

Details of this sweathouse are presented first because it is the simpler of the two for which we have something approaching complete information. Certain features make it especially interesting. The enclosing building shows widely spaced elements which are apparently the ruins of slender square masonry piers. In the final phase these were connected by thin masonry walls, which may have been mere base-walls carried higher with perishable materials. The roof of the enclosing building thus outlined was probably of wood and thatch during all phases; yet even so its support seems to require that the piers were supplemented by wooden posts at the front and sides, as suggested in Figures 9.8 and 9.9. No sculptural decoration was encountered, but platform units were not extensively investigated. The structure was apparently in use at the time of abandonment. Though in a very important position in the West Group Plaza (Fig. 1.1), its appearance then must have been vastly different from that of vaulted palace and temple buildings on that plaza, though similar to that of the nearby Structure O-18. The latter also exhibits the slender piers, and was probably roofed with thatch. Structure N-1 is also especially important to us because only here was the sherd wall in the firebox definitely established, and here is the best evidence for the combination of vaulting and the beam-and-mortar roof over the sweatroom.

No walls showed in the mound. We had not inferred the sweathouse function from Parris' schematic delineation of the mound contours, though we might have done so (see Morley 1938:5, Plate 202). Carefully measured debris sections made later did not justify the tiny central hump which Parris shows. If this is eliminated, the correspondence with his mounds S-2 and S-4, on the same edition of the map, is more complete. As soon as a central trench revealed the narrow doorway and heavy lintel of the sweatroom, we concluded that we had a sweathouse. Without this foreknowledge, much information regarding the firebox would have been missed.

Ruin, except close to floor level, was complete. Finishing plaster had largely disintegrated except in the sweatroom. Here it was well protected by deep debris,
and easily followed. Presumably it could have been used to determine whether there was a time interval between finishing the platform and construction of the steamroom, but this approach was neglected. The excavation, in 1935, was in charge of Cresson. Measurements for the plan and sections (using triangulation and leveling instrument) and some of the follow-up notes were made by the writer, and I am responsible for gaps in recoverable information.

## Unit Designations and Temporal Sequences

Deep cuts to determine the maximum number of phases represented in this mound were not made, but a minimum of three phases is required for the units uncovered, In the scheme of sequences adopted we have held to this minimum. In reality there may have been a larger number of phases. The table of Temporal Sequences (Table 9.7), together with the Stratification Table (Table 9.8), explain sufficiently the unit designations on the drawings, and the necessity of at least three phases. Horizontal Stratification is almost exclusively represented, but in no case is there real doubt as to which of two juxtaposed units was the earlier. The grouping of the three phases into two periods, and assignments of some units to one rather than to another period and phase, seem reasonable, but judgment uncontrolled by stratifications has had to be used. The application of H as the label for a sherd wall believed to post-date Units H and $\mathrm{H}^{\prime}$ and of K to a unit postdating one labeled J violates our usual rule in choosing such designations. Correcting for these inconsistencies did not seem worth the considerable trouble.


Figure 9.8 Isometric reconstruction of Structure N-1-1st-B (building platform and piers surviving from time of Structure N-1-2nd).

As elsewhere in this report the Stratification Table lists available controls proceeding downward with advancing time, the indicated stratification of lettered units in a column being illustrated in the figure designated at the top.

## Remarks on Drawings

Figures 9.8 and 9.9
Because of the unusual character of the enclosing building, special attention is directed to the hypothetical character of the wooden main posts suggested in these drawings. As a general rule in this report, broken-line reconstructions show something known elsewhere on the building concerned, or at least known somewhere at the site. Post-holes in a plastered concrete floor are known in the earliest Acropolis period, but have not actually been seen in association with either piers or thin walls, here or elsewhere. The holes were looked for here along the left front, with negative result. But the floor was completely disrupted and the evidence could easily have been destroyed. On the other hand, the absence of piers where the posts have been postulated seems well established, since the bases of piers survived at the corners, as well as under the protecting debris of the sweatroom, and similar


Figure 9.9 Isometric reconstruction of Structure N-1-1st-A (with elements surviving from prior phase).

No top surface had survived on any of the benches (C, D, E. F) shown in Figure 9.9. They may have been somewhat higher than they are shown.

Figures 9.11 and 9.12
Figures 9.11 and 9.12 show an entirely hypothetical reconstruction of the top of the firebox, which had completely fallen. That of Structure P-7


Figure 9.10 a. Plan of Structure N-1-1st-A; b. longitudinal section of Structure N-1-1st-A with firebox in elevation; c. cross section of Structure N-1-1 st-A at center.


Figure 9.11 Isometric reconstruction of sweat room and firebox of Structure N-1-1st-A combined with cross section at center, all phases so far know on this line.
(Fig. 9.57) has been used as a guide, but this is basing one reconstruction on another. No firebox yet reached by excavation survived to the top. The design adopted for the tops of these fireboxes embodies the use of horizontal slabs as seen at Aguacatán (Fig. 9.1). The minimum length of slabs for such use here would be about 9.8 cm . A number of slabs were measured as they were taken from the debris which filled the box. The thickness ranged from 5 to 11 cm and the maximum length recorded is 60 cm . Two slabs, one of them 50 cm long, touched the floor and probably did not come from the semivaulting of the sweatroom, unless the firebox was entirely open at the top. We failed to attempt fitting to see if some of these slabs were fragments of longer ones, broken during the collapse, The reconstruction is provided as something to look for in future digging, and is not a well-established design here or elsewhere.

## Discussion by Periods and Phases

## Structure N-1-2nd (earliest)

This period is not represented separately in the illustrations. It has been assumed that the enclosing building and its platform, as shown in Figure 9.8, are survivals from this $\mathrm{N}-1-2$ nd period. The sweatroom and firebox of this N-1-2nd period, it is supposed, had been replaced by new ones by the time of Figure 9.8. Apart from those components, Figure 9.8 illustrates what has been assigned to the earliest period we have distinguished.

## Building Platform (Unit M)

Under our assumption, this early unit was the same low platform as that shown in Figure 9.8 as of a later time. However, it is possible that it was shorter, and


Figure 9.12 Cross sections through firebox, Structure N-1-1 st-A, with what is known of earlier phases.
even somewhat less deep, in the N-1-2nd period, the dimensions in the next period being in creased by additions. The history of the sweathouse P-7 makes these possibilities more than mere logical ones (cf. Figures 9.8 and 9.42 which are at the same scale). Trenches to determine the matter were not dug. However, even if originally smaller, such a condition might pertain to a still earlier, unrecognized, phase, and not to that here being considered. The presence of the sunken passage in this phase is implied by the sill, presumably of an old firebox, described below.

## Enclosing Building (Unit J)

The evidence for this building consists of the ruined bases of six slender masonry piers (J) those shown (with other features assigned to the next period) in Figure 9.8. These are square in cross section, about 75 cm to a side, and are noticeably more slender than those of Structure O18. The scant amount of debris (Fig. 9.10b) and all other tests prove absence of vaults here, as on Structure O-18. For the support of a roof, wooden posts, or piers since removed, must be postulated at certain points during this period, as in the later ones of Figures 9.8 and 9.9. In addition, there was presumably a centered rear pier or post. While a beam-and-mortar roof can be imagined by postulating interior wooden supports, a thatch roof seems more likely.

We should consider the possibility that the piers never rose to roof height, and were merely bases for
wooden main posts. As such, why should they be provided for some posts and not for others? While slender by comparison with piers at the site in general, they could surely have been carried to a height of 2 m or so without loss of stability. They were in good condition to a maximum height of 40 cm . This is as much as one would expect, whatever the original height. None showed a top surface. The simplest interpretation makes them, in effect, masonry posts for roof support. Remains of these piers may be seen in Figures 9.13, 9.15, 9.21, and 9.23 .

Once the surviving sweatroom (labeled Unit I in Figure 9.8) was in place, the supposed central support and the surviving inner piers at the rear were surely unnecessary for roof support. The distances between nearest faces of rear corner piers and the sweatroom are about 3.6 m . Spaces of this length surely could have been bridged by roof timbers of moderate thickness. That the local Maya would have thought so is indicated by the slightly greater width of the doorways in the early temple K-5-3rd. The wall of the sweatroom (I) overlaps one side of the left of these inner rear piers (see Plan, Figure 9.10a). The situation was probably similar at the other inner rear pier, but our record is faulty there. The junction of wall and this pier is shown in Figure 9.23.

The functional meaninglessness of the inner rear piers when the known sweatroom was in place, plus the overlapping of the latter, provide the chief evidence on which we have assigned the structure of the piers (Unit J)
to a period earlier than that of the sweatroom. Cresson's field sketch indicates that the masonry of the sunken passage is discontinuous with that of the jambs of the doorway, as required if the sweatroom is a later construction. This is not actually stated, but is partially confirmed by photographs. An additional factor considered is the fact that the sweatroom does not consistently follow the quite accurate parallelogram formed by piers and passage.

## Firebox Sill (Unit L)

Labeling the structure of the piers and posts the "enclosing building" during the $\mathrm{N}-1-2$ nd period implies the existence of a contemporary sweatroom, removed to make way for that shown in Figure 9.8. While no physical evidence of this was encountered, evidence of an earlier firebox associated with a sunken passage was not entirely lacking. Unit L (Figs. 9.11, 9.12a, and 9.20) is apparently the sill of an old firebox, the front further to the rear than that of the known firebox. Neither notes nor the photograph make it clear that the sunken passage once reached back this far. But without the passage the sill is inexplicable. There may have been some stone-robbing in the next period, and one stone attributable to the side of the passage may be seen in the photograph. The sill is fabricated of several stones, and is not a monolith, like the later one.

The position of this sill is such that one would expect the rear wall of a hypothetical firebox to have been in the area now covered by the supposedly later sweatroom wall (i.e., by Unit 1). Investigation did not extend this far. We are perfectly free to imagine an earlier firebox, as well as an earlier sweatroom, to go with the known early sill. The sill implies a contemporaneous sunken passage, since it is too far to the rear to be part of a typical stepped-top platform.

## Sunken Passage (in Unit M)

The passage, assumed to date from the beginning (on the basis of the foregoing evidence), slopes slightly downward toward the front, at least in the major portion of its length, i.e., from the firebox sill of the next period. It certainly would have drained off any water which reached it. The passage is about 70 cm wide. During this period and the earlier phase of the next the vertical depth of the passage was measured as 32 cm , near the surviving firebox, and about 40 cm at the surviving sweatroom doorway.

## Structure N-1-1st-B

In our adopted scheme of sequences, this phase witnesses the installation of the known and presumably new sweatroom and firebox, without any unnecessary changes in the platform and enclosing building of the earlier period. The new units ( I and H ) combine with the older ones (M and J), as indicated in Figure 9.8.

## Sweatroom (Unit I)

The presence of semivaulting, though crude and steep, is shown by the cross section of Figure 19.10b. Figure 9.22 shows the inner face of the right (southeast) wall, with semivaulting on it. The photograph shows that there was no consistent selection of slabs instead of blocks, for use above the vault-spring. The slope, beginning about 50 cm above the floor, was quite definite, and noted on both right and left walls. At the front the surviving vaulting had started to fall inward as the low wall itself leaned outward. The cross sections of Figures 9.12 a and 9.12 b suggest strongly the presence of the soffit slope on the rear wall, though destruction was here far advanced. Despite the rudeness of this vaulting, and the collapse of its upper part everywhere, all this evidence of the existence of soffit slopes is too much to attribute to coincidence, though at any one point the observed cross section might seem attributable to chance and to movement as ruin progressed. The use of blocks as well as slabs in the sloping portion corresponds with the practice in the unused chamber above the sweatroom at Structure P-7.


Figure 9.13 General view, enclosing building and sweat room from right rear corner, surface of supplementary platform (Unit A) in extreme foreground. Note remains of benches, piers, and probably base walls; man with rod stands in sunken passage outside (front of) sweat room.

We are surely dealing with semivaulting only, and not with the ruin of a completely vaulted room. That the slopes could never have been carried high enough to be capped with slabs should be clear from the cross section of Figure 9.10 b and from Figure 9.14, which indicate the quantity of debris. The precise height reached can only be guessed, with what controls are available. The highest point at which the vault-facing stood intact was 1.2 m above the floor, but the interior hearting of the vaults stood to a maximum of 1.5 m , about at the surface of the mound. In the reconstruction we have added 50 cm to this, giving a ceiling height of 2 m which, one imagines, is too high rather than too low. The soffit slope, as indicated by a section in good condition (on the right wall) is taken as 15 degrees.

As reconstructed, the space spanned by the beams is about 2.5 m , the maximum required in the reconstruction
of the enclosing building of Structure P-7 (Fig. 9.47). There the evidence is quite satisfactory for a concrete roof on wooden beams supported by semivaulting. If we assume that 2.5 m was about the maximum unsupported span allowed for a beam-and-mortar roof, the presence of the steep vaulting here is perhaps explained. In both cases, probably, a solid roof with a span wider than this was desired. At the reconstructed height (with the known room depth of 3.25 m ), the presence of the semivaulting here reduces the otherwise necessary span of the beams. But this reduction is not great, and the explanation is a dubious one. Of the fact that the roof was largely supported on beams laid across steep half-vaults there seems very little doubt. That it was concrete is suggested by the notation of much light-colored disintegrated mortar among stones and slabs in last 50 cm above floor.

## Firebox

Figures 9.8 and 9.10 show the relation of the box to the sweatroom, and one-half of it is reconstructed in Figure $9.11\left(\mathrm{H}, \mathrm{H}^{\prime}\right)$. Attention has already been called to the fact that in the latter figure the top is entirely conjectural. A roof could as well be placed on what had survived.

## Front and SideWalls (Unit H)

Figure 9.16 gives a good view of the front wall of the firebox. On the observer's left side of the opening it is formed of two very heavy slabs set on end; on the right side there were two thick slabs also, but that next to the opening has split, presumably from the heat. A heavy horizontal slab at the corner is in situ. A stone lintel undoubtedly had its bearing on the jamb slabs. The larger of two lintel fragments, fallen an angle, is shown in situ in Figure 9.17. In Figure 9.16 the two pieces of the lintel have been assembled on the sweatroom floor, to observer's right of the firebox. One-half of the front wall is shown in Figure 9.11, reconstructed as we believe it was originally.


Figure 9.14 Partly excavated sweat room and firebox, Structure N-11 st-A; rod on sweat room floor, lintel in place at left; note sunken passage running from firebox sill to lower left of picture.

The on-end construction of the front of the firebox is in strong contrast to the side walls, which were fabricated of ordinary tabular stone. One can see that this was so in Figure 9.14 (outside of left wall) and in Figure 9.20 (inside of right wall, parallel to the knife lying on firebox floor). On the other side, though in very bad condition, the inner side-wall face may be said to have survived to a height of 86 cm , just a little higher than to top of the opening. These inner faces were vertical.

The opening was 73 cm wide and 82 to 83 cm high, as indicated by the jamb-stones. The ends of the lintel were somewhat irregular. On assembling the fragments the maximum length was found to be 98 cm , depth 34 to 40 cm , thickness 24 cm , a heavy lintel for the narrow span, but not so heavy as that of the sweatroom itself.

Evidence of intense heat within the firebox was very striking. The inner faces of front and side walls were burned to a chalk-like color and softness. On the sides many stones had been cracked into several pieces, and the pieces of one large block remained in place. The large monolithic left jamb-stone was split lengthwise, presumably by the heat, after it was in position, as already mentioned. The jambs were chalky along the inner edges only, as was the inner edge of the lintel and the exposed part only of the lower face. The outer edge was smokeblackened. Black discoloration was also noted on the top of the sill in the firebox opening and on the plaster of the original sunken passage floor, as far distant as the sweatroom doorway. This latter circumstance suggests the sweeping out of ashes, which would contain charcoal. The surfaces of the inner faces of the jamb stones were scaling off, as was the underside of the lintel.

Excluding the rear wall from consideration for the moment, the evidence of intense heat was present in all expected places, and absent at all others. There can be no question that hot fires were built within this construction. It supplies us with what was before lacking definite proof that these components were not miniature shrines, unless offerings were made to intense fires themselves. They are properly labeled fireboxes.

## RearWall (Unit K)

The hypothetical overhanging rear wall of the firebox in the reconstruction of Figure 9.8 is not the same as that shown in Figure 9.9, which seems to belong in the final phase. There are two factors suggesting that the original rear wall of the firebox was replaced by a new one (a sherd wall) in the next period. The first factor is the fact that the rear wall of the sweatroom itself showed no evidence of heat, so it must always have been protected. The second factor is the presence of Unit $K$, and evidence that it is older than the sherd wall. Unit K is a line of stones running across the firebox, one or two courses high (Figs. 9.12a and 9.12c). These are best explainable
as a remnant of an earlier rear wall of the box. Through much of its length the known sherd wall tests directly on this line of stones, and it might be supposed to be merely a base for the sherd part of the final wall. But at one place soft floor material ran in between the top of the sherd wall (Fig. 9.12c) completely burying the stones, and thus suggesting a difference in age. On the other hand Unit K seems too close to the early sill (Unit L) to have functioned with it in the earliest N-1-2nd period.


Figure 9.15 View similar to that of Figure 9.14, but from greater distance and after further excavation; man to left stands beyond right front pier of enclosing building; pier and remnant of bench at observer's extreme right.

Two sherds appeared as chinking elements in Unit K, a feature not unknown in ordinary masonry walls. We have no means of knowing with certainty whether this early wall extended to full box height with stone as the material or not, but we have a hint that it did. This consists in finding several calcined stones on the early passage floor, just in front of the firebox. Unit K is an obvious source for them. If stone throughout, this wall would correspond to Unit 6 at Structure P-7 (Fig. 9.57).

## Floor and Sill (Unit H')

The floor was not paved with slabs. As found, it consisted in the main of crushed stone and what we can call earth, and at one point this was followed over Unit K and under the sherd wall (Unit H). This is indicated in Figures 9.11 and 9.12 . A slope downward toward the front is necessary to connect the base of the sherd wall with the sill (Unit H'), but no precise surface could be followed. No such slope is required to connect Unit K with this sill. The sill, unlike the earlier one, was monolithic. This is a correspondence with late rather than early phases at Structure P-7. The sill runs slightly under the right jamb stone, and might conceivably have been placed in an early phase not recognized.

## Structure N-1-1st- $A$

This final phase in the adopted scheme of sequences includes the addition of seven units affecting the platform, enclosing building, sweatroom, and firebox. These units (A to H") are added in Figure 9.9. In theory each could be assigned a separate phase, and arranged in any order of time, except that the four benches must follow the supposed base-walls. It is quite likely that these units were actually distributed through more than a single phase, but of this there is no proof.

## Supplementary Platform (Unit A)

Little need be said of this new feature, except to suggest a comparison of Figures 9.8 and 9.9. The new platform encloses and partly submerges the old building platform at front and sides, and (apparently to a less depth) at the rear. The debris showed low humps along the side edges (Fig. 9.10 b ). These were visible to the eye, and symmetricallyplaced masonry constructions on this platform thus seemed to be definitely indicated. However, investigation on the left (northwestern) side failed to reveal anything still in place.

There is nothing else to indicate that the very considerable additional raised areas of this platform may have been roofed, and presumably it was entirely in the open. The combination of building and supplementary platform is common with temples here, and seems to have been present during the earliest phases of the sweathouse P-7. Structure P-7-2nd-E combines similar wide lateral extensions with a probable enclosing building of similar pier-and-base-wall construction (Fig. 9.43).

## Passage Modification (Unit B)

This unit of construction raised the floor of that part of the passage which lay within the sweatroom, introducing a sweatroom door sill (Fig. 9.11). This was fabricated of tabular stone, and appeared to be somewhat crude. It is assumed that the new passage floor was properly plastered, but the notes nowhere record that the floor surface was seen intact, like the floor of the sweatroom proper. Perhaps the new passage floor was of inferior quality. Its level is estimated as only 10 or 15 cm below the sweatroom floor. This is the maximum allowed by the sherds from Position 6 of the Object Table, if they were within the new unit; and about correct if the sherds lay on the surface of the new passage floor. A bare possibility exists that the passage, from firebox to doorway, was completely eliminated. But a similar secondary raising of this part of the passage occurred in Structure P-7 (Unit 1, Figure 9.57). That reduced the vertical depth of the same part of the passage, but did not eliminate it. The change at Structure P-7 thus affords a satisfactory control for our reconstruction here.


Figure 9.16 Looking down on sweat room; rod lies in original sunken passage (as in Phase B); base of sherd wall of Phase A still in place within firebox; fragments of lintel moved and fitted together to observer's right offirebox.

The new unit, as reconstructed, reduced the height of the doorway from 1 m to about 75 cm ; the ventilating effect of the doorway was thus reduced by about 25 percent. At the same time, of course, the doorway became a less convenient means of entering and leaving the sweatroom. During this phase it appeared more like a square hole than like a miniature Maya doorway.

## SherdWall in Firebox (Unit H")

The final back wall of the firebox was in bad condition, but much of it may be said to have survived, as shown in the three cross sections of Figure 9.12. In Figure 9.12c the remnant is reconstructed in broken line. Figure 9.19 shows the face of the surviving portion. In Figure 9.20 one end of it may be seen behind a knife on the floor, after the rest had been removed. Here, near the lower corner (to observer's left), a single small stone block appears in the face.

Otherwise the wall consisted of potsherds laid in mortar.

This peculiar wall was built against the back wall of the sweatroom itself, as may be seen in Figures 9.12a and 9.20. Apparently it was not bound to the side walls of the box. Its base was in line with, and in large part rested directly on, the supposed remnant of an earlier rear wall of the same firebox (Unit K). The stones of this latter had not been fully exposed at the time of Figure 9.19, but two of them may be seen, to the left of the folded rule.

I do not think the cross section of this wall, as reconstructed in Figure 9.12c, is open to much doubt.

It was clear that the semivaulting on the rear of the sweatroom had fallen inward, as one would expect. In the collapse, the sherd wall buckled throughout most of its length. Straightening out the section of Figure 9.12 b yields a wall-height about equal to that used in the reconstruction of Figure 9.12c. The angle of the slope is based on a small remnant which had not buckled.


Figure 9.17 Front of firebox, large fragment of its lintel as found; at top, falling stones, probably from rear wall of sweat room.

Heavy rim-sherds were selected for the facing. They were placed horizontally and little or no mortar appeared in this face, which was exposed to the flames. The thinner inner portions of these facing sherds would be firmly gripped by the mortar, like the tapering type of vault
stones to be seen at Tikal, or like the boot-shaped vault stones of northern Yucatan.

The interior consisted of sherds laid in mortar, and this is merely suggested in Figures 9.12a-c. Precise drawings of sections of the interior were not made. But it was noted that rim and non-rim sherds occurred here, and that these were laid in a horizontal position. Where the wall had buckled, field sketches show the interior sherds tilted correspondingly. It was noted that convex sides of the sherds were generally placed uppermost.

This wall might be considered as a protective lining, and it did protect the sweatroom masonry behind it. But the masonry side walls of the box were exposed and their stones were consequently badly cracked and broken by the heat. One suspects that an overhanging rear wall, beginning at the floor level, may have been desired to throw heat forward, or for greater heat absorption. Such an overhanging wall, if of limestone, would collapse sooner than the vertical side walls.

Whatever its purpose, a wall of this sort is interesting because it is a previously unknown feature. We place it temporally in the final phase because Unit K seems to have taken its place in the prior phase. The positions of certain sherds confirm this relative dating. Few sherds were recovered, except within the firebox. Here (Position 8 in the Object Table), the remarkable total of 2,695 sherds was found. This figure includes 409 sherds found in position but removed from the wall and left at the site. A small number, perhaps a hundred or so, were left in position (Fig. 9.20). All the sherds removed from the firebox were given a single field number (W-376), but the lot taken from the intact remnant of the wall was kept separate and given the number L-70-107 at the Museum,


Figure 9.18 Longitudinal cut section through debris in firebox; note closely packed sherds in quantity, fallen from sherd wall still to be reached.

Cresson attempted to assemble complete pots, using the sherds of Position 8, that is, sherds surely or probably from the wall. Failure in this indicates that complete vessels were not left in the firebox, and that all the sherds in the firebox come from the sherd wall. However, one large simple-silhouette monochrome bowl was restorable, with about 75 percent of all pieces present. But to accomplish this, sherds from outside the firebox, in the sunken passage, were also utilized. Some of these were from Position 5, in the sweatroom doorway. These could not possibly have fallen from the sherd wall, but might have been in the upper part of the fill of Unit B , which raised the floor of the passage. Others were at Position 9. These may have been immediately in front of the firebox, but were probably at a level requiring that they be in the fill of Unit B. Still others were numbered L-70-107, showing definitely that parts of this vessel were utilized in the sherd wall.

The actual plaster surface of Unit B had, unaccountably, nowhere survived, or at least was not noted. Since the exact line separating debris from the fill of Unit B is not known, the dating of particular sherds as within its fill is somewhat hazardous. But the presence of sherds in the doorway of the sweatroom at Position 5, which fitted others in position in the sherd wall, makes it impossible to believe that they were left on the surface of Unit B at the time of abandonment. Presumably the sherd wall and Unit B were built as parts of one operation, and an excess of sherds, brought for the wall, was thrown in the fill as the passage floor was raised. The same inference explains why Cresson's sketches show sherds scattered quite thickly along the passage, 15 to 20 cm below the sweatroom floor, while the floor of the sweatroom itself was clean, except for a small lot of sherds at one spot (Position 7). It also explains the presence of several calcined stones on the original passage floor just in front of the firebox. They probably were thrown there when most of Unit $K$ was removed, to be replaced by the sherd wall, They would not have been left there unless the floor of the passage was to be immediately raised.

Through ignorance of what to expect, surviving remnants of similar sherd walls were probably missed at certain other mounds. Some account of the signs which might have foretold them is therefore in order. As Cresson came into the firebox, quantities of closely packed large sherds appeared. These began in the firebox opening, and the deposit extended as high as the top of the jamb stones, even at the front. This latter circumstance suggests that our reconstruction of the wall may show it too low, if anything. Most fallen sherds were noted as nested, with about 1 cm of mortar between them. Figure 9.18 shows a cutsection through the deposit on the floor of the firebox.

The mass of fallen sherds appears in the foreground, while at the upper right and farther back the surviving remnant of the wall itself protrudes above the surface of the excavation.

If such a wall is suspected, a number of criteria suggest themselves as justifying painstaking excavation. These are: the presence of a large quantity of closely packed large sherds from several vessels, presence of thick rim-sherds, presence of disintegrated mortar, nesting of the sherds, and mortar adhering to them.

## Enclosing Building

The additions to this building during Phase A did not involve so much labor as did the changes in the platform. Nevertheless, they had a marked effect on the character of the building, unless, as seems unlikely, it had earlier walls of perishable materials.

## Base-Walls? (Unit G)

These walls, found at sides and rear, were in very bad condition (Figs. 9.13 and 9.15). For actual proof that they are base-walls, and did not extend as masonry walls to roof height, good preservation would be necessary. As found, it cannot be said that they showed level tops anywhere, nor had plaster survived, even on the sides. Walls of comparable thinness at Structure V-1-2nd, where they were protected by burial, were plastered; but there also tops were not seen. We do not have a proved example of masonry base walls at the site, but only remnants such as those here, which seem best interpreted as such, the interpretation being founded on their thinness. Measurements at satisfactorily preserved portions showed this as 42 cm (rear) and 40 cm (end). Such walls would not be expected to survive to a height of more than three or four courses of stone, as found, whatever the original height.


Figure 9.19 Surviving base of sherd wall at rear of firebox behind sherds of Figure 9.18.

A circumstance tending to confirm the base-wall interpretation is the fact that the end walls are placed outside the line of the piers, passing across them to form the corners of the enclosing building in this latest phase. If such thin walls rose to roof height, in a high wind they would have been very likely to fall, unless reinforced. This placement prevents the piers from exercising this function in respect to an outward fall. Along the rear the walls run between the piers, which could thus tend to prevent collapse in either outward or inward directions. But here this placement was required even for basewalls, since along the rear (but not at the sides) the piers were very close to the edge of the platform (Fig. 9.9). The differential placement argues for dating the walls as later than the piers in more than a mere constructional sequence, and also, perhaps, for the proposition that they were never full height. It is our supposition that wooden stockade or wattle walls, daubed with clay and presumably plastered, rose from the base-walls to the rear and end beams of a thatched roof.

The front was probably open, since no traces of base-walls could be found there. It will be noted from the figure (9.10a) that the front part of the left end wall could not be located either. This is where investigation of the platform began, and the apparent absence may be due to initial inexperience. The open front of the reconstruction should not be considered as absolutely proved, but we think it is highly probable.

## Benches (Units F, E, D, C)

As noted already, tops of benches nowhere survived. The maximum surviving height of Unit D, at the face, was 65 cm , but its fill next to the sweatroom-protected by sweatroom debris - showed a minimum height of 72 cm . We have every reason to believe this is close to the actual height. There is no reason to suppose that the other benches were any lower, but they may have been.

Presumably Unit E was added to Unit D sometime after the former had been built and used, The notes show that the probability was recognized in the field, but the answer was not dug out. That most of the front wall of Unit C is missing is doubtless due to faulty digging.

## Measurement

The measurements tabulated [in Table 9.9] apply to the enclosing building in its earliest form (Structure $\mathrm{N}-1$ 2 nd ). They were obtained at one time by scaling from the original drawing of the one-to-a-hundred plan, and indicate quite accurate measurement by the Maya when laying out principal points of the building platform and building.

The two columns give measurements surely intended to be equal, and the maximum discrepancy is only 15 cm . Careful attention to a symmetrical arrangement is very evident. If centered posts of about 25 cm . are

Table 9.9 Structure N-1-2nd Metric Dimensions

| Depths (between outer corners of corner piers | 15.2 | 15.2 |
| :--- | ---: | ---: |
| Lengths (between outer corners of corner piers) | 7.5 | 7.5 |
| Corners to Sunken Passage | 7.2 | 7.3 |
| Spaces between piers: | 5.9 | 6.0 |
| Between corner piers, front-rear | 13.7 | 13.7 |
| Between corner piers, side-side | 3.0 | 3.1 |
| Between rear corner and rear inner piers | 6.1 |  |
| Between rear inner piers |  |  |

reconstructed at rear and sides, the spans of the roofbeams at the rear will be about equal to each other, but noticeably greater than the spans at the side. Apparently there was no single standard in this respect.


Figure 9.20 Interior of firebox seen through its front opening; floor dug out behind sill of Structure N-1-1 st to show earlier sill (Unit L) behind it, at point of knife; remnant of sherd wall and right side wall above and left of knife in picture; masonry of rear wall of sweat room at upper right; whiteness of side wall due to brushing its calcined surface.

The plan (Fig. 9.10) shows the parallelogram outline, the sides failing to form right angles with front and rear by about 2 degrees and 2.5 degrees respectively. The Supplementary Platform of the final period (Unit A) is reconstructed in Figure 9.10 to correspond, but its corners were not dug out, and we are not really sure of this regular distortion in that period. It does not appear in the sweatroom (Unit 1). The front wall of this fails by about two degrees to be parallel with the front edge of the platform, though the left (northwest) side wall is more or less parallel with the left edge of the platform; the right wall fails to fit the parallelogram form by about 3.5 degrees. The two side walls measure 3.7 m and 3.9 m , respectively, showing a discrepancy of 25 cm in a rather short distance.

## Proportions - Function

For the final period (Strs. N-1-1st-A and -B), the traits picked out in the Comparative Trait tabulation are sufficient to guarantee that sweat-bathing was the principal function. If this function goes back to the earlier period (Structure N1 -2nd) we must postulate a sweatroom and firebox which was removed to make way for those we encountered. This is not a very hazardous proceeding, for we have good evidence that precisely this occurred at Structure P-7, and here we did not dig for such evidence. Without this postulate, a sunken passage during this period is inexplicable. And if we assume that the passage was cut into the platform during the later period, then we cannot understand the presence of a sill at the correct level and horizontal position for a firebox sill, functioning with a passage.

Since we have no physical evidence of the early sweatroom itself, we cannot say that we have physical evidence that the platform was then over-size with respect

Table 9.10 Structures J-20, P-7-1st, and N-1-2nd Dimensions

| Structure | Length | Depth | $\%$ |
| :--- | ---: | ---: | ---: |
| Str. J-20 (double-range palace) | 15.9 | 7.7 | 48 |
| Str. P-7-1st (double-range enclosing building) | 19.6 | 10.0 | 51 |
| Str. N-1-2nd | 15.2 | 7.5 | 49 |

Table 9.11 Average Dimension Tables: Platform Units

| Units | Height | Length |  | Depth | Slope |
| :--- | :--- | :--- | :--- | ---: | :--- |
| M (N-1-2nd) |  | 1.0 | 16.0 | 8.2 | V |
| M (N-1-1st) | 0.4 | 16.0 | 8.2 | V |  |
| A (upper level) | 0.6 | 29.6 | $11.0^{*}$ | $?$ |  |
| A (step terrace) | 0.3 | 29.6 | 1.0 | $?$ |  |
| A (complete) |  | 0.6 | 29.6 | $12.0^{*}$ | $?$ |

Note: Starred dimensions are approximations usually based on reconstruction; the letter $V$ means approximately vertical.
to anything, nor that the early building of the piers was then an enclosing building. However, the proportions of platform and building confirm independently the other evidence that it was always the enclosing building of a sweathouse, on a platform oversize with respect to a sweatroom. The overall dimensions are within the limits indicated for enclosing buildings at other mounds, and so is the proportion of depth to length. This proportion, about 50 percent, is not expectable in local palaces, though it is a criterion which must not be used blindly. A comparison of dimensions of three buildings given in Table 9.9 warns against this: Length, depth, and a percentage index obtained by dividing depth by length appear in that order.


Figure 9.21 Pier and right (SE) building platform wall at right front corner, Structure N-1-1st-B.

Our Structure N-1-2nd building is smaller than the enclosing building of Structure P-7-1st, but the proportions are about the same. We have a closely similar index for a palace building of the same approximate size as Structure N-1-2nd. But like other local palaces of similar proportions, Structure J-20 is so placed that it could not have been much longer, and being of the double-range type, the depth could not have been much less. The special circumstance of its position at the site probably accounts for the index of about 50 percent in this palace, but there is no reason to suppose that lack of space operated to limit the length of Structure N-1-2nd or Structure P-7-1st. The evidence is good that enclosing buildings of sweathouses such as those of Figures 9.25 and 9.26 may show proportions within the range of the typical long palaces; but when the depth-length index rises close to 50 percent without space-limiting factors, we probably are not dealing with a palace. In the absence of a pyramid or other special temple indicators, we are probably dealing with the enclosing building of a sweathouse.

## Dating

No inscriptions or sculpture of any kind were encountered. For the most part, sherds were of coarse, heavy utility wares which have not as yet been given chronological significance. Included, however, were sherds from the incomplete monkey bowls illustrated in Satterthwaite (1942a). Coming from within the firebox (Position 8 of the Object Table), they almost certainly had fallen from the sherd wall of Structure N-1-1st-A. The form and the

Table 9.12 Average Dimension Tables: Building Units

|  |  |  | Elevation |  |  |  |  |  |  | Table |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :---: | :---: | :---: | :---: |
|  | Section |  | Table |  |  | Door | Door | Max. Lintel |  |  |  |  |
| Units | W | R | $\mathrm{W}^{\prime}$ | Length | Depth | Width | Height | Dimensions |  |  |  |  |
| J (Enclosed Bldg.) |  |  |  | 15.2 | 7.5 |  |  |  |  |  |  |  |
| J-G (same, later) |  |  |  | 16.0 | 7.5 |  |  |  |  |  |  |  |
| I (sweat-room) | 0.7 | 3.3 | 0.7 | 6.2 | 4.7 | 0.7 | 1.0 | $1.3 \times 0.7 \times 0.4$ |  |  |  |  |
| I (same, interior) |  |  |  | 4.8 | 3.3 |  |  |  |  |  |  |  |
| H (fire-box) |  |  |  | 2.2 | 1.5 | 0.7 | $0.8 *$ | $1.0 \times 0.4 \times 0.2$ |  |  |  |  |
| H (same, interior) |  |  |  | 1.2 | 0.9 |  |  |  |  |  |  |  |



Figure 9.22 Right wall and semi-vaulting interior of sweat room, Structure N-1-1st-B.
orange-bar decoration on the outside correspond to a find in the hearting below the elevated portion of the Throne Room of Structure J-6-1st, and to fairly common finds in surface debris. On the basis of this evidence the sherd wall need not be much earlier than the time of abandonment, but it could be some unknown time before 9.17.15.0.0, the date of Throne 1. Other sherds show the contemporaneity of the sherd wall with the modification of the sunken passage. Structure N-1-1st-A was clearly late rather than early so far as ceramics are concerned.

We have no means of knowing how long a period should be allowed for earlier phases. It may be noted that the pier-and-base-wall type of enclosing building may have existed during a fairly early phase at another mound (Structure P-7-2nd-E), but did not exist in the final period, Thus we have a hint that the enclosing building of Structure N-1-1st-A was an obsolete type which was due to be replaced, though it was still in use at the time of abandonment. The dogma that square masonry piers developed late in the history of Maya architecture does not apply here, for they were known in the doorway of the temple Structure K-5-3rd , a very considerable time before 9.12.5.0.0 (Tables 9.10 and 9.11).

## Masonry Notes

## Enclosing Building

Piers and base-walls of tabular stone, corner piers and all base-walls in very bad condition. Inner rear piers better preserved since better protected. Masonry of piers seems identical with that of larger piers in vaulted buildings (Figs. 9.13, 9.15, 9.23).

## SweatroomWalls

Tabular masonry, with slabs and blocks (Figs. 9.22 and 9.23); interior semivaulting perhaps contains higher percentage of small slabs, but blocks appear here also (Fig. 9.22).


Figure 9.23 Exterior face of wall of Figure 9.22, exposed by removing hearting of bench (Unit C); junction with pier of enclosing building.

## Platform Walls

Tabular stone; blocks and slabs (Fig. 9.21).

## Concrete

All floors undoubtedly concrete; well preserved in sweatroom only.

## Plaster

White finishing plaster survived on floor of sweatroom and on floor of sunken passage at early period, where protected by Unit B. Fragments of plaster apparently in fill of Unit B, 3 cm thick, of pink color, with thin white finishing plaster added. Plaster or mortar fragments among sherds of sherd wall in firebox also of pink color, and pink mortar adhered to one sherd; mortar in place between others. Lime mortar undoubtedly used in interior of sherd wall.


Figure 9.24 Cut section through debris in sweat room; rod, marked in centimeters and decimeters, rests on sweat room floor, beyond partly excavated sunken passage; note absence of vault slabs in quantity; fallen debris, near camera, just right of rod, is in opening offirebox.

Fills
The fill of Unit B, a minor late and shallow addition, appears to have been solid. The character of Fills elsewhere was not investigated (Table 9.13).

Table 9.13 Structure N-1 Object Table

| Position | Sherds | Figurines | Miscellaneous |
| :---: | :---: | :---: | :---: |
| 1. Surface debris on Unit A at front center |  | W-37-2;-3;-4;-7 | W-37-1 (bone fragments, probably animal) |
| 2. Surface debris right of right (SE) wall of Unit A, near front corner | W-37-15 |  |  |
| 3. On floor of sunken passage (Unit M), 1 m to 2 m forward of sweatroom | W-37-9 |  |  |
| 4. About center of left (NW) part of Unit A, at floor level | W-37-11 |  |  |
| 5. In sweatroom doorway, 55 cm below lintel, $5-30 \mathrm{~cm}$ from left (NW) jamb, in vertical or upside down positions (probably on, possibly in, Unit B). | W-37-14 |  |  |
| 6. In sunken passage within sweatroom, 10 to 20 cm below sweatroom floor level (possibly on, probably in, Unit B) | W-37-10 |  |  |
| 7. On sweatroom floor, near left rear (SW) corner. | W-37-8 |  |  |
| 8. Within firebox, in debris or in position in sherd wall. | W-37-6 |  | W-37-12 (sample of mortar from sherd wall) |
| 9. Below Position 6, on or above original sunken passageway (high probability these are from fill of Unit B) | W-37-13 |  |  |

# 3. Six Partially Excavated Sweathouses <br> (Structures S-19, J-17, O-4, S-21, S-4, and R-13) Linton Satterthwaite 

## Preliminary Remarks

We have very incomplete data on the six sweathouses here considered, as compared with the previously described type-structure (Structure N-1-1st), and with Structure P-7-1st to follow. Six less-well-known sweathouses are here grouped together merely to save space. The apparently arbitrary order in which they are arranged in the title, and in assigning figure numbers, places them in the decreasing order of lengths of the mounds and presumably of enclosing buildings. If our reconstruction of Structure S-19 (Fig. 9.25) is correct in fundamentals, for which there is real evidence, we are dealing in that case with an enclosing building appreciably longer than the one selected as the type. We are also dealing with others of about the same length, and with one which must have been very much shorter, if there were enclosing buildings to fit the platforms. Despite the small amount of time spent on this series of mounds they already indicate existence of wide variation in size and proportion of the platform, and they show the presence of the sweathouse in various semi-retired parts of the site, from the Acropolis to the Southeast Section. (See map, Figure 1.1, Strs. S-19, J-17, O-4, S-2, S-4, R-13.)

In no case were walls showing, but the heavy lintels of all but Structure J- 17 were visible at the surface of the hump marking the sweatroom. Cresson is responsible for the excavations up to the doorway of Structures S-19 and R-13. His work was done in 1936, when we knew what to expect. The writer had accomplished as much at Structures S-4 and O-4 in 1932, and in ignorance undoubtedly destroyed some evidence of the design at the bottom of the doorway of Structure O-4 (Fig. 9.38). Later Cresson proceeded through this doorway, but stopped when the sunken passage had been established in the interior.

In the cases of Structures S-2 and J-17, the center trench was continued to the inner side of the back wall. Much surviving evidence was surely missed here through ignorance of what to expect. For these two operations the writer is responsible. In each of these cases workmen were assigned to cut cross sections through the debris, to determine whether or not the roofs had been vaulted. Both mounds were far distant from the scene of major operations at the time (1932), and the workmen were allowed to proceed for several hours at a time between inspection visits. Special point is made of this regrettable


Figure 9.25 Isometric reconstruction of Structure S-19, showing supposed plan of enclosing building (thatch roofed?) with hypothetical flat airtight room over sweat room.
fact, because it explains the failure to find the firebox in Structure J-17, when the interior of the sweatroom was completely cleared. Sherd walls were probably missed at both of these structures. The peculiar nature of the J-17 room led to some desultory trenching in the mound outside the sweatroom, but time was lacking to make a proper investigation of what at the time seemed inexplicable without extensive and closely supervised excavation.

In general, and except for Structure J-17, information respecting these six structures is confined to what may be inferred from the contours of the mounds themselves, combined with that secured by a narrow transverse trench at center. Accordingly publication of plans is confined to the small-scale rectified ones on the map of the site (Fig. 1) and to those inherent in the isometric reconstructions of Figures 9.25 to 9.30. The true plans of what little was uncovered indicate the same failure to achieve true right angles which one finds in all buildings at the site.

## Remarks on Drawings

A glance at Figures 9.25 to 9.36 will show that they are very largely imaginative reconstructions. It is important to remember that nothing not shown in solid line should be treated as an established feature from which one may reason in more than a tentative manner. We know nothing about the fireboxes in any of this group of sweatrooms, excepting only that of Structure S-2 (Figs. 9.28a, 9.28b, 9.34). Those shown for the other buildings in broken line are modeled on known ones in Structures N-1 and P7, in order to show visually that available controls leave room for them. Except for Structure J-17, the precise dimensions of none of these sweatrooms are known. However, for the depths, in all cases we have either a precisely determined or a reasonably accurate profile of the mound at center, fixed in relation to what little was excavated, and this is given in the cross section drawings of Figures 9.31-9.36. The dimensions given of the lintels afford a certain control as to wall thicknesses, where these were not dug out. These controls agree everywhere in indicating sweatrooms with interior depths (front-to-rear dimensions) equal to or greater than the maximum found in buildings of other types ( 2.6 m in Structure J-11, a palace). Use of these controls, in each case separately, led to the particular room-depths reflected in the drawings of several sweatrooms.

In all cases the approximately known room-depths, and the vertical depth of debris, rule out the possibility of completely vaulted roofs on the sweatrooms. This was confirmed by absence of noted cap-stones. At Structure J-17 a carefully measured cross section of the debris even indicates absence of semivaulting (Fig. 9.32b). Here the source of the few slabs shown is presumably the wall itself (Fig. 9.37). In this sweatroom, if the roof
had been semivaulted, a large number of vault stones should have fallen inward and arrived at or close to the floor. Since this was undoubtedly a sweatroom and a thatch-roof is thereby ruled out, we restore a simple beam-and-mortar roof. The same is done in the other cross sections, except that in Figure 9.35 the semivaulted arrangement of Structure N-1 is assumed for Structure S-4, where the span was probably about the same. We can be reasonably sure that all roofs were flat and solid, as shown; but whether the indicated distinctions in respect to semivaulting are correct or not is uncertain.

In the cross sections as reconstructed, the ceiling heights are arbitrarily placed 2 m above the top of the sunken passage, or above the sweatroom floor (these latter levels usually being the same). This gives the same ceiling height as was adopted for reconstruction purposes at Structure N-1. It may not be correct, and very likely it is wrong to make these heights the same everywhere. No controls are available, except at Structure R-13 (Fig. 9.36). Here the outer side of the sweatroom wall survived to a height about 1.8 m above the top of Unit $\mathrm{C}^{\prime}$, i.e., to within 60 cm of the top of the roof as reconstructed.


Figure 9.26 Isometric reconstruction of Structure J-17 (also see Figs. 9.32a and 9.32b; interior of sweat room completely excavated, firebox not recognized).

Except for Structure J-17 (Fig. 9.26), the lengths of the sweatrooms are much vaguer approximations than are the depths. End walls were not dug out, and the positions are estimated from Parris' schematic representations of the sweatroom mounds. The lengths as reconstructed may be wrong by as much as $1-2 \mathrm{~m}$. There is little doubt, however, that they were somewhat greater than the depths, but not by a great deal. Sweatrooms which approach but fail to realize fully the square form were apparently universal.

Parris' mound representations are the basis for the reconstructed lengths of the platforms in Figures 9.26 to 9.30, and for the depths of these units in Figures 9.27 and 9.28. Though vague approximations, these seem valid
for comparative purposes. The faces of Units E and D of Structure S-4 in Figure 9.29 are located approximately by utilizing Parris' work, but the position of the rear of Unit C in the drawing is a mere guess. The degree to which carefully measured transverse debris profiles control reconstructed platform units such as these is sufficiently indicated in the cross section drawings themselves.

Having warned against too literal an acceptance of what is shown in broken line, it is desirable to note that absence of reconstructed enclosing buildings does not mean that sweatrooms stood in the open on large platforms, as Figures 9.26 to 9.30 seem to suggest. All of these platforms probably supported enclosing buildings. The blank areas on the platforms in Figures 9.27-9.30 merely reflect lack of time to examine them carefully, either by excavation or by debris profiles controlled with the instrument. Good evidence of enclosing buildings appeared where either of these approaches was applied outside the sweatrooms (Figs. 9.25 and 9.26).

Figure 9.25
The enclosing building of Structure S-19, though a reconstruction in its entirety, reflects a plan which could, in essentials, be read in the debris with the eye only. It is shown entirely in broken line because no surviving part of it was actually laid bare. The precise widths of piers and doorways, and the thickness of piers and walls, is conjectural; and it is not certain that the walls rose to roof height, as suggested in the drawing. Rear and right end walls were indicated by distinct ridges of debris, the left end wall by a less distinct one. Three of the piers were indicated by slight bulges which, like the walls, consisted of stone surrounded by soil probably washed from the hillside to the rear. Careful profiles were made with the instrument in 1934, when excavation was not permitted. We should offer this reconstruction with less confidence were it not for the fact that the plan of the adjoining Structure J- 18 was fully worked out by the same method, and later confirmed by sampling excavations. There the indications were that the walls rose to roof height. The center section of Structure S-19 (Fig. 9.31) suggests a survival here to a height of about 1.3 m . Wall and pier thicknesses, and pier widths, are taken as equal to those of the neighboring structure. The piers may have been smaller. Experience at Structure N-1 indicates that thin base-walls, with either posts or piers, would not have left sufficient debris to show the rear and ends of the building. The reconstruction is probably not correct in all details, but it is not fanciful either.

The sweatroom dimensions utilized are controlled by a carefully measured longitudinal debris profile, as well as by the transverse one of Figure 9.31. The sweatroom left a central hump, with hollows on either side outlined
by rear and side wall ridges. The longitudinal profile will be given as part of a single line showing the vertical relationship of this mound to those of Structures S-18 and S-17.


Figure 9.27 Isometric reconstruction of Structure O-4 (also see Figure 9.33; excavated trench penetrated only short distance into sweat room).

It is possible, though unlikely, that the front of the roof of the enclosing building was supported on posts instead of on piers. There seems to be no doubt that the side walls extended so far front that the roof supports must have rested on Unit D, rather than on D'. The positions of the low humps of stone supposed to be debris of piers indicate this also.

Figures 9.31 to 9.36
Most of the measurements reflected in these cross sections were made with rule, tape and plumb-bob, without the leveling instrument. Consequently most floors are shown as perfectly level. No significance should be attached to the fact that only at Structure S-19 (Fig. 9.31) is the floor of the sunken passage shown as sloping. It is possible to believe that the others sloped also, as is the case wherever the matter was ascertained.

The debris profiles in Figures 9.31, 9.32, 9.34, and 9.35 were made very carefully with aid of the leveling instrument so far as these are shown by dotted line. Extensions of some of these profiles, with lines formed of crosses, must be approximately correct, but depend on reading of photographs, or on memory. The entire debris profiles of Figures 9.33 and 9.36 are of this nature. For Figure 9.36 the notes show that the front wall survived to the maximum height shown for the mound, and that there was a deep depression marking the sweatroom, its bottom at the level of the top of the lintel. The writer's memory of this depression, surrounded by high ridges on all sides except over the lintel itself, is very clear.

All these debris profiles are on the center lines, or on lines passing close to the doorways.

Table 9.14 Average Dimension Tables: Platform Units (Building Platforms, Probably Limiting the Dimensions of Enclosing Buildings)

| Unit | Height | Length | Depth |
| :--- | :--- | :--- | :--- |
| D-D' (Str.S-19) | 0.4 | $24^{* *}$ | $6^{* *}$ |
| E (Str. J-17) | 0.3 | $23^{* *}$ | $6^{*}$ |
| C (Str. 0-4) | $?$ | $17^{* *}$ | $?$ |
| D-D' (Str. S-2) | $0.6^{* *}$ | $16^{* *}$ | $6.5^{*}$ |
| C (Str. S-4) | 0.4 | $16^{* *}$ | $?$ |
| C'(Str. R-13) | 0.5 | $10^{* *}$ | $8^{* *}$ |

Note: Starred dimensions are approximations based on reconstruction; double-starred approximations are based only on observation of the extent and form of mound surfaces in relation to excavated portions of the structures.

## Discussion by Components and Particular Features

## Platforms and Enclosing Buildings

Structure S-19 (Fig. 9.25) indicates that the enclosing building may differ radically from those of Structures $\mathrm{N}-1$ and P-7-1st in the matter of proportions (cf. Figure 9.25 with Figures 9.9 and 9.46). However imperfect our reconstruction may be, there is no reasonable doubt that it was decidedly longer and probably somewhat narrower than the $\mathrm{N}-1$ building. The debris left little doubt that it was a single-range affair, and as such its roof-span is still very much greater than that of any single-range palace at our site. Whether or not we are correct in showing masonry walls and piers to full height, the roof was presumably thatched, though a beam-and-mortar roof should be considered a possibility. Complete vaulting is out of the question, since the minimum debris depth at either side of the sweatroom reaches a level only a few centimeters above that of Unit D', presumably the floor level. For the same reason, semivaulting on this enclosing building is unlikely, since that at Structure P-7-1st left fairly deep deposits.

If we restore a thatch roof, this building would present an appearance very similar to that of Structures S18 and S-17 at its left. In elevation, if our reconstruction of piers is correct, this sweathouse may have looked like a typical non-vaulted palace.

It occurs to one that Unit $\mathrm{D}^{\prime}$ may be a secondary raising of the floor. If so, our reconstruction of an original stepped-top building platform at the end is incorrect. This is definitely known only at Structure P-7-1st, with a double-range enclosing building. The extremely low placement of the sweatroom doorway, with reference to the enclosing building floor (Unit D'), may be compared with the situation at Structure R-13 (Fig. 9.36). Possibly

Unit C' of the latter building is secondary. In both cases the floor surrounding the sweatroom is higher than one would expect. But only at Str, S-19 does this suggest that one would not ordinarily pass directly from the sweatroom to enclosed spaces on either side, because only here does the raised floor come right up to the sunken passage. One is tempted to consider that at Structure structure-19 a sweatroom has merely been inserted in a palace, with a raising of the floor behind the piers. But against this idea is the fact that the depth is much greater than that of known single-range palaces, including the neighboring ones, which are not narrower because of vaulted roofs.


Figure 9.28 a. Isometric reconstruction: Structure S-2; b. isometric reconstruction: Structure S-2 (possible unproved early phase).


Figure 9.29 Isometric reconstruction of Structure S-4 (also see Fig 9.35; excavated trench outside and through doorway of sweat

Structure J-17 corresponds to Structure S-19 in providing ample room-space on either side of the sweatroom, but very little in front of it. At least, this is true if Unit $E$ is a building platform, serving an enclosing building (Fig. 9.26). The remnant of wall labeled Unit $B$ confirms the natural assumption that this is the case, as does Unit A, which is probably the face of a bench.

The debris on either side of the sweatroom was not noticeably lower, and in this respect this mound differs from all other sweathouses seen. A careful longitudinal profile was not made, but a cross section sketch about 3 $m$ northwest of the sweatroom showed the same debris depth of about 1 m . Ridges and humps, giving the clue to the plan, were absent. It would be hazardous to assume that the roof of the enclosing building was of thatch, but the debris did not seem to be that characteristic of fallen complete vaults. The dimensions of the platform are such that a double-range enclosing building here is a possibility, and a line of stones which might be the base of a medial wall was encountered. They were not located accurately, and are therefore omitted in Figure 9.26. They seemed, however, to mark a rise in the floor-level, rather than a free-standing wall, the platform then being of the stepped-top variety. If this is correct, in the figure the base of Unit A would be raised accordingly. The recording here was too sketchy to be sure.

Structures O-4 and S-2
It is probably safe to assume that enclosing buildings existed wherever platforms suitable for them are present, and where evidence to the contrary is not available. However, for these two structures, without excavation one cannot safely decide even on the limits
of such buildings. In either case they may have been relatively long and narrow, corresponding to the rear and higher portions of the respective mounds; or they may have been much deeper, extending over the lower front portion of stepped-top platforms (Figs. 9.27 and 9.28). Unless the latter was the case at Structure O4, there the sweatroom door was in the façade of the building as a whole.

At Structure S-2 the sunken passage is replaced by a sink (Fig. 9.28a), but it is not impossible that a normal sunken passage has been modified (Fig. 9.28b).

Accurate longitudinal debris profiles are not available. The existence of prominent humps marking the sweatrooms, and the known floor levels with reference to these, show that the debris depths at the sides are too slight for fallen complete vaults.

## Structure S-4

This is the only one of the six structures here considered which could have had an enclosing building based at one level, and still have approximated that of Structure N1 in size and proportions (cf. Figures 9.9 and 9.29). its roof was not complete vaulting, by the same criteria as noted above. There was a suggestion in the debris that the corners may have been masonry piers as at Structure N-1.

## Structure R-13

This mound introduces the possibility of an enclosing building with about as much roofed over area in front of the sweatroom as at Structures N-1 and S-4, but with little or no space at its sides (Fig. 9.30). The nearly square mound may, of course, mean that there was no enclosing building at all. Since a careful longitudinal profile was not made, the proportions suggested in Figure 9.30 should be viewed with caution, since an error of a meter or so here would be more significant than with the other longer mounds. The unique forward projections of the mound shown by Parris were not investigated. The mound also differed from all others in that the outline of the sweatroom was perfectly clear without excavation (Fig. 1.1). If there was an enclosing building its roof was surely not a completely vaulted one (Fig. 9.36).

## Summary

Though this series of buildings is very imperfectly known, it is quite clear than enclosing buildings might vary greatly in dimensions and proportions, very much more so than could the heart of the complex, the sweatroom itself. We cannot say that enclosing buildings were certainly universal here, but the mounds indicate that they were, for sweathouses within the main ceremonial
precincts. If so, the sweatrooms were always placed at the longitudinal center of the enclosing building. Two generalized types of plan can be distinguished. In both there is ample covered space at the sides of the sweatroom, none to its rear. In one there is also considerable space in front of it, in the other there is little, and possibly some times none at all. A third type may have existed, in which there was ample roofed space in front, and little or none at the sides as well as behind the sweatroom, but this is very uncertain. At Structure P-7, still to be described, a sub-type of the enclosing building provides ample space at sides and front, and a roofed passage at the rear.


Figure 9.30 Isometric reconstruction of Structure R-13 (also see Fig. 9.36; excavated trench outside and up to front of sweat room only).

There is good evidence that no enclosing building was roofed with the complete vault, and no definite evidence that semivaulting appeared on any of the seven probable or certain enclosing buildings thus far considered. So far as very incomplete data are available, the absence of vaulted ceilings may reflect a requirement forbidding the relatively narrow rooms of the palaces and temples. Double-range enclosing buildings on stepped-top platforms, analogous to Structure P-7-1st, may have occurred within this group of
six, but are improbable in the two cases where excavation extended beyond the sweatrooms.

## Sweatrooms

It was determined that all six sweatroom walls were of masonry, the thicknesses of front walls ranging from 72 to 90 cm so far as known. The record shows that while the front and rear walls of the sweatroom of Structure J-17 corresponded to the minimum thickness of 72 cm , one side wall was exposed and measured and was only 55 cm in thickness. Having failed to observe this at more than one point, and suspecting an error, the broken-line reconstruction of Figure 9.26 assumes a constant thickness throughout. We have a positive indication that side walls might on occasion be thinner, but distrust the evidence.

The cross sections of Figures 9.31 to 9.36 show, in all cases, less debris than would have been left by completely vaulted roofs, but plenty for the natural assumption that roofs were either beam-and-mortar or semivaulted.

The sizes of the humps of debris marking the sweatrooms indicate that they were all of approximately the same size as that of Structure N-1. In the case of Structure J-17, the interior dimensions are known to have been 3 m by 4 m . There is little doubt that the depth of the $\mathrm{S}-2$ sweatroom was 3 m . The clearly defined ridges at Structure R-13 indicate a sweatroom somewhat longer and somewhat less deep, but not markedly so. There is no sign of the tiny sweatrooms of the modern examples noted in [the early part of this chapter], though they might have existed in the little-known peripheral housemound areas. One may guess that the sizes of the sweatrooms in this series all represent approaches to the feasible maximum.

Table 9.15 Average Dimension Tables: Building Units (Sweatrooms)

|  |  |  |  |  | Façade | Table |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  | Section | Table |  |  | Door | Max. Lintel |  |  |
| Units | W | R | $\mathrm{W}^{\prime}$ | L | D | W | H | Dimensions |
| C (Str. S-19) | $?$ | $?$ | $?$ | $?$ | 4.3 | 0.8 | 1.1 | $1.6 \times 0.7 \times 0.4$ |
| D (Str. J-17) | 0.7 | 3.0 | 0.7 | $5.4^{*}$ | $4.4^{*}$ | 0.8 | $?$ | $1.6 \times 0.7 \times 0.3$ |
| B (Str. 0-4) | 0.8 | $?$ | $?$ | $?$ | $?$ | 0.8 | $1.1 *$ | $1.3 \times 0.8 \times 0.3$ |
| C (Str. S-2) | $0.9 *$ | $2.9 *$ | $0.9 *$ | $?$ | 4.7 | 0.9 | $?$ | $1.6 \times 0.8 \times 0.3$ |
| B (Str. S-4) | 0.9 | $?$ | $?$ | $?$ | $?$ | 1.0 | $1.3 ?$ | $1.8 \times 0.8 \times 0.4$ |
| B (Str. R-13) | $?$ | $?$ | $?$ | $?$ | $?$ | 0.8 | 1.1 | $1.5 \times 0.9 \times 0.5$ |

Note: Starred dimensions are approximations based on reconstruction.


Figure 9.31 Cross section at center with reconstruction: Structure S-19.

## Entrance and Drainage Arrangements

Door and lintel dimensions are known, except for the door heights in two cases (Table 9.15). Structure S-4 shows the maximum door-height of 1.3 m . It is barely possible, but unlikely, that this door was never higher than about 1.1 m . This is the height of the lintel above an apparently secondary passage floor. A raising of the floor by 20 cm , reducing the vertical depth of the passage, seems quite certain; but the material of this supposedly secondary floor extended at least to the façade of the sweatroom, yet a door sill was not seen. It is not impossible that the lower floor and the lower part of the passage walls pertain to an earlier sweatroom, a situation known at Structure P-7. In that case the maximum door-height of this group of six sweatrooms would be 1.1 m , still combined with a maximum width of 1 m .

All doorways are placed low with respect to the enclosing building platforms, and in five cases sunken passages permit placement of the threshold below the sweatroom floor level.

Structure S-2 is unique in providing a threshold above floor level, from which one descends by steps to a sink in front of the firebox (Figs. 9.28a and 9.34). Unfortunately the height of the lintel is not here known. It has been restored, in the figure, as giving about the same vertical relationship to the firebox as is found in all known cases, of which there are six. The result is an extremely low door opening. This arrangement might be a secondary modification of a normal design, though we failed to investigate the point. Figure 9.28b shows such a hypothetical earlier phase; while in the cross section drawing of Figure 9.34, Unit A, with a question mark, has been distinguished from Unit E, as the hypothetical original platform. This sweatroom certainly differed from all the others in respect to its entrance and drainage arrangements. No covered drain or escape hole from the sink to the platform hearting was noted.

The sunken passage of Structure O-4 was floored with slabs, a feature not observed elsewhere at the site. They appear to have been rough-worked for the purpose, two of those exposed being long and narrow like capstones, and extending clear across the passage (Fig. 9.38). The slab floor was covered with plaster.


Figure 9.32 Cross sections of Structure J-17: a. at center, with reconstruction; b. near center with sketch of slabs in debris.

Only lack of information accounts for the perfectly horizontal floors shown in most of the sections, as has been mentioned. Floors of enclosing buildings and sunken passages presumably all sloped downward toward the front, as in the well-known structures N-1 and P7. In two cases there are positive data confining such an assumption. In the case of Structure S-19 it was necessary to give the passage floor a perceptible slope in order to fit Cresson's measured heights for the steps of Units D', D and E into a carefully measured debris profile. Confirmation is also available at Structure S-4, Sketches show the sweatroom floor at the same approximate level as the floor outside. But the vertical depths of the passage


Figure 9.33 Center cross section with hypothetical reconstruction: Structure O-4.
were 29 and 42 cm inside and 52 and 60 cm outside, the doorway. The alternative figures refer to apparently secondary and original floors respectively. A slope of about 10 cm in 1 m is indicated, though it may have been actually less than this.

## Passage Outside Only?

Structure S-4 presents an interesting detail. The inner left corner of the sweatroom doorway extends from the lintel to the floor of the passage, as shown on a careful scale drawing made by the writer in 1932. Stones of the masonry were sketched and show that the lower part of the jamb is continuous with the wall of the passage outside, to the front Therefore, the passage, outside the sweatroom, was built at the same time as the sweat-roof itself. The sketch does not show existence of the passage inside. However, on a check-up in 1936, Cresson draws it there also, and measures its height, showing its walls as flush with the jambs of the door. Probably he extended the old trench just a little, His sketch is a hurried one, merely meant to locate his measurements, and it shows no masonry details. Combining our observations, it can be said that, on one side at least, the passage wall inside the sweatroom was built after completion of the door and the passage wall outside.

This might be a mere sequence in the order of construction, but there are two reasons for doubting this. If the complete passage, inside and out, was part of the original plan, the observed careful construction of the inner corner of the doorway, between passage and sweatroom floor levels, was a waste of labor. Photographs show rather clearly that this did not occur at Structure N-1, nor at Structure J-17 (Fig. 9.37); and it certainly did not occur at Structure P-7. We thus have reason for believing that the original design at Structure S-4 called for the sunken passage outside the sweatroom only. Investigation was too sketchy to say definitely that, in the beginning, the sweatroom was operated without the
passage inside, and with its entire floor level below that of the enclosing building. But this is implied, the inner passage then resulting from a truly secondary raising of the sweatroom floor on either side of the area in front of the firebox. Originally, then, the doorway may not have been sunken in our particular sense, i.e., with reference to the floor of the sweatroom.

This sequence, in more than a mere structural sense, is not definitely established here, but we have a strong hint that it occurred. In such a design the operation of the sweatroom would be precisely the same as if the door and the sweatroom floor were at enclosing building level, without any sunken passage at all. The advantage of the latter would seem to lie only in keeping the enclosing building free of water and ashes. On raising the sweatroom floor, but continuing the passage through it to the firebox, these advantages would accrue here also, and in addition patients would be higher with reference to the fire and the roof. The possibility of such a sequence in design is therefore of theoretical interest.

The idea is advanced merely as posing a problem worth investigating at some future time. Cresson's data for Structure O-4 are also pertinent, but equivocal. There also the interior passage wall on one side ends against the inner corner of the jamb which descends to the passage floor level; the masonry' on the other side is also discontinuous except at the very bottom, where passage wall and jamb are tied together by one stone. One cannot safely infer contemporaneity from a single stone, since truly secondary walls might on occasion be tied to original construction in this manner. An undoubted case occurs in the palace structure J-21. For the other three structures of this series of six, no data on the question are available.

Sweathouses were undoubtedly built with sunken passages inside as well as outside the steamroom, as part of the original plan. The question raised is whether there may have been an earlier period when the whole


Figure 9.34 Cross section at center with reconstruction, Structure S-2.
steamroom floor was sunk to the level of the passage floor, so that the passage would then occur outside only.

## Vestigial Outside Passage.

At Structure O-4 the sunken passage outside the doorway is almost non-existent, being only about 25 cm long. The operation of the sweatroom could hardly be affected if all its elements were to be raised together so as to place the floor of the doorway at the level of Unit C (Figs. 9.27 and 9.33). This remains true whether or not the enclosing building extended forward so as to rest on the lower platform Unit C', as well as on Unit C.

If the enclosing building was limited to the higher portion of the platform (Unit C) the shortness of the outer passage is explained: like others it reached outdoors, despite its shortness, because the sweatroom façade was in the façade of the enclosing building. But being so short, it might just as well have been eliminated by raising the sweatroom units, as suggested. The stratified series at Structure P-7 suggests strongly that a long-standing habit had been to place the sweatroom well back in a deep enclosing building and in such cases the passage outside the sweatroom seems to have a meaning. Its presence in such abbreviated form here may then be due to mere conservatism. It is implied that long narrow enclosing buildings were not early in a developmental series.

If on the other hand, the enclosing building here extended forward, out over Unit C’, that was the lower front portion of a stepped-top building platform. Then the failure to sink the floor of the sweatroom doorway still further, so as to extend the passage across Unit C', is unique. Besides this, there are two factors indicating that the sweatroom was in line with the façade of a long narrow enclosing building, though this also would be an apparently unique feature. The lower Unit $C^{\prime}$ is much longer than Unit C, and may be merely a secondary step-terrace such as occurs before the temple Structure R-10. Another pertinent circumstance is that, among all
sweathouses investigated, only here is there evidence of stucco decoration above the doorway of the sweatroom. As a general rule, one expects sculptural embellishment on the outsides of Maya buildings, though of course such a rule is not universal.

Speculations of this sort have little present value. But if they are kept in mind they may be useful in planning excavations designed to demonstrate stratigraphically just what lines were actually followed in the evolution of this type of building.

## Fireboxes

As stated under Remarks on Drawings, in this series we penetrated to the position of the firebox in only two cases.

## Structure J-17

The inexperience of the workman who dug the trench here and the lack of close supervision are sufficient explanation for the fact that no part of the firebox was uncovered intact. Two circumstances show clearly that it was present. One is the fact that the passage walls are low and substantial so that they seem to have suffered little in the process of excavation, yet they stop short of the expected firebox location; the closest approach after excavation was 1.4 m from the rear wall. Another is that in the firebox area, and about at floor level and below, we were puzzled by large numbers of sherds. At the time (1932) I lacked the wit to associate this fact with the plentitude of sherds which had been found by Mason at Structure P-7. In Figure 9.32a, a sherd wall is reconstructed as rising from a low stone ledge which was present at the base of the sweatroom wall.

On the cross section drawing as made in the field, a special note shows that sherds were plentiful in what is now interpreted as the firebox region, and at sunken passage level. Apparently the firebox floor was at passage level, without a sill. Presumably the front as well as sides


Figure 9.35 Cross section at center with reconstruction, Structure S-4.
were built of tabular masonry. Had the front of the box been of heavy on-end construction like that of Structure $\mathrm{N}-1$, heavy slabs could scarcely have been missed, even with unskillful digging. If the walls had become badly cracked by the fire, like the side walls of the N-1 box, they would have been extremely difficult to identify and follow. Evidence of fire should have been present, but it was not looked for.

A firebox was undoubtedly present here. It may have been as large as, or smaller than, that of Structure N -1. It probably differed in lacking a sill and the on-end monolithic construction of that example.

## Structure S-2

This firebox shows definitely that the firebox floor could be at passage level, or rather in this case, at sink level (Fig. 9.34). The interior width is about 55 cm . The interior depth, for purposes of comparison, is difficult to give, since the side walls are flush with the jambs of the opening. The presumed lintel over the opening was not found. If broken, its fragments may have been thrown out in illsupervised digging. A large, somewhat tapering stone was set on end, to form the lower part of the left corner of the opening, but on the other side tabular construction is continuous from the outer corner of the opening to the rear wall. The distance from this corner to the rear masonry wall is 1 m , but at floor level a projecting ledge at the back reduces this dimension to about 80 cm .

In the reconstructions of Figures 9.28a, 9.28b, and 9.34 it has been assumed that the on-end corner stone supported one end of a lintel over the opening. This gives an opening height of 75 cm . This stone, by no means regularly rectangular, bulged a few centimeters, so that the opening at floor level was slightly less than the width of the box further in. However one reconstructs it, this box was appreciably smaller than that of Structure N-1 in its interior horizontal dimensions. The exterior ones were not ascertained.

Quantities of sherds were noted here, as at Structure $\mathrm{J}-17$. The notes indicate that, in a later check-up by the writer, some of these were found still in the firebox, at and below the level of the rear ledge at its back. These were mostly fragments of heavy utility vessels, and all were mortar-covered. The debris at higher levels in the firebox had been noted as dark gray in color. The evidence for presence of a sherd wall, any surviving remnant having been destroyed in the digging, is convincing. Notes on the condition of the masonry, whether calcined by fire or not, are not available, but a sketch indicates that the side walls were either unusually small stones, or that larger stones had been fractured to smaller pieces.

The cross section (Fig. 9.34) shows the possibility that the box had its own rear wall of masonry, behind the sherd wall, but independent of the sweatroom wall. This was not really established. While such a design differs from that at Structure N-1, it agrees with that at Structure P-7-1st, and permits the supposition that front and rear walls of the sweatroom were of the same order of thickness.

## Summary

The data available on two fireboxes in this series of six sweathouses are sufficient to show very considerable variation from the box selected as the type at Structure N1. A firebox could be smaller, even though apparently in a sweatroom of comparable size. The on-end construction at the front could probably be absent, and surely could be only partially present. It is quite clear that the firebox floor could be at the level of the sunken passage or sink in front of the box, so that the firebox sill was not a constant element. While it seems probable that there was always an opening covered by a lintel, this might be no narrower than the interior of the firebox itself.

So far as they go, the additional data suggest that sherd walls were universal in the latest phases. Whether our reconstructions are essentially correct or not, these
peculiar walls probably could be renewed without disturbing the rest of the box, if this was ever necessary.

## Decoration

Excavations in this group of six buildings were such that surviving evidence of sculptural decoration over the sweatroom doorways should have been found, if it existed. Results were negative except at Structure O-4. Here Cresson found stucco fragments, some containing sherds, in the debris in the doorway, along with 53 sherds in the doorway and just before and behind it. Some of these had stucco still adhering. In merely approaching the doorway in 1932, many large sherds were encountered by the writer. I was puzzled by their number until it was noted that remains of stucco adhered to many of them. There can be practically no doubt that some stucco design appeared above the sweatroom doorway. This is a unique feature in our whole series of sweathouses, and, as suggested elsewhere, it may be correlated with a unique design in which the sweatroom was not set back within a relatively deep enclosing building.


Figure 9.36 Cross section at center with reconstruction, Structure R-13.only).

The association of stucco sculpture with even one sweatroom is important. It suggests that the sort of sweathouses thus far found here were part and parcel of the complex of ceremonial buildings used by the priests. It tends to confirm the evidence of their location, which is more suggestive in this respect at some mounds than at others.

## Dating

We have no sure means of dating any of these structures relative to each other or to the other two known sweathouses. We might arrange them in some typological scheme, based on a theoretical evolution of the types. Such a procedure is hazardous at best, and it certainly should not be attempted with such partially known structures.

The indicated high degree of variability in enclosing buildings, and to a lesser extent in fireboxes, at least suggests that the time-range represented by Structure N1 and these six other examples is considerable. On the other hand the sweatrooms themselves seem all to have been substantial masonry affairs of about the same size as that of Structure N-1, and like that in having heavy stone lintels. At Structure P-7, the sweatroom, corresponding in these respects, is undoubtedly late in a series; it is stratified over remnants of another, apparently of much lighter construction. This latter, however, belongs in the second and not in the earliest of three periods, The indication is that none of the sweatrooms and fireboxes in the group of six here described go back beyond some middle period in the city's history. Behind this suggestion is the unproved assumption that heavy and light sweatroom walls were not built contemporaneously. If, in general, light walls followed, rather than preceded heavy ones, they should have appeared in the latest phases of some of the nonvaulted sweatrooms here examined.

In surmising that none of the sweatrooms thus far examined were very early at the site, we must remember that parts of the buildings may be older than others, though still in use at the time of abandonment. In addition, despite the lowness of the platforms, remnants of largely removed sweatrooms and enclosing buildings may lie completely buried. In none of the six examples considered in this section were such remnants searched for. In the one case where this was done, at Structure P-7, these were found.


Figure 9.37 Interior of sweat room, Structure J-17, showing sunken passage leading to doorway at observer's left, firebox believed to have occupied area at lower right.

It is by no means impossible that the sherd walls undoubtedly present at Structures J-17 and S-2 were later than the fireboxes themselves, and these in turn could have been secondary replacements in their sweatrooms. There is no positive reason for suspecting
either of these situations, but the possibilities make the sherds unsatisfactory for ceramic dating of the buildings. However, they date the sherd walls themselves as no earlier than the first appearance of the ceramic types surely represented in the sherd walls.

The sherds from the J-17 sweatroom excavation were piled at one side in 1932, and were first examined carefully by Cresson in 1935. There is no guarantee that any particular sherd came from the sherd wall, but most of them probably did. The number of fragments which got to this pile was 1,293 , about half the number at Structure N-1, but many were probably thrown out by the workmen. Included in this salvaged lot were the fragments of the large-lipped plate with monkey design illustrated in Satterthwaite (1942a). This is undoubtedly a late form and design, the latter corresponding with the designs on the deeper bowl at Structure N-1. The indication is that the sherd wall dates from the latest ceramic period, or at least that the sweatroom was then in use.

Among the few sherds saved from the excavation of Structure S-2, and almost certainly coming from a sherd wall, is a fragment of a large polychrome bowl of the same basic form as the monkey vessels from Structures N-1 and J-13, though the design is a different curvilinear one. Rough bard white mortar or plaster still adheres to much of one surface. The indication is that this sherd wall also was constructed after the appearance of a ceramic form still in use at the time of abandonment. So far as we know, sherd walls may have been an exclusively late feature in the fireboxes; evidence of early ones would not be likely to survive (Tables 9.14 and 9.15).


Figure 9.38 Doorway and sunken passage of sweat room, Structure O-4; note slab floor of passage damaged at front; halves of broken lintel removed from doorway during excavation.believed to have occupied area at lower right.

## Masonry Notes

Very little masonry of the structures here considered was exposed, and little attention was paid to it. Wherever seen, platform and sweatroom walls were of tabular stone laid in mortar. At Structure S-4 crushed stone was observed in the mortar, between the stones in the sweatroom wall. The Structure J-17 sweatroom walls seemed to be predominantly of thin small slabs, with selection of large blocks at corners. Here the comparatively shallow sunken passage walls were formed of one course of large blocks (Fig. 9.37). At Structure O-4, the body of the plaster on the passage floor was about 3 cm thick, pink in color, with a white finishing coat. This recalls the similar plaster in the passage of Structure N-1, the pink color being unusual.


Figure 9.39 Lintel and doorway of sweat room, Structure S-4, from front; sunken passage outside sweat room in foreground.

The heavy stone lintels, all plain, seem to have all been well tooled, at least where necessary to obtain smooth exposed faces. However this was not specifically recorded in all cases. It was noted that the lintel of Structure O-4 was well worked everywhere. The ends were gently rounded, when seen from above (apart from a large part of one end, which probably was damaged in the fall). This lintel also showed a slightly convex vertical profile on the well-preserved end, and on one of the long faces, probably the front. The careful work on the ends was useless from our point of view. A similar curving of the front edge can be detected in the photograph of the R-13 lintel (Fig. 9.40), and it was observed at Structure S-19. One is inclined to suspect the use of parts of old plain stela. But one long face of the J-17 lintel was fairly straight in vertical section, the other cut to the curve indicated in Figure 9.32. One end was not tooled at all, the other roughworked and not at a right angle to the long axis, though fairly straight. We believe the curved edge of this lintel was the inner one, as indicated, but this is not certain. Since this form occurs on some stones believed to have been vertically placed

Table 9.16 Distribution of Pottery and Stucco (Structures S-2, S-19, J-17, and O-4)

|  |  | Sherds | Stucco |
| :--- | :--- | :--- | :--- |
|  | In debris in sweatroom |  |  |
| Str. J-17 | In debris front of sweatroom | W-42-1 |  |
| Str. O-4:1 | In debris in doorway, near floor level | S-9-1* |  |
| Str. O-4:2 | In debris in, and just front of and just behind doorway |  | S-9-2* |
| Str. O-4:3 | In debris, center trench through sweatroom | S-9-3* |  |
| Str. S-2 | In debris in sunken passage, outside sweatroom | SE-9-1 |  |
| Str. S-19 |  | SE-12-1 |  |

* Sherds at Str. 0-4 probably all from disintegrated stucco.
panels, it should be noted that here it surely occurred on a lintel. This stone does not look like part of a reused stela. It may be noted in the Dimension Table that the depth of a large lintel may be somewhat short of the wall thickness; this non-exact correspondence was observed in position at Structure S-4 (Fig. 9.35). On the other hand, a lintel may be somewhat deeper than the wall at floor level, as at Structure J-17 (Fig. 9.32). In all cases the lintels, whether originally quarried for this purpose or not, were long enough to give substantial bearings on the jambs. They range from 56 to 83 cm longer than the distance they spanned, assuming vertical jambs. At Structure 0-4 the jambs were 25 cm further apart at the top than at the bottom, but probably had been forced out of shape by the heavy fragments of the lintel itself, which rested between them like a wedge. Even without allowing for this, the O-4 lintel could have overlapped each jamb by 16 cm . A more probable minimum amount of bearing surface, indicated by this series of sure lintels, is about 25 cm (Table 9.16).


Figure 9.40 Lintel and doorway of sweat room, Structure R13 , seen at an angle from front; rule stands against right side of sunken passage, pick against wall of Unit C' (No excavation behind front face of lintel, which was found exposed as shown).

## 4. Structure P-7, Linton Satterthwaite

## Preliminary Remarks

Published notices of Structure P-7 refer to it in its latest form, and have already been referred to. This structure came to be known to us as the standing building, the only one at the site where more than remnants of a vaulted roof had survived. However, this applied only to the sweatroom, which was found completely vaulted, in contrast to all others thus far discussed at this site. The enclosing building of this final phase was in a ruinous state, but portions of it survived to an extent which makes reliable reconstruction possible (Figs. 9.46, 9.47, 9.57-9.63). In passing to this structure we do not leave semivaulting behind us, but it is here applied to the enclosing building, instead of to the sweatroom.

Maler's entirely different interpretation of the ground-plan stems from the assumption that the whole building was roofed with complete vaults (Maler 1901:53). His assumption could scarcely have survived a half-day of digging and is in itself a fair guarantee that he did not disturb the mound-contours by excavation. Even so, his imaginary walls, had they existed, could not have fallen to produce the observed results (Fig. 9.47, Sections A-B, I-J, G-H).

Surviving masonry was generally in good condition, as was floor plaster, the latter fact being very helpful in establishing a minimum of eleven sequent phases, and in showing a high degree of probability that the structure functioned as a sweathouse from the earliest to the


Figure 9.41-46 41—Isometric reconstruction of Structure P-7-3rd (Units 30-27); basal platform (Unit 30) cut out to show relation to basal platform of Strs. P-7-4th-B and -A (Unit 35); plan of firebox suggested without physical evidence. 42—Isometric reconstruction of Structure P-7-2nd-F (Units 26-22). 43—Isometric reconstruction of Structure P-7-2nd-E (Units 26X-21). 44 -Isometric reconstruction of Structure P-7-2nd-C (Unit 17, plaster with turn ups to missing masonry); drawing shows survivals from prior phase (Str. P-7-2nd-D) not illustrated elsewhere, as follows: step-terrace (Unit 20); short extension to Unit 25 (Unit 19); probable extent of building platform modified by Unit 18 and hidden below plaster of Unit 17. 45-Isometric reconstruction of Structure P-7-2nd-A (Units 1412); Units 16 and 15 of prior phase (Str. P-7-2nd-B) illustrated in cross section of Figure 9.53 only. 46-Isometric reconstruction of Structure P-7-1 st-A (Unit 1, with Units 11-2 surviving from Structure P-7-1st-B or prior phase).
latest phase. This means that sweathouses may go back to the earliest local period of occupation. As one would expect, the sequence of phases reveals significant changes in design. These were more profound in the enclosing building than in the sweatroom itself, but hints of interesting developments in the latter are not lacking. The extensive semivaulting of the roof of the final enclosing building is a structural feature unique in the Maya area
thus far, and adds to the claim of this mound for special attention.

We have here more convincing evidence of this roof-type than anywhere else. It was first inferred by Mason in 1931, when he did the bulk of the excavation at this mound. The same year Wyer was assigned the task of measuring the main features of the latest phase, which was done without the controls of triangulation

Figure 9.47 Drawings of Structure P-7-1 st-A, with reconstruction; plan with unexcavated areas as of 1934 indicated by stippling; at sides and top center, sections combined with elevations; top right, partial roof plan; top left, perspective drawing of sweat room exterior with cut sections through enclosed building.


Figure 9.48 Composite longitudinal section of Structure P-7, approximately correct for line passing through center offinal sweat room, except that Unit 26X is a rearward extension of Unit 26, beginning behind that line, and Unit 21 survived as a remnant on Unit 26X only; the suggested level of Unit 35 in inferred from an exposure far forward of that line.
and the leveling instrument. I remeasured with these aids in 1934, when excavations were not permitted. The drawings now published are based chiefly on that work, combined with Mason's notes and measurements as of the time of his excavations, where needed.

After this rechecking in 1934, Mason prepared a rough-draft report, chiefly on the final phase, which has been freely used here, without further acknowledgment. Figure 9.47 was drawn in 1935 by Proskouriakoff to accompany that report. In later seasons I became convinced that a very little further excavation might establish the existence of more phases than was then clear, so it happened that I returned here for a day or two at a time, with this limited objective, and as work at other mounds permitted. As of 1935 the original excavations had reached the latest floor in the areas indicated by lack of stippling in Figure 9.47. This had been penetrated only in the sweatroom and sunken passage outside it, and in the left rear room (right of an observer facing the building). My later excavations were confined to additional penetrations at strategic spots within these areas, and to extending the cut at the left so as to give a cross section reaching the plaza at the front.

Any attempt to exhaust the possibilities for learning what had survived from earlier phases would have been very time-consuming and would have vitiated other plans. Nevertheless it has been possible to assemble the many disconnected items of buried construction with reference to a single front-rear axis, which very clearly remained the same from first to last. When available stratifications are brought to bear, many of these items must be put in one phase rather than in any other, and all may be assigned to particular phases where they become parts of reasonable broken-line reconstructions. The reconstructions make sense as sweathouses of the local types known at other mounds. A picture of change within this functional limitation emerged, and the reader can get a quick impression of it by comparing Figures
9.41-9.46. These consist largely of broken lines, but it will be found on close inspection that no important component is thus drawn or partially drawn unless there was some (though perhaps not much) physical evidence for it. Where this is only an isolated bit of wall, usually its position combines with the positions of others to fit the generalized sweathouse pattern, as established at Structure N-1 and in the latest phase here. In all cases, something existed which will not fit the plans of local temples and palaces.

Returning our attention to the final phase, mention should be made here that before Maler's time vandals had gone to great labor to break a large hole through the right side of the sweatroom wall and vaulting. Once inside, they undoubtedly proceeded immediately to probe in the firebox which, in their imaginations, doubtless seemed like a treasure chest. Mason found it partially destroyed, and presumably its already ruinous condition accounted for Maler's description of it as a "large stone bench." As we shall see, there is no reason for doubting that it was a firebox quite similar to that at Structure $\mathrm{N}-1$.

It is probable that the avarice of modern woodcutters prevented us from seeing this firebox of the Initial Series Period exactly as it was left at the time of abandonment. The completely vaulted sweatroom roof protected it from the elements and from falling trees. The semivaulting of the enclosing building must have collapsed a few generations after abandonment, sealing in the low doorway completely.

## Unit Designations and Temporal Sequences

Although no deep digging was done at this mound, shallow cuts produced a relatively large number of superpositions. Some of these cuts eventually coalesced to form the front-to-rear trench referred to above, penetrating the debris of the final enclosing building, the floor of the latter, and exposing the left face of an earlier, shorter, platform. This trench was carried forward and down to plaza level,
where bedrock was encountered, with an interruption below the medial wall of the final enclosing building. The findings here are largely covered by the cross section of Figure 9.53. The earliest basal terrace in this cut, Unit 35, may be the earliest construction at this spot, but this was not proved by following bedrock to the rear.

Stratifications were found in a number of scattered lesser cuts, and as many of these as possible are brought together in the longitudinal cross section of Figure 9.48. Various other cuts are shown in Figures 9.49-56, placed on the same page for ready reference and comparison. The datum or zero height is indicated on each, to help in visualizing stratigraphical relationship as between different figures. It will be noted in Figure 9.48 that the floor of the earliest probable building platform encountered, Unit 34, is at a height above Unit 35, which makes it likely that the two were used together. Therefore this earliest building unit may be the earliest built at this part of the East Group. But again, this was not proved by the required amount of deeper excavation. Our sequence may or may not start at the very beginning of occupation of this part of the site, but it surely begins long before the time of abandonment.

As implied in the above, at this mound units of construction have been numbered rather than lettered, because it seemed advisable to distinguish more units than there are letters in the alphabet. In general, primed numbers refer to a part of a unit seen to the left rather than the right of the front-rear axis. In two cases the letter X has been added to a number to distinguish a distinct unit. Unit 34X as a label connotes special doubt whether a supposed wall remnant really was such. In the case of Unit 26X, the special type of designation will serve to remind one that its temporal relationship to Unit 26 is a matter of inference rather than physically dug-out proof. The two together came to form a single platform, but which is an extension of the other is open to some theoretical doubt.


Figure 9.49 Composite longitudinal section of units exposed near right front $(W)$ corners of platform units shown.


Figure 9.50-52 50-Longitudinal section near left rear ( $E$ ) corner offinal sweat room (Unit 8), showing probable excavation into earlier platform before erecting the new sweat room (see similar evidence in Figs. 9.53 and 9.56). 51 —Longitudinal section in final sweat room, slightly to the rear of line of Fig. 9.48, passing through "pit" of Fig. 9.42 (i.e., through Units 23 and 23', forward offirebox). 52- Longitudinal section through left (SE) half offinal sweat room, including area of fireboxes of various phases.

As is usual, there is some leeway where judgment has had to be exercised in assigning a given unit to a particular phase. The scheme of sequences adopted is tabulated to make it possible to get a fair notion of the changes which went on without struggling with the tedious text devoted to particular phases. The latter, it is believed, justifies the tabulation as it stands, and it is felt that fuller knowledge would not require drastic rearrangements, though it would certainly fill out many phases considerably.

A tabulation of all stratifications would be large and cumbersome, and of doubtful value. Instead of providing it, with the tabulated descriptions of units in each phase we give figure numbers applicable to the units concerned; if a figure number is underlined it refers to a three-dimensional drawing of one or more of the units in question; if not, to such a unit or units as part of or in relation to a cross section. The latter show stratigraphical relationships so far as they are known and seem significant.

We do give a Table of Selected Stratifications, and use it in demonstrating that eleven phases certainly existed. In assigning particular units to them, the usual principle adopted in such cases has been applied: when we come to a new phase we assign as much to it as the stratigraphies

Table 9.17 Structure P-7 Scheme of Temporal Sequences

| Str. P-7 |  | Unit | Figure Nos. (drawings) |
| :---: | :---: | :---: | :---: |
| $4^{\text {th }}-\mathrm{B}$ | *Basal platform (stairway not searched for) | 35 | 9.48,9.53 |
|  | *Building platform with apparent plaster passage drain (enclosing <br> building platform? Evidence not searched for) | 34,34' | 9.48,9.51, |
|  | *Pr |  |  |
|  | *Probable remnant of front wall of sweatroom | 34X | 9.57 |
|  | *Probable remnant of rear wall of firebox or fire pit (Stepped wall in correct relation to Unit 34X) | 33 | 9.57 |
| $4^{\text {th }}$ - A | Thick resurfacing of platform (of Unit 34), with elimination of old plaster drain | 32 | $\begin{aligned} & 9.48,9.51, \\ & 9.57 \end{aligned}$ |
|  | Paving of presumed firebox or fire pit with stone slabs | 31 | 9.52,9.57 |
| -3d | *Basal platform (new) | 30 | 9.41,9.53 |
|  | Stairway of same | 29 | 9.41,9.53 |
|  | *Building platform, new, with shallow sunken passage; re surfacing of passage (New enclosing building platform? Evidence not searched for) | 28,28' | $\begin{aligned} & 9.41,9.48, \\ & 9.51,9.57 \end{aligned}$ |
|  | Paving stones, new, forming low sill (for old or a new firebox or fire pit?) New sweatroom presumed, evidence not searched for | 27 | 9.41,9.57 |
| $-2^{\text {nd }}-\mathrm{F}$ | *Building platform, new, with new sunken passage over old one (enclosing building platform? Evidence not searched for) | 26,26' | $\begin{aligned} & 9.42,9.48, \\ & 9.49,9.55 \end{aligned}$ |
|  | *Supplementary platform (first at this mound) | 25,25' | $\begin{aligned} & \text { 9.42,9.48, } \\ & 9.49 .9 .53 \end{aligned}$ |
|  | Floor of new sunken passage at level of supplementary platform | 24 | $\begin{aligned} & 9.42,9.48, \\ & 9.51,9.52, \\ & 9.57 \end{aligned}$ |
|  | Rectangular pit at head of sunken passage (presumed to have partly contained a new firebox but possibly predating this period) | 23 | $\begin{aligned} & 9.42,9.51, \\ & 9.57 \end{aligned}$ |
|  | *Remnants of supposed firebox, new | 23' | 9.42,9.52 |
|  | *Remnant of supposed front wall of sweatroom (new) | 22 | 9.42,9.55 |
| $-2^{\text {nd }}-E$ | *Rearward extension of low platform, presumably as a deeper building platform (evidence on left side) | 26'X | 9.43,9.48 |
|  | *Remnant, apparently of pier and base-wall (reconstructed partially as enclosing building of type of Str. N-1-1st-A) | 21 | 9.43,9.48 |
| $-2^{\text {nd }}-$ D | Step-terracing at side of basal platform stairway | 20 | 9.44 |
|  | Slight lateral extensions of supplementary platform | 19 | $\begin{aligned} & 9.44,9.48, \\ & 9.49 \end{aligned}$ |
|  | *Major lateral extensions of supposed building platform (for new or extended enclosing building? Evidence not searched for) | 18 | $\begin{aligned} & 9.44,9.48, \\ & 9.49,9.53 \end{aligned}$ |
| $-2^{\text {nd }}-\mathrm{C}$ | Two resurfacings of building platform as extended in prior phase; construction of new masonry as evidenced by turn-ups (Plaster of Unit 17 may have turned up to a medial wall of enclosing building; that of Unit 17' may have turned up to bench or wall forming stepped-top platform. | 17,17' | $\begin{aligned} & 9.44,9.53 \text {, } \\ & 9.54 \end{aligned}$ |
| $-2^{\text {nd }}-B$ | Bench (?), apparently facing rear | 16 | 9.53 |
|  | Thick resurfacing inferred from height of base of bench; actual new surface not found and presumed destroyed | 15 | 9.53 |


| Str. P-7 |  | Unit | Figure Nos. (drawings) |
| :---: | :---: | :---: | :---: |
| $-2^{\text {nd }}-\mathrm{A}$ | *Raising top of basal platform at rear, forming stepped top | 14 | 9.45 |
|  | *Raising top of building platform at rear, marking first appearance of stepped top building platform | 13 | $\begin{aligned} & 9.45,9.48, \\ & 9.53,9.56 \end{aligned}$ |
|  | *Remnant of presumed enclosing building, new | 12 | 9.45,9.56 |
| $-1^{\text {st }}$ - B | *Basal platform stairway, new | 11 | $\begin{aligned} & 9.46,9.47, \\ & 9.53 \end{aligned}$ |
|  | Forward extension of rear of stepped-top basal platform | 10 | 9.46 |
|  | Slight forward extension of building platform | 9 | 9.46,9.53 |
|  | Corresponding slight forward extension of supplementary platform | 9' | 9.46,9.53 |
|  | *Sweatroom, new | 8 | 9.46,9.47, |
|  |  |  | $\begin{aligned} & 9.48,9.51, \\ & 9.52, \end{aligned}$ |
|  | Semivaulting of enclosing building, where structurally continuous with sweatroom | $8^{\prime}$ | 9.47,9.57 |
|  | Slight raising of rear of stepped top building platform accompanied by tearing out at front of rear portion | 7 | 9.53,9.56 |
|  | *Firebox, new, at higher level and with sill, burying rear portion of rectangular pit | 6,6',6" | $\begin{aligned} & \text { 9.46,9.57, } \\ & 9.52,9.57 \end{aligned}$ |
|  | Extension of walls of sunken passage rearward to new firebox, preventing sunken pit effect | 5,5' | $\begin{aligned} & 9.46,9.57, \\ & 9.51 \end{aligned}$ |
|  | *Enclosing building, new, double range with semivaulting (part of semivaulting over sweat-room separately labeled as Unit $8^{\prime}$ because continuous with Unit 8). | 4 | $\begin{aligned} & 9.46,9.47, \\ & 9.48, \\ & 9.49,9.53, \\ & 9.54,9.56, \\ & 9.57 \end{aligned}$ |
|  | Benches with back-screens (all masonry thrones) | 3,3' | $\begin{aligned} & 9.46,9.48, \\ & 9.53,9.56 \end{aligned}$ |
|  | Bench (part of legged throne??) | 2 | 9.46,9.53 |
| $-1^{\text {st }}$-A | Raising of sunken passage within sweatroom, sweatroom door sill | 1 | $\begin{aligned} & 9.46,9.47, \\ & 9.48,9.51, \\ & 9.57 \end{aligned}$ |

Note: Starred units required considerable labor in construction and/or are new basic sweathouse components; unit numbers omitted in Figure 9.47.
permit, unless there seems to be good reason to deviate from this rule in assigning some particular unit. In grouping the phases into periods, as for Structure N-1, the principle adopted is that a new period shall include a new sweatroom, known or reasonably inferred (Table 9.17).

## Evidence for Minimum of Eleven Phases

The Table of Selected Stratifications (Table 9.18) lists one or two units pertaining to each of 11 phases, proceeding downward in the table in the order of advancing time. The two left columns of units are locked in place by

Unit $18^{\prime}$, which is common to each. The third column is not locked to either of the others in this manner, but nevertheless we cannot place Units 4 and $5^{\prime}$ in different phases.

This follows from a series of structural sequences within the phase of Structure P-7-1st-B. In Figure 9.57, Unit $8^{\prime}$ is that part of the semivaulting of the enclosing building, Unit 4, which seems to rest on the sweatroom, Unit 8 . This part of the enclosing building is given the special label 8 ' to emphasize that, though we first thought it later than Unit 8, a section cut through both showed them to be a single unit structurally. The
term semivaulting over the sweatroom (Unit 8') applies strictly only to the roof-supporting elements at the front and sides of the sweatroom which supports them. At the rear these merge into half of a complete vault, the other half of which rested on the rear wall of the enclosing building, that is, on Unit 4. The situation here is best seen in Sections E-F and K-L of Figure 9.47. Units $8,8^{\prime}$ and 4 clearly belong together in a single phase. Referring again to Figure 9.57, Unit 5 (corresponding to Unit 5') was built against Unit 6, the firebox, and that was built against the rear wall of the sweatroom, that is, against Unit 8 , which we have seen belongs in the same phase as Unit 4 . Whatever the structural order, Unit 5' cannot precede Unit 4 in significant phase, and it certainly did precede Unit 1 in a significant sense, since the latter changed the vertical depth of the passage. Thus we must have the eleventh phase, Structure P-7-1st-A, for the raising of the passage,

It might in theory be argued that Unit 1 represents a late change in plan, after lower parts of the structure P-7-1 st-B had been started but not completed. There is no stratigraphical proof to the contrary; but since a similar raising of the passage floor has been noted at other mounds, this seems extremely unlikely (Table 9.17).

It may be noted that reversing the orders of Units $26^{\prime}$ and $26^{\prime} \mathrm{X}$ in the column of Figure 9.48 would not affect the necessary number of phases in the table. In the table, and in Figure 9.48, Unit $26^{\prime} \mathrm{X}$ is in parentheses because it really belongs to the rear of that longitudinal cross section. The observed relationships of Units $26^{\prime}$ and of $26^{\prime} \mathrm{X}$ to Unit $18^{\prime}$ were the same, and it seemed simpler to bring the front and rear portions of a composite platform onto the one drawing. We neglected to dig out actual proof that Unit $26^{\prime} \mathrm{X}$ is a later rearward extension of Unit 26', and not the reverse.

Since we use these two units as phase-indicators, it should be stated that a line in the masonry of the left face of the platform in final form showed clearly that it was a composite one, there had been an extension, either forward from Unit $26^{\prime} \mathrm{X}$ or, almost certainly the case, backward from Unit 26'. Masonry details here were not recorded, and we failed to expose more than one face at the old corner. However, if in theory we should reverse the sequences of Units 26 ' and 26'X, the latter would come immediately after Unit 28' (the platform illustrated in Figure 9.41). In such a temporal position it does not make sense; considering it as a rearward extension of Unit 26', as in Figure 9.43 and our table, makes Unit $26^{\prime} \mathrm{X}$ a logical step in the development of the large enclosing building of the final period.

# Discussion by Early Periods and Phases 

## Structure P-7-4th-B (earliest)

This phase is not illustrated by a special threedimensional drawing, but a portion of the basal platform (Unit 35) appears in a cut-out in Figure 9.41. To the observer's left of this portion one may imagine a stairway hidden beneath the later one shown, presumably centered before a building platform about 50 cm high. The latter, Unit 34, is also hidden by the later construction shown in Fig, 9.41. Its top only was seen, and only on and near the front-rear axis (as determined by units of later phases). Part of this exposure is shown in plan in Figure 9.57.

In that figure it will be seen that Unit 34 X is in just the right position for a remnant of the front wall of a sweatroom, that is, it is below the front wall of that component of the final period. This Unit 34 X consisted of two thin slabs, bedded side by side on a few centimeters of yellow earth, presumed to be remains of mortar, and similar to the bedding of the much later sweatroom wall of the final period. There is not much doubt that we correctly infer a wall-remnant here, and none that it belongs in time within this period, though actual proof that it belongs in this earliest phase, rather than in the next phase, was not recorded.

The plaster floor of the platform, Unit 34, extended by some unknown amount more than 2 m forward of this wall-remnant. In the rearward direction at one point it could be followed to within 30 cm of a stepped remnant of wall, Unit 33, based at its level. At this point extreme heat had modified the plaster to such a soft chalky consistency that its surface could not be followed further. There is no doubt, however, that this surface once reached back to Unit 33, which appears in cross section in Figure 9.57. This unit, as can be seen in that figure, is in just the right position for a remnant of the rear wall of some sort of masonry arrangement for the fire, that is, it is partly below the rear wall of an undoubted firebox of later times (Unit 6) and below another similar remnant of an intermediate phase (Unit 23).

From the foregoing we conclude that out earliest platform, Unit 34, served a sweatroom of normal size, with interior arrangements for the fire centered at the rear of the sweatroom, just as in all known later examples. As in many of the latter, including Structure $\mathrm{N}-1$, the sweatroom was set back on a platform much deeper than was necessary for this component alone, and the platform probably was also much longer than the sweatroom, providing raised areas at the sides as well as to the front. Presumably an enclosing building roofed over the sweatroom and these additional areas, but there is the logical possibility that in the earliest


Figure 9.53 Composite front-rear section, approximately correct for line running through center of bench-throne in left (SE) rear room of final period, just outside left walls of platform-units 28', 26', and 26X; masonry of early stair sidewall sketched in elevation.
phases a building platform larger than required for the sweatroom merely provided unroofed raised areas at the front and sides.

The actual size of this earliest building platform is unknown, but its length was less than that of Unit 28, the building platform of the next later period. The length indicated in Figure 9.48, by broken line, is based on no more knowledge than the fact that the left side wall of the earliest platform, Unit 34, must lie somewhere behind the corresponding wall of Unit $28^{\prime}$.

An interesting feature of this phase is the plaster passage drain, sunk into Unit 34. One side of this is indicated in Figure 9.57, largely in broken line, as Unit 34'. This duplicates what was more completely seen on the other side of the axis, hidden below later construction in this drawing. The platform as a whole sloped gently downward toward the front, and on either side of the axis low shoulders in the plaster defined a long narrow area sunk about 5 cm below the level on either side. Cross sections through this appear in Figures 9.48 and 9.51. These shoulders definitely were such, and not turn-ups to since-vanished masonry walls of a sunken passage, though they lay immediately below such walls of the next period.

On the one side where preservation was best, the shoulder of this shallow drain turned to the side and "petered out" as the lowered area bounded by it rose in the lateral direction. This happened about 40 cm forward of Unit 33, the remnant of the firebox or fire-place which clearly belonged with it. As indicated in Figure 9.57, the shoulder marking the left side of the drain passed by the
end of the wall-remnant Unit 34X. The drain was in the correct position, and of the correct width, to confirm our inference that Unit 34 X is a remnant of the front wall of a sweatroom, and also that it is at the doorway of such a room, the drain passing from within, through the doorway and out across the deep building platform to the front. This drain differs in no way, except in its shallowness, from the sunken passages of later phases. Hence we can be sure the doorway of the earliest sweatroom known was of the same approximate width as those of later periods.

Actual plaster turn-ups to Unit 34X were not noted for this phase nor for the next; in the latter phase the plaster surface of Unit 32 was seen to be broken off just short of the inner side of the wall-remnant. This probably occurred when the wall was largely removed. It lay below the sunken passage wall of Structure P-7-3rd and must predate it. Lacking the evidence of plaster turnups, the slabs themselves are good evidence, though not the best, that the walls of this earliest sweatroom were only about 30 cm thick. This is decidedly thinner than at any other mound thus far known, but similar to the probable thickness of the same element in a later phase here (Structure P-7-2nd-F).

## Structure P-7-4th- $\boldsymbol{A}$

We have here the first appearance of slab-paving for the fire. This is illustrated in cross section as Unit 31 in Figure 9.57. These slabs had been removed some years before the plaster passage drain of the previous phase was discovered, but since their forward ends must have
lain above a portion of the drain, they belong in the next phase, that here under discussion.

Apparently at the same time there was a resurfacing of the building platform, so thick at the center as to obliterate the old plaster passage drain (see Unit 32 in Figures 9.48 and 9.51). This new floor surface was flush with the slabs for the fire, though actual contact of the new surface with them was not recorded. It must be remembered that in the vicinity of the firebox, destruction by heat as well as by early treasure hunters must be reckoned with.

The general slope forward was maintained. Our evidence indicates that provision of a special drain was temporarily given up. If it was not, the sides of either a plaster passage drain or a sunken passage remained hidden from us, because the drain was wider than in earlier and later phases. In that case, the plaster floor of Unit 32 should have covered the end at least of Unit 34X, which almost surely marks the position of the door jamb of the earlier phase. The plaster did not quite reach that remnant of wall, the jamb apparently still functioned, and it is a fair conclusion that in this phase nothing but the slope provided for drainage. Thus the plaster passage drain of the earlier phase appears to have been an unsatisfactory experiment. The presence of the slabs, obviously used in connection with the older Unit 33, shows that fires were still being provided for, and confirms the evidence that the old sweatroom was still in use as such.


Figure 9.54-56 Composite front-rear section, approximately correct for line passing through bench-throne in right (NW) rear room offinal period (54). Front-rear section through front wall of sweat room offinal period (Unit 8) showing supposed remnant of earlier sweat room wall (Unit 22) (55). Front-rear section on line through sweat room offinal period near its left ( $E$ ) corner; note plastering of platform before erecting final enclosing building wall (Unit 4), and remnant of earlier enclosing building wall below it (Unit 12); position of slab suggests disturbance of old platform during final operations (56).

## Structure $\mathbf{P}-7-3$ rd

What is known of this period (consisting of a single phase) is illustrated in Figure 9.41. This and the cross sections show that everything about it is new, it completely obliterated all known earlier units.

We are dealing with a time of important change. The raising and forward extension of the basal platform (Unit 30) was a job of considerable magnitude. The known side of the new stairway for it (Unit 29) lines up with the corresponding side of the new building platform (Unit 28), so the reconstruction of a rather imposing full-width stairway, fully covering the building, is mandatory.

The two front corners of the building platform were exposed, so we know the length, and that the sunken passage is centered. It survived wherever looked for, except close to the firebox or fire-place, where a new set of paving slab (Unit 27) maintained the effect of a low firebox sill. This is all that survived of a presumed new firebox. No remnants of a new sweatroom were encountered, but this must be postulated in view of the overwhelming evidence at other mounds (and in later phases at this one) that the sunken passage is a certain sweathouse indicator.

We still lack physical evidence of an enclosing building, but we did not dig for it.

It is interesting to note that the sunken passage of this phase was comparatively shallow, and tended to be a few centimeters wider than that built above it later on. The surface of Unit 32 of the prior phase could have been used as the floor of the new passage, but a new plaster surface was provided and there was a still later resurfacing. These tended to make the passage, the earliest sunken passage known, even shallower than otherwise, but this effect is somewhat minimized in Figure 9.48.

It was at first supposed that the low walls of this passage were merely the lowest course of a much deeper one. Future excavators are warned against making a similar mistake. That it was a mistake is shown sufficiently by the solid-line portions of Units 28 and $28^{\prime}$ in Figure 9.48 .

## Structure P-7-2nd-F

Figure 9.42 illustrates this earliest phase of a new period. Comparison with Figure 9.41 shows no change in the basal platform, but everything else is entirely new. The building platform (Unit 26) is about the same size as before, but has been built over the prior one. We still lack positive evidence that it served an enclosing building. Unit 25 completes the obliteration of the old building platform, where its sides would otherwise have remained exposed (Figs. 9.48 and 9.49). This Unit 25 marks the first appearance of the supplementary platform in our sequence. During the next phase it corresponds closely to the supplementary platform of the latest phase at Structure N-1.

Assignment of this supplementary platform to this phase, rather than to the next, requires a wider exposure to the rear than to the front of the building platform, a suspicious circumstance. If we shift this component to the next phase it is hard to understand why the new building platform was not properly registered on the old one (in Figure 9.48 Units $26^{\prime}$ and $28^{\prime}$ are flush, but in Figure 9.49 Units 26 and 28 are not).

The height of the sunken passage walls is also now comparable with that of such walls at Structure N-1, but the passage shows a feature not observed elsewhere, and not fully illustrated. Its parallel walls run back to a point about 5.4 m from the front, that is, to points well within the sweatroom. There they turn away from each other, and then turn rearward again, finally joining at the back to form a rectangular pit, open at the head of the passage. This measured about 1.2 m in width by 1.1 m in depth. We have labeled its walls Unit 23. Though the rear portion survived only at the base, it was fairly clear that walls of pit and passage were continuous.

It is possible that the pit alone served as a fire-place at first. A remnant of wall, Unit 23', was so placed on the floor of the sweatroom, at the side of the pit, as to suggest that a firebox was built in its rear portion (see Units 23 and 23 ' in Figure 9.52). The net effect was probably as reconstructed in Figure 9.42, the passage is a little wider immediately in front of the firebox. Judging by levels, but not by an actually surviving definite surface, the slab flooring of the prior firebox was buried beneath a new floor of plaster or earth.

A firebox in this phase calls for a sweatroom in which it served, and there is evidence that such a room existed, that it was of approximately the same size as that of the final period, and that it had masonry walls or base-walls. This evidence is Unit 22, explainable as a remnant of the front wall, torn down to its base course to make way for the final (and thicker) front wall of the final period. The final wall (Unit 8) was placed directly above it, while the positions of its front face and of exposures of three plaster floors which must have functioned with it, show that at the observed point it was less than 65 cm in thickness (Fig. 9.55). Unfortunately, in working in under the final wall, from its interior face, we did not proceed far enough to reach the interior face of the earlier unit, and so must suggest it in broken line in the figure. In Figure 9.42 the wall-thickness for this sweatroom is taken as 60 cm . This may be correct, or it may have been still thinner.

We are probably safe in concluding, from this evidence of thin sweatroom walls during this period, that neither complete or semivaulting was used for the roof, hence that it was entirely supported on beams.

## Structure P-7-2nd-E

This is an interesting phase because the little which we learned about it indicates the situation summarized
in Figure 9.43. The only elements in this figure which do not survive from the phase of Figure 9.42 are Unit $26^{\prime} \mathrm{X}$, and Unit 21, resting on it. The latter is our earliest physical evidence of an enclosing building. Whether this was of pier-and-base-wall construction, as suggested in the figure, is not really certain. The model for this is Structure N-1-1st-A, and what little had survived of Unit 21 best fits that masonry style.

It is quite possible that this phase consisted of a rearward extension of the building platform to accommodate a rearward extension of an already existing enclosing building of this sort. In any case, in this phase we encounter a new feature, maintained throughout the rest of this sequence, but not found as yet at any other sweathouse mound. By extending the old enclosing building, or providing a new one, the sweatroom is no longer all the way back within the building, though it is still to the rear of a central position on the front-rear axis.

Merely theoretical doubts that Unit $26^{\prime} \mathrm{X}$ (and therefore Unit 21) may have belonged in an earlier phase have been disposed of.

## Structure P-7-2nd-D and P-7-2nd-C

These are puzzling phases, the later of the two being summarized in Figure 9.44. The composite building platform of Figure 9.43 (consisting of Units 26 and 26X) was extended laterally so as to submerge the old supplementary platform. This new construction is labeled Unit 18 (Fig. 9.48). Unit 19 represents a slight extension of the supplementary platform, so that this component now seems a mere matter of style, and no longer provides extensive raised areas at the sides of the enclosing building. The levels are such that the old enclosing building probably still survived, as suggested in Figure 9.44, and the problem arises as to whether the building platform itself now provided raised unroofed areas at the sides. We know that these were eventually to disappear altogether.

There followed two apparently general resurfacings of older as well as new parts of the enlarged building platform. We rank these as a separate phase and attach the label Unit 17 because turn-ups show that masonry construction was added at the time of the first of these resurfacings, survived to the time of the second one, but followed the enlargement of the building platform. These turn-ups are located in Figure 9.44. One of them shows that a wall, bench or some masonry feature was placed on the extended portion of the old building platform, left of the enclosing building, unless that was enlarged. This wall, on Unit 17, faced forward, well back of the longitudinal axis. The other also faced forward, close to the median position. In neither case was it determined whether they were free-standing walls or not. The plaster


Figure 9.57 Isometric reconstruction of enclosing building, sweat room and firebox of Structure P-7-1st-A, combined with cross section at center, all phases, so far as known on this line; sunken passage modification (Unit 1) shown as cut off to rear of sweat room door sill; all other exposed elements as in Structure P-7-1st-B.
tum-ups are shown in the cross sections of Figures 9.53 and 9.54 .

Neither of these phases seems to have been particularly minor in character, though we know little about them. Step-terracing at the base of the basal platform (Unit 20) is assigned to the earlier of these two phases, but it may belong earlier or later than either.

## Structure P-7-2nd-B

Not much can be said of this phase, other than what can be read in the cross section of Figure 9.53. The bench (Unit 16) faced rear and overlay the turn-ups to one of the two vanished walls of the prior phase (Unit 17'). This position, and the level of the bench, show that the turnups of the earlier Unit 17' could not have been to the


Figure 9.58 Structure P-7-1 st- B and -A, restoration drawing by Tatiana Proskouriakoff.
face of the higher rear portion of a stepped-top building platform. That feature (Unit 13) does not appear till the final phase of this period, since its fill rests against Unit 16, our supposed bench. What we have taken to be a surviving bit of the plastered top of the bench may possibly be floor-surface of the next phase. In that case, Unit 16 may be a cut-down section of a free-standing wall, rather than a bench.

This phase involved removing old masonry construction and adding new, but it may have been confined to rearrangements within (or possibly outside) an enclosing building. There is no reason for doubting the continued functioning of the sweatroom of the earliest phase of the period.

## Structure $\operatorname{P-7-2nd-A}$

The evidence is good that this phase includes an important change in the design of a new enclosing building, but there is no sign that the sweatroom itself was new or underwent modification. The new feature, Unit 13, marks the introduction of the stepped-top building platform so far as it serves the
enclosing building (Fig. 9.45). A stepping-up of the rear portion of the basal platform by Unit 14 is also assigned to this phase, without physical proof that it belongs here.

So much of Figure 45 is in broken line that the reader is referred to Unit 13' in Figure 9.53, where the plastered top of this elevated rear part of the platform runs under and slightly below Unit 4, the rear wall of the enclosing building of the next phase; and see Figure 9.56. In the latter cross section we may assume that plaster running immediately below the lowest course of a wall merely means the erection of the wall after the platform had had time to harden. Here we have two such floor surfaces surviving, the earlier one, on our Unit 13', running under an obvious remnant of an earlier rear wall belonging with it (Unit 12).

While the plastered surface of Unit 13' could not be followed forward from the rear, the floor material itself was followed forward to the face of the bench, Unit 16, as indicated in Figure 9.53. Evidently the bench (or a cut-down section of old wall) was incorporated in the new raised part of the platform.

Though we have physical evidence of a new enclosing building in this phase, we know very little about it, unless we reason back in time from the final period, during which the stepped-top design for the building platform was retained. For this present phase we lack evidence within the building as to where the step-up occurred, but this is probably because the face of the rear portion was torn out in the next period, when medial walls of the later enclosing building were based on the lower front level. That operation cut through Unit 16 and the two floors of Unit 17’ below it. However, on the outside of the enclosing building of the final phase, to the right, a step-up in the building platform was seen and is drawn in Figure 9.46 (as if seen on the building's left side). The latest wall rests on it, but it probably dates from the phase here being discussed. At the left of Figure 9.48 we have a longitudinal cross section through this stepped-up part of the building platform. Its top, on the outside, corresponds in level with the floor attributable to Unit 13, not to Unit 7. Though in plan the step-up occurs precisely in line with the rear of the final medial walls, it is probable that their positions were adjusted to the earlier step-up. The outer faces of the final outer walls, at least in some places, apparently rest directly on the old building platform which, at the rear, means on Unit 13. Within the building there was a further raising (by Unit 7) and the inner faces of the same walls were based on this higher interior level, as in Figure 9.56. It is probable, then, that the step-up of the phase under consideration was along the same line as that of the final period, as indicated in Figure 9.45.

It is quite possible that by the time of this phase the enclosing building had here evolved to about its maximum size, and already showed the main features of the final plan, the passage behind the sweatroom, the stepped-top building platform, and, one may conjecture, two ranges of rooms separated by medial walls.

By the time of this phase, successive resurfacings had added to the height of the front part of the building platform by an appreciable amount. Earlier floors were, however, very hard to distinguish outside the sweatroom, and within it our record of them is somewhat confusing. However, the cross section through four plastered surfaces in Figure 9.48, to observer's right of the sunken passage, was clear. The later ones probably curved down to the top of the sunken passage, being destroyed near the passage in the phase to follow, when an extra course was probably added to the passage walls. However, we were not really able to prove that the passage walls were thus raised.

## Discussion of Final Period (Structure P-7-1st-B and -A)

The two phases of this period can be conveniently considered together. Phase A consists only of the raising of the sunken passage within the sweatroom. This blanked out a firebox sill, introducing a sweatroom door-sill instead, but otherwise all units of the earlier phase B continued to function. Figure 9.46 presents a full summary of the plan in three-dimensional form, for comparison with what is known of earlier phases thus illustrated. Solid lines are used here on an assumption of symmetry, What was not actually seen is indicated in the plan and sections of Figure 9.47, and in the partial roof-plan of that figure. In the perspective drawing, at the upper left of that figure, and in Figure 9.58, there is no effort to differentiate what is restored from what was seen in place. It is perhaps likely that the ceiling of the enclosing building was not smooth, as shown in Figure 9.47, but consisted of exposed beams and cross-poles resting on the semivaulting, as suggested in Figure 9.57. These drawings tell the complete story of our reconstruction, and if they are studied in connection with the photographs provided, it will be apparent that very little uncontrolled imagination has been used. However, since the building is unique, a certain amount of textual description and comment seems desirable.

## Basal Platform

A new stairway, Unit 11, is assigned to this period, but it may belong earlier. It was wider than the stairway which preceded it, Unit 29, but its side wall was not searched for, so its precise width as reconstructed in Figure 9.46 is conjectural. A cross section through it appears in Figure 9.53. It may have extended on either side indefinitely, as alternatively reconstructed in Figure 9.58, but the subsequent discovery of the end of the earlier stairway, just covering a building platform, argues against this.

The stepped-up rear portion of the basal platform was extended forward about a meter by Unit 10 (compare positions of the faces of Units 14 and 10 respectively in Figures 9.45 and 9.46). This change could be assigned to any phase after P-7-2nd-D, but it probably is connected with the forward extension of the building platform in the latest period.

## Building Platform

As stated before, the building platform of the prior period was of the stepped-top variety, and the higher rear portion was now raised somewhat. But this further raising appears to have been confined to the interior of the enclosing building (Unit 7 in Figures 9.48, 9.53 and 9.56). The side faces and presumably the rear face of the old building platform continued to function in this final period. However, there was a slight forward extension of the building platform, and a corresponding extension of the supplementary platform (Units 9 and 9' in Figure 9.53).


Figure 9.59 Ruin of central and right (observer's left) portion of Structure P-7-1 st, as seen from front after partial excavation of enclosing building; workman stands in doorway between medial wall and sweat room, behind ruin of pier-like section of front wall; range pole marks end of sunken passage in prior period of Strs. P-7-2nd-F to - $A$.

## Enclosing Building

The enclosing building of this latest period is entirely new. Since it rests in large part on an older building platform which was not lengthened, it probably was no longer than the building which it presumably replaced, and its rear wall occupied the same position as the older rear wall (Unit 4 over Unit 12 in Figure 9.56). Its front walls rested almost entirely on the forward extension of the old building platform, so the new building was surely a little deeper than the old.

One is tempted to liken this building to a doublerange palace, with modifications in the plan to allow for insertion of the sweatroom. However, it does not show the Janus façade, and at this site we never find the stepped-top building platform in a palace, nor roomdepths approaching those found here. The front-rear dimensions of the building platform in earlier phases suggest that the typically narrow rooms of the palace type were never suitable for enclosing buildings of sweathouses. Figures 9.8, 9.9, and 9.25 through 9.30 seem to tell the same story of deep enclosing building rooms at other sweathouse mounds, whether or not the building platform may have been of the stepped-top variety, and whether or not there may have been two ranges of rooms in the enclosing building.

## Roof

At no known sweathouse mound of this site is there any evidence of vaulting or semivaulting for the enclosing building, except in this final period at Structure P-7. Here it is considered to be certain. Evidently this use of semivaulting was, in part at least, dictated by the necessity


Figure 9.60 Structure P-7-1st-B, showing right front corner of enclosing building (left foreground in picture) with sweat room beyond; note remnants of medial molding and upper zone.
for deep rooms, which the builders of the period did not feel competent to roof with the complete vault.

As may be seen in the drawings, the semivaulting rests on outer and medial walls except in the region of the sweatroom. There, instead of merely crossing the roof of the latter, we have a hollow square of masonry, consisting of semivaulting and, at the rear only, a complete halfvault. This enclosed a functionless chamber or air space, similar to such features in roof-combs at Tikal. The roof evidently could not be counted upon to remain absolutely water-tight, for this chamber was provided with a drain, about 12 cm . wide and of an equal height. This appears in longitudinal section in Figure 9.47, Section K-L, and the opening appears in the perspective drawing of that figure, and in the photographs of Figures 9.63 and 9.65. After passing below the semivaulting it continued on into the chamber at least 20 cm , but here it was an open channel about 5 cm deep, the sides formed by edges of slabs in the floor of the chamber, which, in a sense, was also the roof of the sweatroom.

Mason's notes record presence of slabs elsewhere in this floor. They were presumably merely the top of the completely vaulted roof of the sweatroom. If this floor, or roof, was plastered, the surface had disappeared, nor did any trace survive on the inner sides of the semivaulting and vaulting which formed the chamber.

These inner sides were much cruder than the exposed outer sides, as may be seen by comparing Figures 9.63 and 9.65. On the inner sides, facing the chamber, the soffit slope generally began about 50 cm above the base, instead of directly at the base, as on the outer sides. At some points at least the inner slope was about 17 degrees

Table 9.18 Table of Selected Stratifications

| Figure | 9.48 | 9.53 | 9.51 |
| :--- | :--- | :--- | :--- |
| Str. P-7-4th-B | 34 | 35 |  |
| Str. P-7-4th-A | 32 |  |  |
| Str. P-7-3rd | $28^{\prime}$ | 30 |  |
| Str. P-7-2nd-F | $26^{\prime}$ | $25^{\prime}$ |  |
| Str. P-7-2nd-E | $\left(26^{\prime} \mathrm{X}\right)$ |  |  |
| Str. P-7-2nd-D | $18^{\prime}$ | $18^{\prime}$ |  |
| Str. P-7-2nd-C |  | $17^{\prime}$ |  |
| Str. P-7-2nd-B |  | 16 |  |
| Str. P-7-2nd-A |  |  | $5^{\prime}$ |
| Str. P-7-1st-B |  | 1 |  |
| Str. P-7-1st-A |  |  |  |

from vertical, but outside, where measurable, the slope was about 23 degrees. It is hard to imagine any function for these inner soffits unless there was a conscious use of the cantilever principle, but the design and execution failed to provide as much balance as was possible. Nothing was found in the chamber except potsherds in the debris which covered the floor. These undoubtedly originated in the roof material.

The medial and upper moldings of the sweatroom caused us at first to suppose that it had once stood in the open and not within an enclosing building. The fact that these moldings do not run across the rear should have given us pause. Examination of an exposed section later showed that the semivaulting is structurally continuous with the upper zone of the sweatroom, and it is also structurally continuous with the semivaulting on the right medial wall. There is no doubt that the whole enclosing building and the sweatroom were built as one operation, though of course there were structural sequences within the phase. The free-standing walls were allowed to harden before the roofing commenced, since the plaster on the right side wall was seen to curve in and run over its top, below the semivaulting.

## Evidence for Semivaulting

Thus far, what has been said about semivaulting might have applied just as well to complete vaulting which had failed to survive to full height. A considerable number of factors make such a hypothesis untenable.

1. Since Maler's extra walls were imaginary, complete vaults here would have covered much wider spans than any known for a Classical Period building. There are three features in the design which indicate that a major advance in this direction was not being planned for. A comparison with the two "most advanced" completely vaulted buildings at this site is instructive here (Table 9.18).

An absolute measurement the front walls here are somewhat thicker than the thinnest ones supporting complete vaults, but this is probably because they are decidedly higher; in addition to the weakening effect of the greater height of these walls their thrust-resisting capacity is further reduced by front doorways much wider than in known completely vaulted buildings at this site; and the amount of this thrust is increased to more than was necessary by the insetting of the upper zone. This zone was structurally continuous with the semivaulting, and had it not been inset its balancing effect would have been greater.


Figure 9.61 Structure P-7-1st looking down into front room or gallery after its partial excavation; sunken passage partially hidden by debris in foreground, which also hides lower portion of sweat room at observer's right.
2. The soffit slope of what survived is about 23 degrees from vertical, except that, after rising for about 1 m , it seemed to curve to a less steep angle. Any believable continuation upward to form complete vaults would make the vault height

Table 9.19 Structures P-7-1st, J-11-1st, and F-4 Vaulted Buildings

|  | Str. | Str. | Str. |
| :--- | :--- | :--- | :--- |
|  | P-7-1st | 3.7 | J-11-1st |

considerably greater than that of the walls, that is, more than 3.2 m . Such high vaults could not have fallen so as to leave such shallow deposits of debris as are shown in sections A-B and G-H of Figure 9.47. The situation in the chamber over the sweatroom is also instructive. When found, some of the soffit slopes had survived on all sides. This shows that, though this semivaulting was not as well-balanced as it might have been, no large complete masses of it had toppled outward. It had been disintegrating gradually, and all fallen material which had originally sloped out over the chamber must have been found in it.Yet Mason's notes record a minimum debris depth of only 50 cm . With complete vaulting the depth of debris on the chamber floor would have been much more than this, everywhere.
3. Specialized capstones were used over the sweatroom and over the vaulted interior doorway which did not fall. Such stones would have been provided for complete vaults over the rear rooms and front gallery of the enclosing building. They were not noted in the debris there.
4. At three places, indicated in the roof-plan of Figure 9.47, firmly embedded slabs projected horizontally about 15 cm beyond the line of the soffit slope. They were all at the same level, 1.3 above the spring, and this was the highest level reached by the soffit slopes anywhere. One of these slabs is at the junction of the slopes of semivaulting on a medial wall and the sweatroom, and was firmly embedded in both elements. The slabs had not been pushed out by roots. To allow for them we have reconstructed a molding at the top of the semivaulting. In order to incorporate them in a reconstructed complete vault the latter would have to be of the stepped variety, for which there is no evidence elsewhere at the site.
5. In Figure 9.59 it may be seen that the maximum surviving height of what survived above the right medial wall is about the same, from end to end. The fact that it is a little lower at the observer's left is due to minor excavation there. On the completely vaulted hypothesis, this element originally rose to at least double the height shown, and it could scarcely have disintegrated everywhere at the same rate, so as to produce so close an approximation to a level top for what remained, when seen from the front, this maximum height being greater than the maximum anywhere else.


Figure 9.62 Structure P-7-1 st-B, front façade of sweat room (door sill of Structure P-7-1 st-A removed; man stands on excavated portion offloor of enclosing building).
6. There was a plastered concrete roof at about this level, a fact which is proved by the character of material on the surviving surface of this semivaulting above the medial wall, compared with material in the debris on the floors of the enclosing building.

Scattered over the surface of the semivaulting were many water-worn pebbles-gravel from the river together with a few weathered sherds. Gravel was also noted on the highest portions of semivaulting as it survived over the sweatroom, and also near the building's right front corner. Crushed limestone rather than gravel is the normal residuum of concrete at this site, and careful examination of exposed sections in this building showed


Figure 9.63 Structure P-7-1st, seen from right rear ( N ), showing (from observer's left to right); sweat room with post-Columbian large hole, small drainage hole, and superimposed semivaulting; rear face of right medial wall and semivaulting; outer face of end wall of enclosing building from jamb of side doorway to right front corner.
that gravel was not used in floors, nor in plaster or hearting of walls or surviving semivaulting. The search for gravel was extended to cuts through fallen debris. At various levels, and in all parts of the enclosing building, cuts through the debris revealed lenses and often more or less continuous bands of gravel, sometimes with a few sherds. Thin limestone flakes seemed to be more plentiful in these lenses and bands, but it was the gravel which defined them. The highest one noted was 1.8 m above the floor of the left side of the front gallery, where roofcollapse had been complete. Elsewhere they were never more than 60 cm above the base of the debris, sometimes at the base itself.
7. In the front gallery, besides the deposits of loose gravel, we were able to find several intact fragments of concrete, which consisted of gravel, the pebbles being held together by a very hard dirty white mortar, this color contrasting with the yellowish mortar characteristic of that in walls and semivaulting. This special concrete occurred in thin sheets, the thickness being from 2 to 5 cm , so that frequently the same pebble was visible from both surfaces. In several cases these fragments were
found with a coating of lime plaster, like floor plaster, on one side only. In the debris, this might be found face up or face down. The most satisfactory example was near the center of the front gallery in the cut shown in Figure 9.61. It lay, plastered side up, on a deposit of crushed stone and earth of a minimum thickness of 7 cm , the latter directly on the floor.

On a final check-up, a loose but intact fragment of the gravel concrete (without the final plaster coat) was found within a few centimeters of the surface of the semivaulting on the nearby right medial wall, proving that there, as well as in the fallen debris, the loose gravel was the residuum of an unexpectedly thin sheet of a special sort of concrete. Obviously the gravel originated from a roof consisting of a fairly thick layer of ordinary concrete, probably containing occasional sherds and thin limestone flakes, on which a thin layer of gravel was spread before the final plastering. If this thin sheet of gravel had originally been spread at a level very much higher than the maximum surviving height of the vaulting, it would have been absent or very scarce, instead of plentiful, on the surviving surface above the right medial wall. Various

Table 9.20 Average Dimension Tables: Basal Platform Units

| Phase | Unit | Height | Length | Depth | Slope |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Str. P-7-4th-B and A | 35 | 1.6 | $?$ | $?$ | 82 |
| Str. P-7-3rd to 1st-A | 30 | 1.9 | $?$ | $?$ | $82 *$ |

Note: Starred dimension is an approximation usually based on reconstruction.
other lines of evidence requiring a roof not much above this surviving height are thus confirmed. The spaces between elements of the vaulting, thus limited as to height, must have been bridged by wooden beams.
8. When complete vaults fall, experience shows that vault-stones and/or capstones frequently are in actual contact with the floor, or nearly so. Where wooden beams are used in the roof, ordinarily these would rot and let down roofing material before walls (or walls and semivaults) began to disintegrate, so that we should expect most building stone to be elevated somewhat in the debris. This was the characteristic condition in the enclosing building here, though it cannot be said that no building stone whatever reached the floor.

## Miscellaneous Dimensions

The right medial wall, which survived completely, and still supported more or less complete semivaulting, was 3.2 m high, though on the rear side the stepping-up of the floor reduced the visible height by about 30 cm . Near the right front corner, on the outside where medial molding and part of the upper zone survived, the end wall was measured as 3.2 m high. Had the medial molding been exactly level, a decided slope of the front gallery floor would have increased this dimension, if anything, so 3.2 m is a minimum, not maximum figure for walls forming that gallery. To the rear, as has been noted previously, the outer sides of the outer walls appear to have been based on the stepped-up rear portion of the old building platform, the inner sides sometimes being founded on a secondary slight raising of that element. Nevertheless, the spring of the vaulting at the rear of the sweatroom was at the same level as elsewhere, so it is safe to conclude that side and rear walls were lower by an amount sufficient to compensate for their more elevated bases. Therefore, presence of the stepped-top building platform probably did not result in stepping up the exterior moldings and roof at the rear.

The semivault height was 1.3 m , as determined by the supposed molding slabs at the ceiling, already mentioned. The slope was about 23 degrees from vertical, disregarding a tendency toward a less steep slope at the top. Disregarding the molding slabs, which might have been placed only between beams, the exposed lengths of
the latter were no more than about 2.7 m , considerably less than the wooden lintels which must have spanned the middle doorway of the front gallery (Table 9.21-9.23). As reconstructed, the roof beams rest above the molding with an exposure of only 2.4 m .

## Benches

Excavation was sufficient to make it fairly certain that there were only the three benches shown in Figure 9.47, unless others were placed in the rear corner of the left rear room, or against one or both end walls of the front gallery. The benches in the rear rooms, so far as known, are indistinguishable from some of the all-masonry thrones of the palaces. Their heights were 59 and 63 cm . Each certainly had a masonry back-screen, but only the lower portions survived. Thicknesses of these backs were measured as 15 cm and 20 cm respectively, the exposed top measuring about 0.9 m by 1.8 m in the case of the completely excavated sample. The bench in the front room, also masonry, is puzzling. It is much narrower than expected $(48 \mathrm{~cm})$ but there was no sign of a slab top, or of legs to support such a slab top at the front. Thus we have benches, but none of the type found at Structure $\mathrm{N}-1$, unless some of the latter had back-screens which failed to survive.


Figure 9.64 Ruin offirebox, Structure P-7-1 st, after removal of floor and sill, exposing complete on-end jamb stone; inner face of left wall at center, masonry rear wall at left of picture; at right, crude masonry extension of left wall of sunken passage, abutting jamb stone.

Table 9.21 Average Dimension Tables: Supplementary Platform Units

| Phase | Unit | Height | Length | Depth | Slope |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Str. P-7-4th-B and A | None? |  |  |  |  |
| Str. P-7-3rd | None? |  |  |  |  |
| Str. P-7-2nd-E and F | 25 | 0.4 | $19.0^{*}$ | $11.2 *$ | V |
| Str. P-7-2nd-D and B | 19 | 0.4 | $21.2 *$ | $11.2 *$ | V |
| Str. P-7-2nd-A | 19 | 0.4 | $21.2 *$ | 6.0 | V |
| Str. P-7-1st-B and A | 9 | 0.4 | $21.2 *$ | 6.0 | V |

Note: Starred dimensions are approximations usually based on reconstructions; the letter $V$ means approximately vertical.

The rear rooms, because of the nature of their benches, seem classifiable as thronerooms. The throne in the right rear room was built after the floor as well as the medial wall had been plastered, but this seemed not to be the case in the other room, and both may date from the earliest of the two phases of this final period, to which we have assigned them. The hypothesis can be entertained that the double-range enclosing building developed in response to a need to provide secluded thronerooms as well as a large open room near the sweatroom.

The narrow bench in the front gallery rests on floor plaster which turns up to the medial wall or (possibly) which once turned up to an earlier medial wall, since torn out. The final floor plaster in front of the bench turns up to it (Unit 2 in Figure 9.53). In this case also it is impossible to say with assurance that we are dealing with a feature belonging in a secondary phase. The original height of this bench could not be ascertained with certainty. The surviving height was 50 cm .

## Sweatroom

In plan, this room measures 4.8 m by 3.8 m on the outside, and does not differ notably from what is known of sweatrooms at other mounds. It is the only completely vaulted one and, probably for this reason, the only one surviving to any considerable height.

Façades
The height as seen from the front is the same as the height of the walls of the enclosing building, minor variations aside. Thus the spring of the vaulted doorway to be seen in Figure 9.59 is 14 cm lower on the sweatroom side, The rectangular moldings are 15 cm high, project 2 to 7 cm , and provide the effect of a vertical upper zone 1.1 m high. The medial molding forms the floor of each of the two niches in this upper zone on the front side. The niches are best seen in Figure 9.62 and in the perspective of Figure 9.57. That on the left (observer's right) was found badly damaged, probably by vandals before they shifted their attack to the right side. The well-preserved right niche varies from 65 cm in width at the bottom to 57 cm in width at the top. This tapering is caused by the nonverticality of the outer side only. The lack of symmetry is noticeable. The depth of the niche, measuring from the edge of the molding, is 38 cm . The back, as it rises, curves forward to the edge of a single slab, set flush with the wall like a lintel. The lower edge of this slab, at the top of the niche, is about 20 cm below the upper molding.

One wonders if the moldings and niches are reminiscent of sweatrooms which did not stand within enclosing buildings. The effect of an independent sweatroom building is enhanced by setting the spring of the superimposed semivaulting back from the edge of the

Table 9.22 Average Dimension Tables: Building Platform Units

| Phase | Unit | Height | Length | Depth | Slope |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Str. P-7-4th-B and A | 34 | $0.5^{*}$ | $?$ | $?$ | $?$ |
| Str. P-7-3rd | 28 | 0.4 | 12.35 | $7.3^{*}$ | V |
| Str. P-7-2nd-F | 26 | 0.4 | 12.1 | 7.3 | V |
| Str. P-7-2nd-E | $26,26 \mathrm{X}$ | 0.4 | 12.1 | $9.5^{*}$ | V |
| Str. P-7-2nd-D to -A | $26,26 \mathrm{X}, 18$ | 0.4 | 19.7 | $9.5^{*}$ | V |
| Str. P-7-1st-B and -A | $9,13,18$ | 0.65 | 19.7 | $11.2^{*}$ | V |

Note: Starred dimensions are approximations usually based on reconstructions; the letter $V$ means approximately vertical.

Table 9.23 Average Dimension Tables: Building Units of Str. P-7-1st-B and A

| Units | Section <br> Table |  |  |  |  | Façade <br> Table |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  | W | R | M | R' | W $^{\prime}$ | Length | Depth | Width | Height |
| 4 (encl.bldg.) | 0.9 | 3.8 | 0.9 | 3.6 | 0.9 | 19.5 | 10.0 | 2.5 | 3.2 |
| 8 (sweatroom) | 0.8 | 2.2 |  |  | 0.8 | 4.8 | 3.8 | 3.2 | 3.2 |
| 8 (same, int.) |  |  |  |  |  |  | 3.3 | 2.2 | 0.8 |
| 6 (firebox) |  |  |  |  |  | 2.0 | 1.1 |  | 1.1 |
| 6 (same, int.) |  |  |  |  |  |  | 1.0 | $0.4 *$ |  |

Addendum: Maximum dimensions, lintel of Unit 8, $1.3 \times 0.8 \times 0.3$.
Note: Starred dimension is an approximation based on reconstruction.
upper molding, instead of offsetting it as on medial and outside walls of the larger building. At the rear there are no moldings, and there the semivaulting springs without either offsetting or insetting, good evidence that offsetting of vaults at the spring-line was a matter of esthetics and not of structural convenience.


Figure 9.65 Structure P-7-1 st, seen from right (NW); end of wall of enclosing building in foreground, from jamb of doorway; sweat room and semivaulting in background.

The door is capped by a heavy lintel, 1.1 m above the passage floor, but only 73 cm above the sweatroom floor on either side of the passage. In width it varies from 72 to 83 cm .

At the rear and along most of the sides, the effective height of the new sweatroom is reduced by the stepping up of the building platform. This reduces the actual height of walls of the enclosing building at the rear, but both sides of those of the sweatroom are based structurally at the lower level. This is doubtless connected with the fact that on the inner sides these walls had to reach down to the sweatroom floor at the same level as the floor of the front gallery. We have inferred that this sweatroom
replaces another of similar size in the same position, which, in the phase preceding this one, functioned with a stepped-top building platform. We must further infer that in the neighborhood of the sweatroom there was some excavation into the old higher portion of the platform (Unit 13), in order to remove the old walls, and base the new ones at the lower level. Failure to find the floor of Unit 13 near the right side confirms this inference (Fig. 9.48), and similar conditions were noted at the left rear corner.

## Vaulted Roof

The vault slopes in from all sides, covering a room-area measuring 3.3 m by 2.2 m . Much of the plaster on the soffit slopes survived, and no damage had been suffered by the vault except for the large hole broken through wall and vaulting on the right. The appearance was one of very neat and accurate construction, but measurement showed that this appearance of accurate construction was misleading.

There is no offset at the spring. An average wall height, from floor to the spring, can best be taken as about 72 cm , though in one place this was measured as 68 cm and in another as 90 cm . The capstones vary as much as 4 cm in height above a single point in the short distance from center to one end. Assuming a spring everywhere at the same level, the average vault height was 2 m , and, disregarding minor differences in floor level, the caps may be said to be 2.7 m above the floor on either side of the sunken passage.

This seems very high for a sweatroom, but the soffits slope in from all sides so that the room could not have held a steam cloud nearly so large as a semivaulted room of the same maximum height. Apparently all four slopes were intended to be the same, and if we average them they seem significantly different from the slope of the semivaulting on the enclosing building. Careful measurements yielded slopes of 25 and 29 degrees on the
front-rear cross section, and 25.5 and 27 degrees on the longitudinal section. The average slope of 27 degrees is certainly much steeper than it needed to be here. One wonders if the wall heights of the enclosing building were determined upon first, the sweatroom being designed to reach that pre-determined height, with a roof of ordinary thickness. There were no vault-beams.


Figure 9.66 Right front corner of enclosing building, Structure P-7-1st, after clearing to expose remnant of upper zone; jamb of doorway in end wall at observer's left.

## Firebox

This important component would have yielded more information than it does, had it not been partially destroyed by human agency. It probably did not differ greatly from the firebox of Structure N-1-1st. As in Figure 9.11 for that mound, in Figure 9.57 for this one we show a cross section combined with onehalf of a three-dimensional reconstruction.

In both cases the jambs of the opening were monolithic, but here the on-end construction does not extend to the whole front of the box. Here as there, a firebox sill is present, but the jamb-stones do not rest on it-the sill is fitted between them. It was present from the first, however, since the rear wall (Unit 6") was based at the level of the sill, as was the inner side of the side wall. The photograph of Figure 9.64 shows, from left to right, the rear wall, the inner side of the left side wall, and the left monolithic jamb.

We know that the firebox rose (at the rear at least) to the spring-line of the vault-about 70 cm above the sweatroom floor. This is proved by plaster turning out to its former top at this level. The surviving part of the rear wall (Unit 6") had an approximately level top, a fact which bolsters our reconstruction to a slight degree, but anything above this is conjectural. In Figure 9.57 we have suggested
a sherd wall in front of Unit 6", in order to account for large numbers of sherds found within the box. Unit 6 " itself, of masonry, has a slight but definite slope.

This firebox functioned with the sunken passage of the prior period, possibly but not surely after a slight raising of its walls to compensate for rising of the floor level with successive earlier resurfacings. Had there been no change other than this, just in front of the box, the passage would have been a little wider than elsewhere. This was prevented by extending the old walls backward from the corners where they diverged. These new walls (Unit 5) were comparatively crude. In Figure 9.64 one of these walls is seen ending against a jamb-stone of the firebox.

The floor of the box was of earth or plaster, as at Structure $\mathrm{N}-1$, and there was evidence of extreme heat here as there. As has been stated, in the final phase of the period, within the room, the floor of the sunken passage was raised to the level of the box by Unit 1 .

## Measurement

We do not have many accurately located points except for the final period, and in the plan for that (Fig. 9.47), many points were seen far above floor level. Consequently, this is not a suitable mound at which to draw fine distinctions with respect to accuracy in laying out and executing plans. Nevertheless a few observations seem justified.


Figure 9.67 Broken section through right end of wall of enclosing building, Structure P-7-1 st; squared blocks at lower left and in jamb of doorway.

When Unit 26, the building platform of Phase P-7-2nd-F, was constructed, the right side wall formed an obtuse angle of about 92.5 degrees with a line joining the two front corners. The left side wall formed an obtuse angle of about 95 degrees with this line, so the two sides diverged by more than seven degrees. The sunken passage met this corner-to-corner line at a very close approximation to 90 degrees. The platform did not show the parallelogram form so evident at Structure N1, but it was far from a proper rectangle. It was surely significantly longer along the rear than along the front. The front was bisected by the passage, with an error of only a few centimeters, indicating accurate linear measurement there. But if the inner end of the passage had been located by equally accurate measurements from the sides, it would have bisected the platform as a whole with greater accuracy than was observed, and the passage would have met the line joining the front corners at a less close approximation to a right angle. The latter line does not accurately locate the two sections of the wall. At the passage each of these is 20 cm or so forward of this line.

When this platform was extended to the rear by Unit $26^{\prime} \mathrm{X}$ (as known on the left side only) the addition to the side wall did not run back on a prolongation of the line defining the left side of the original platform, but on a line orientated differently by about 5 degrees. As a result, in the complete composite platform, the greater length of the rear was doubtless retained, but it was not increased, though a resulting bulge in the composite side wall must have been noticeable. Presumably early carelessness was now noticed.

In the final period, the plan of the sweatroom includes inside corners known at floor level. These form a fairly accurate parallelogram, the divergence from rectangularity being about two degrees. There seems to have been no similar tendency in the plan of the enclosing building, which closely follows its platform, most of the latter dating from the prior period. In contrast to the still earlier platform Unit 26, this one is noticeably longer at the front than at the rear, if we correctly interpret the positions of known parts.

## Proportions, Decoration, Function

In all phases there seems to have been a centrally placed sweatroom of about the same small size, but the building platform grew larger as time went on. From first to last it was much deeper than was necessary for the sweatroom only, and it probably was always much longer than necessary. After the two phases of the earliest of the four periods this latter characteristic is certain. Such platforms, deep in relation to length, and too large for a small room centered at the rear, are non-characteristic of local temples and palaces, and are known elsewhere at the site only in association with more definite sweathouse
indicators. Their presence here confirms the sweathouse function in phases where more striking evidence is scarcest. Whether they supported enclosing buildings from the first is uncertain, but there is good evidence that they did so during the later phases.


Figure 9.68 Inner faces of walls and semivaulting above sweat room, Structure P-7-1st, showing junction at left front corner of chamber.

No sculptural or carved stone decoration was encountered, but in the final period two niches in the façade of the sweatroom suggest the presence of clay idols there. There was no evidence that anything had been permanently fixed in these niches. The niches, combined with moldings as if for an independent building, show clearly that the sweatroom was the chief center of interest of the whole structure. The provision of throne rooms in the final phase (and possibly earlier) suggests that the sweathouse ceremonies had more in common with those practiced in palaces than with those for which the temples were designed.

A T-shaped opening penetrates the right medial wall, and presumably was balanced by another in the left medial wall. Such openings have been found nowhere else at this site. The surviving opening is rectilinear with rounded corners. The maximum height and width is 36 cm and 30 cm respectively. This opening surely had a symbolic meaning which is here indirectly associated with sweat-bathing. Seen from the rear, it appeared above the throne (Fig. 9.63).

## Dating

Sherds in the firebox of the latest phase presumably came from a sherd wall there. The reader should be reminded that vandals preceded us here. Included among these sherds was the Polychrome C sherd illustrated by Butler (Figure 4.3). The masonry of the final enclosing building seems identical with that of the technically most advanced vaulted palaces of the latest


Figure 9.69 Ruin of semivaulting over sweat room, Structure P-7-1 st, seen from front left corner; workman holds rod, marked in centimeters, on floor of chamber (the roof of sweat room); debris in chamber has been cleared.
period of the Acropolis. Similar thrones may be original in this sweathouse, but secondary in the palaces. Though ceramics were very scarce here (apart from the firebox area), and inscriptions nonexistent, it is probable that the final structure, with its semivaulted enclosing building, belongs in a final period of architectural activity for the site as a whole.

We have no reliable yardstick for measuring how far back from this the entire sequence goes. Included among sherds from Position 6 (Table 9.24) was an example of Polychrome E (Butler classification) such as has been found on bedrock at the very beginning of the architectural stratification on the Acropolis; and also a sherd of a lipped bowl of the form expected on the latest Acropolis level, and at the surface everywhere. The sherds of Position 6 result from digging in the left rear room, which penetrated from the surface there down into Unit $18^{\prime}$. The early type sherd may have come to rest during the phase of Unit 18', that is, during the sixth of the phases of the sequence, counting forward in time. However, the hearting of this and other platform units
seemed sterile during later times, and an early sherd may have been redeposited in late times.

The fact that the end of the buried basal platform stairway, Unit 29, lines up with the end of the building platform of P-7-3rd, argues for their contemporaneity. Since this end of the stairway rests on the bedrock, it is clear that during the two earliest periods (comprising the three earliest phases) the East Group plaza had not been raised sufficiently to eliminate all exposures of bedrock. It is unsafe to infer great antiquity for these periods from this circumstance alone, since such exposures were tolerated in late times in the West Group. Nevertheless these phases pre-date the latest plaza floor, and the earliest may represent the first building at this spot.

The fact that a minimum of eleven phases must be distinguished, coupled with good evidence that most of them surely involved significant change, shows that this mound was the site of a sweathouse for a very considerable time, whatever that may have been in terms of years or katuns (Tables 9.20 to 9.24).

Table 9.24 Operation E-2 Object Table

| Position | Sherds | Remarks and Miscellaneous Objects |
| :--- | :--- | :--- |
| 1. Base of building | -3 | -2 (human bones) |
| 2. Soil of trench in sweatroom <br> 3. Under lintel of sweatroom | -5 |  |
| 4. Interior of sweatroom | -8 | -6 (fragment of bright red plaster) |
| 5. In firebox | -1 |  |
| 6. Northeast (left) rear room | -10 | -10 (flint blade) |
| 7. Same, near bench (Unit 3') | -7 | -7 (pumice stone) |
| 8. Northwest (right) rear room | -9 |  |
| 9. Particular locations not noted | -4 |  |

## Masonry Notes

Fills
Pure broken rock, small size, in building platform Units 26 and 18; solid earth and stone in raised rear portions of building platform where seen (Units 13 and 7); not penetrated or recorded elsewhere.

## Outer BuildingWall

In final phase, tabular stone, blocks frequent, much chinking with thin flakes, bonding at corners (see Figures 9.60, 9.63, 9.65, 9.66); tops plastered.

## InteriorWalls

Well-preserved in places in final period, but masked by surviving plaster; upper portion of sweatroom shows many thin slabs, little chinking, but this is far above the vault-spring inside (see Figures 9.59, 9.62).

## Semivaulting

In final period, blocks as well as slabs, considerable chinking as in outer walls (see Figures 9.59, 9.61, 9.63, 9.65, 9.68).

Vaults
In final period, sweatroom only: cross section available where hole was broken through. Built mainly of long to medium-long slabs tailing deeply into the hearting, separated by thick beds of thin small slabs, spalls and mortar; vault is structural unit from sloping inner to vertical outer face; lines of slabs leveled up at outer face only to form moldings; cross section in niche shows structural continuity with semivaulting above; specialized capstones with edges chipped to provide good fit. Semivaulting of enclosing building resulted in complete vaults over interior doorways, specialized capstones observed over the surviving one.

## Concrete

Crushed limestone and lime mortar for floors in all phases; roof of final period provided with thin cap of gravel concrete.

## Plaster

White lime for floor of all periods, and for final layer of roof in final period. Turn-ups indicate walls were plastered as early as Structure P-7-2nd-C and presumably they were plastered in all phases (Table 9.24).

# Unclassified Buildings and Substructures 

## 1. Structure F-3, Linton Satterthwaite

The general plan of presentation in this publication assigns structures of four functional types to as many Parts of the report. From Part 7 to Part 9 inclusive these types are Temples, Palaces, Ballcourts and Sweat Houses. There is a residuum of mounds about which we know something, and among these are the ruins of several buildings for which functions cannot be deduced with the criteria at present available. These, together with a platform almost certainly supporting an unexplored building ruin, are gathered together here. Among them is Structure V-1. A temptation to label this as a Dwelling, at least in its latest phase, has been resisted. In some ways the unclassified buildings are the most interesting of the lot, simply because we know least about their uses. Their classification on a functional basis may become possible in the future, when the largely unknown house-mound areas of several Maya sites have been systematically sampled.


Figure 10.1 Isometric perspective reconstruction of Structure F-3, with part of Court Floor 2 cut through to show original platform height. At right, alternative reconstruction of building; also sketch of corner stones at four times the given scale.

## Preliminary Remarks

Before our superficial excavations in this mound a considerable expanse of outer rear wall surface showed at the building's left end. Here it stood to full or nearly full wall-height, but no part of the vaulted roof had survived. The mound appeared much higher from the front and from the right end than from the rear or from the left end, due undoubtedly to erosion from the hill rising sharply in those directions. Excavation, by Satterthwaite in 1934, was confined to a center trench and pits, the objective being identification of the roof-type and cross-section dimensions. A little clearing was done at the left rear corner to locate it as a basis for reconstructing the plan without digging it out. Digging was with only intermittent supervision. No points were surveyed or triangulated, so the plan (Fig. 10.1) must be shown as rectified. We neglected to take levels on the structural units, so the sections are based on straight measurements, except mound surface lines, which reflect careful work with the leveling instrument. The chief interest in Structure F-3 lies in the fact that it was a vaulted building of medium vault-span index in a peripheral location. Also interesting are the presence of a portable altar on the floor, its narrow center door, and the possibility that there may have been only one door (Fig. 10.1).

Building and substructure units have been lettered C to A , with no reliable data on whether they are chronologically sequential in more than a mere structural sense, except that they are alike in masonry. The structure faces east, probably close to due east, judging from Parris' location of the mound before excavation.


Figure 10.2 Plan and Sections of Structure F-3. Note that center doorway only is certain.

## Court of Structure F-3

Originally the court was behind and about 1.5 m above a broad platform which itself is apparently a leveling of the Northwest Group Plaza, opposite Structure J-29. Both platform and court are probably adaptations to terrain. Our little court, and a higher level to the rear, have the effect of carrying the approximately level plaza area as an enclave a short distance up a small valley, leading to the saddle between two Hill AB peaks (see site map, Figure 1.1). Structure F-3 faces the side of this court.

After erection of Unit C the court floor was raised 60 cm (Figs. 10.1 and 10.2). This upper floor (Court Floor 1) slopes noticeably down toward the plaza (south), while the lower one apparently slopes down somewhat from east to west toward the center of the court. Both slopes may apply to both floors, and would be useful for drainage.

We have no data on the extent of the lower court floor, and remains of other structures on it may be
concealed by the later fill. But there seems to be no sign of structures other than F-3 facing this court as finally raised, except an end of Structure F-4, which is provided with a doorway.


Figure 10.3 Inner building-wall masonry. Rule stands on floor and against rear wall. Portable altar in situ.

Table 10.1 Average Dimension Tables: Platform Units

| Unit | Height | Length | Depth | Slope |
| :--- | :--- | :--- | :--- | :--- |
| C | 1.5 | $7.5^{*}$ | $3.4^{*}$ | 81 deg. |
| B | $0.3-0.4$ | $10.0^{*}$ | $5.9^{*}$ | V |

Note: Starred dimensions are approximations usually based on reconstruction; the letter $V$ means approximately vertical.

## Substructure Units

## Supplementary Platform (Unit C)

We have precise data only on the cross-section. The length as restored is based on location of one corner and on an accurate debris-section (Fig. 10.2). There seems no doubt that this platform stood entirely free. Whether so much of its surface as we show in the reconstruction was exposed along the ends of Unit B is questionable; the corners may not have been rectangular and may have been inset. A centered stairway from Court Floor 2 (the earlier), if ever present, must have been removed, since the later floor runs out from the Unit C wall. But a stairway from this higher and later level might have been missed.

The slope, measured at front center, is considered reliable. We failed to note whether Court Floor 2 runs under this unit.

## Building Platform (Unit B)

This also is known with certainty only by the crosssection. At left rear, corner stones of this unit and of the building were in semi-position. On the spot we concluded definitely that the sides of both were flush; but on examining photographs and considering the fact that wall stones of the building had unquestionably been moved somewhat by large roots, we have restored a 10 cm plinth-like exposure here. It is possible that this should be about 20 cm wide, as was sure at front and back. No data were recovered on run-under of the floor of Unit C. The height of Unit B is 40 cm at the rear, 30 cm at the front, accounting for a building floor slope which was noted but not measured.

## Building (Unit A)

## Plan and Section

Piers and doorways of collapsed vaulted buildings are often invisible before excavation, and there was no visible sign of the central doorway here until after excavation. We dug only at center. Hence we have provided alternative restorations with and without piers and extra doorways (Fig. 10.1). The simpler plan was used on the map of the site. The restored wall-height is slightly more than a required 2 m minimum. Stones surviving above this, in semi-position, may or may not pertain to a medial molding (Fig. 10.7).


Figure 10.4 Cut section through debris in room of Structure F-3. Rule extended to 1.4 m , stands on floor. Jamb of centered doorway at observer's left.

A vaulted roof is restored on the most reliable evidence, short of actual survival. The room debris was 1.5 m deep at center and was largely a mass of slabs such as do not occur in the walls, together with masses of mortar (Fig. 10.4). Specialized capstones were present (Fig. 10.5).

## Portable Altar

This small drum-shaped stone was found in the position shown in the figures, its center about 40 cm behind the line of the front wall or piers and about 25 cm left of a line at right angles to it, and passing through center of the central doorway. It appears in Figure 10.4 in situ and in this same position in the drawings. Floor finishing plaster was good on this floor only in patches, as if partly destroyed by our digging. However, the altar was carefully removed by Satterthwaite. It was level, its base at floor level, and it was right side up, as indicated by markings as if from use on top, and by the rough-worked bottom. There was no finishing plaster on the floor below it, contrary to the situation in the nearby Structure F-4. Dark red paint was noted on the altar sides from the top to at least 2 cm from the bottom, where it fades out.

We can interpret these facts in several ways. The altar may have been set $2-3 \mathrm{~cm}$ into the plaster floor, in the markedly forward and off-center position found, and then painted. This would account for finding no
finishing plaster below it. But the observed disappearance of patches of plaster on the floor generally may have occurred in occupation times, and would also account for this. In such case the altar may have been so set, or may have been merely placed on top of the floor, in either case elsewhere, and have been moved to a damaged floor area at or just before abandonment. Paint near the bottom would tend to disappear with handling, perhaps with sweeping or washing floors. It must be admitted that lack of finishing plaster below the stone, and lack of paint near its base, can be used as arguments against the portable nature of the stone.

Table 10.2 Average Dimension Tables: Stage Elevation

|  | Stage |  |
| :--- | :--- | :--- |
| Unit | Elevation | Depth |
| C | $1.0-1.6$ | 1.8 |

In this connection, a slab of what seemed to be floor material was found in position leaning against the edge of the altar. Two or three sherds and a couple of small bones were noted in the immediate vicinity, above base-of-altar level. Two or three long-bone fragments were found about 15 cm below the altar, in the floor material.

Considering all these facts we have concluded that the floor was probably losing its finishing coat at the time of abandonment, that the stone drum is properly classified as portable, and probably had been pushed from a centered and more rearward position at that time. What was taken as broken floor material leaning against it may easily have been thick plaster fallen later from walls or vault. There was no other evidence suggesting intentional tearing up of the floor.

## Decoration

There was no reported sign of painted or sculptural decoration on any unit. Conditions for preservation of stucco fragments here were better, if anything, than at Structure F-4 where they were found.


Figure 10.5 Capstones from debris of Structure F-3; part of one on right missing; holes in it probably not artificial.

## Narrow Façade Doorway

The doorway width is only 1 m , decidedly narrower than any other outer doorway known at this site, except for stone-linteled steam-room doorways in sweat houses, which in some cases may have been in the façades. The width used in this building is similar to many at Yaxchilan, where heavy stone lintels are common. No fragments of such a lintel were found here. The door was presumably spanned by wooden beams, though a stone one would have been practicable.

## Mound Interpretation

The two debris sections of Figure 10.2 were carefully made with tape and leveling instrument. With floor level known by an exposure of the plinth the room debris depth was known before excavation, and was such as to leave no doubt of a fallen vault. This mound is a good illustration of how fallen vaults can often be distinguished by debris depth alone, without excavation, if there is a clue to the floor level. Notes on the character of the stone visible at surface were not made here.

Table 10.3 Average Dimension Tables: Building (Unit A)

| Section | Table |  | Elevation | Table |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| W | R | $\mathrm{W}^{\prime}$ | Length | Depth | Piers | Doors |
| $0.65^{*}$ | $1.7^{*}$ | 0.7 | $7.5^{*}$ | $3.0^{*}$ | 1.0 ? | 1.0 center |

Note: Starred dimensions are approximations usually based on reconstructions.

Table 10.4 Object Table (Operation NE-2)

| Position | Sherds | Miscellaneous |
| :--- | :--- | :---: |
| 1. Surface to floors of Units A, B, C and Court Floor 2, in trench on center <br> axis running from court to inside rear wall of building, field notes suggest <br> objects are from under floor of building, i.e. in Unit B, at least in part. | NE-2-1 | Few small bones and |
| fragments. |  |  |
| 2. Surface to level of base of Unit C, from pit at outside rear center. | NE-2-2 |  |
| 3. On building floor, or possibly set in it. |  | NE-2-3 (portable altar) |



Figure 10.6 Masonry of Unit C, front center. At top, stones of unit B and, at upper left, of Unit $A$, the building. Rear wall of building shows through doorway (Str. F-3).

## Dating

The masonry suggests general contemporaneity with the vaulted palaces of the Acropolis, as does the vaulted roof itself. The vault-span index of 40 percent is not here limited by space considerations. This proportion of wall thickness to span is almost identical with that of Room 1 of Structure J-6-1st, rather well dated at 9.17.15.0.0, but both span and wall thickness here are less. If piers are found to be absent here the index should be weighted, i.e., made somewhat higher, for comparison. A rear wall thickness of 73 cm , reflected in Figure 10.2, as opposed to 65 cm for the front, is probably erroneous. It is deduced from a circuit of linear measurements without triangulation, and is restored as 65 cm in the section table, in agreement with the front wall (or pier?) thickness.

Sherds of Position 1 (Table 10.4) may date from any time. They were so scarce as to suggest they are from within masonry or some floor. Included is a lipped sherd with orange bar decoration such as was found in the Room 1 fill of Structure J-6. So, while proof is lacking, both masonry and ceramic criteria permit placing the building in the middle of the supposed vaulted period, in accordance with its index.

One mottled sherd from Position 2 is probably from an early-type bottle. Court Floor 1 was not here identified, but the sherds were probably from within it, or possibly from Court Floor 2. As at Structure F-4, nearby, there is this indication that this spot was in use from early to late ceramic times.

## Abandonment

As noted, the paucity of sherds suggests they are from within masonry or floors. Apart from the altar and a few bones and bone fragments, nothing was found. The center of the room, at least, seems to have been left clean.

## Function

This building, like the nearby Structure F-4 next described, contained a portable altar. But that building also is unclassified. If there is but one doorway here, we could scarcely feel secure in classifying this structure as a palace of local type. If, however, it turns out that there are three doorways, such classification might be considered. It would then be much shorter than the shortest three-doorway palace or palace room which we have put in that category, and the shortness of those others seems due to lack of available space, a controlling factor absent here. This building seems to be late, rather than early, and agrees with palaces of all periods rather than with late temples in its simple rectangular planoutline.

If it was a temple, in its simple outline its affinity in this respect is with the early Structure K-5-3rd temple, and, possibly, with Structure O-16. However, the latter building may have had the complex Petén outline. Construed as a temple, Structure F-3 would be the only known vaulted one at this site, which was not on
a pyramid, and if there is one doorway only, the only vaulted temple at the site with this feature.

If it was a dwelling, being vaulted it certainly is not of the type which surface examination leads us to expect in the house-mound areas. It may be considered to lie in such an area since it does not face the nearby plaza and is somewhat retired from it. We lack any positive reason for seeing the dwelling function here.

The portable altar indicates at least intermittent ceremonial use of some sort. The paint on the altar shows that this did not include use of fire.

## Future Work

One or two man-days should suffice to determine whether there is more than a structural sequence between the lettered units, to learn the building-wall height, the corner design of the Supplementary Platform, and whether it had a stairway. There would be a fair chance of finding included sherds, and perhaps a bedrock deposit. Most important, one would like to know whether there are other doorways (Tables 10-1-10.3).

## Masonry Notes

## Fills

Only that of Court Floor 1 seen: solid earth and stone. Some of the stone looked like poor building stone. No data on fill walls.

## Walls

Satisfactory exposures of all units indicate no distinction in masonry types, except that thick tablets and blocks were selected for the top of the building platform wall (Figs. 10.6 and 10.7). Stone in the walls of Units C and A, both outside and in, is medium-size tabular, with many short thick blocks and a few irregular stones and with plentiful
tabular chinking (Figs. 10.4, 10.6, and 10.7). Partial reconstruction of the right door jamb from photograph indicates bonding (Figs. 10.1 and 10.4). Mortar grayish yellow.

## Vault

Debris indicates typical slab type (Fig. 10.4) with typical capstones (Fig. 10.5); remains of much grayish yellow mortar.

## Floors

Court Floor 1 noted as poor; Floor 2 showed crushed stone remains of concrete. Structure floors undoubtedly concrete (memory, no note made).

## Plaster

White finishing plaster seen on room floor, in patches; possibly in good condition before excavation, but absent under portable altar. Gray plaster not noted. No wall plaster seen in position.


Figure 10.7 Masonry of all units, at rear. Face of Unit C shows only in pit. Man's foot is near left rear corner of Unit B (Str. F-3).

## 2. Structure F-4, Linton Satterthwaite

## Preliminary Remarks

About two-thirds of the interior of this building was cleared by Satterthwaite in 1934. Before this no walls showed. The ruin of the building walls was great, and probably most of the damage dates from the time of collapse. Our original objective was merely the determination of rooftype and cross-section dimensions. This objective was expanded to learn the building plan, which is unusual at
this site. Interest was augmented by finding a portable altar in situ. Little attention was paid to substructure components, and none to stratigraphy. The components have been given the Unit designations D, C, B and A (Fig. 10.8). They must have been constructed in this order of time, but whether the sequence was more than a mere structural one was not determined. The structure faces about due south, judging from Parris' location of the mound before excavation.


Figure 10.8 Isometric perspective reconstruction of Structure F-4; at lower left, sketch of corner stones in doorway at four times the given scale.

## Substructure Units

## Probable Basal Platform (Units D and C)

Unit D is reconstructed as partly a continuation of the wall retaining the fill for the court of Structure F-3, which latter is about 25 m to the southwest, facing toward the end of Structure F-4. But the drawing of Units D and C is founded on debris contours only, taken in the main from Parris' map, confirmed by memory and photographs. The height of D is estimated as 1.5 m from a photograph. That of Unit C, 1.5 m , is deduced from accurate levels running to Structure F-3, the plinth of which is 48 cm below the Structure F-4 floor, near the altar. However, if Unit C
dates from the time of the upper court floor, seen only at Structure F-3, it was only about 90 cm high.

Both Units C and D are probably adaptations to natural terrain. The contours of the hill, which rises steeply close behind them, indicate that bed-rock rises gradually under the court, but more steeply under Units D and C, necessitating a higher level for the latter. Unit D is restored as continuous with the court platform, without real evidence. It is quite possible that a stairway rose from the plaza to give direct access to the stage formed by Unit C, in front of the building, and that another stairway connected Unit C with the court of Structure F-3. Without excavation, stairways of the required small projections cannot be deduced from debris contours.

## Building Platform (Unit B)

The cross-section is known (Fig. 10.9). This is similar to that of Structure J-11-1st and we have reconstructed the ends of the platform on that model. The height of lower and upper faces was 35 and 40 cm . We have restored 10 cm for slope of the step-like stage, considering 11 cm of height-difference as due to settling.

## Building (Unit A)

## Plan and Section

Figure 10.9 shows, that the reconstructed plan is quite, reliable, the contour of the mound calling for a left room of about the size of the right one. The partitions between rooms are structurally secondary to the main walls and piers, which they abut. We did not have the wit at this time to determine whether base levels and plaster might prove them a non-contemporary modification, nor


Figure 10.9 Plan and Section of Structure F-4.
whether the main walls represent the first building on this building platform

### 10.5 Average Dimension Table: Platform Units

| Unit | Height | Length | Depth | Slope |  |  |
| :--- | :--- | :--- | :--- | :--- | :---: | :---: |
| D | $1.5^{*}$ |  |  | $?$ |  |  |
| C | $1.5^{*}$ |  |  | $?$ |  |  |
| B | $0.9^{*}$ | $9.7^{*}$ | 4.0 | V |  |  |
| Note: Starred dimensions are approximations usually based |  |  |  |  |  |  |
| on reconstruction; the letter $V$ means approximately vertical. |  |  |  |  |  |  |

The maximum depth of room debris was 1.3 m ; there was much disintegrated mortar, and many slabs including capstones, while slabs appear to have played little part in the wall masonry (Figs. 10.10, 10.11 and 10.12). Although maximum surviving wall-height was only 1.3 $m$ there can be no doubt of a vaulted roof. Wooden beams undoubtedly spanned outer doorways, fragments of stone lintels, necessarily thick, being absent.


Figure 10.10 General view of Structure F-4 excavation, looking down and from rear. Portable altar in situ. Men stand before central and end doorways. Part of rear wall stump and plinth in foreground.

In the cross-section we have reconstructed the wallheight, roof and vaulted interior doorways, with vaulting on the partitions on the model of Structure J-11. We actually know nothing directly about roof and ceiling design. The placing of vaulting on secondary partitions certainly occurred on Structure J-9, though there the interior doorways were not vaulted. Primary vaulting on transverse partitions, with vaulted interior doorways as shown here, definitely occurs on Structure J-11. To reconstruct the transverse walls straight up to the main vaults would run counter to a pattern established near both ends of the vault-span index series.

There was a decided slope ( 16 cm ) from the rear of the middle room to the building-platform edge at the front, as in the front room of J-11-1st. Unlike that case, the platform faces did not show a corresponding rise, the height at rear center of Unit B, outside, being only 3 cm more than at the front.


Figure 10.11 Masonry of partition; rule extended to 1.42 m , rests on floor and leans against it. Portable altar in situ in middle room, man in right room (Str. F-4).

The floor of the rooms was in rather good condition, like many of those on the Acropolis, and its white finishing plaster turned up to the walls. The color of the body of the floor was not noted. Gray plaster is too striking to have been missed, and undoubtedly was absent here, despite lack of the proper note.

## Portable Altar

This altar, to be seen in both drawings, was nicely centered behind the middle door, resting on unbroken white finishing plaster of the floor. Despite its careful placement it was clearly a movable piece of furniture. Drum-shaped, it is 27 cm and 23 cm in diameter at bottom and top respectively, and 17 cm high.

## Measurement

The parallelogram type of reconstructed plan is based on triangulation of all building-wall and door corners shown in black and of two points on the inside of the rear wall. Solid lines on the substructure are made to conform but were not so located.

It will be noticed that the partitions do not run parallel to the parallelogram axis. Either the entirely hypothetical position of the building's left wall is wrong, or the partitions were not laid out from either end wall. The situation shown assumes that one of the partitions was laid out with the eye, seeking a right angle with the rear wall, with good results in this case, and that the
other was located in the same way or by measurement from the first. The situation is similar to that in Structure $\mathrm{J}-9$, where both end walls are known. If we restored the left end as parallel with the partitions, and at a right angle to the façade, we should have to make the rear about 50 cm longer than the façade. This is improbable in view of the much greater accuracy in over-all linear dimensions noted elsewhere on larger structures.

The altar was placed quite accurately with reference to the partitions. At the short distance involved this could be done quickly with the eye.
10.6 Average Dimension Table: Stage Elevation

|  | Stage <br> Unit | Elevation |
| :--- | :--- | :--- |

Note: Starred dimension is an approximation based on reconstruction.


Figure 10.12 Capstones from debris (Str. F-4).

## Decoration

Much mortar was noted in the debris just outside the central doorway, on Unit B. Several fragments of modeled stucco decoration were found in this debris, and in the central and right rooms. Some showed sherd inclusions. Sherds with stucco adhering, undoubtedly all that is left of such fragments, were found in all three locations. There is little doubt of the former presence of stucco decoration both inside and out. The latter is perhaps a confirmation of the vaulted roof reconstruction.

## Mound Interpretation

A preliminary examination of this mound with nothing but a meter stick led to an uncertain estimate of 1.6 m total debris-depth, and of 1.3 m debris on the floor. The latter turned out exactly correct. Several large slabs, thick and some reasonably thin, were noted on the surface at top and side, wall-stone predominating near the base (at rear). On this basis a completely fallen vault was correctly considered possible and highly probable.

A large thick worked stone was taken to be a corner stone, and a rear doorway was postulated as probable. This was wrong, unless in the left room. We correctly deduced that the front was in a long side of the mound, and that this faced the plaza, because of the sharply rising hill close to the other side. The existence of piers and front doorways was completely masked by the debris.

If we had had the sweat-house type of mound in mind at the time, we could have deduced from the length of this one, and the absence of comparatively flat areas at the sides at building platform base level, that we were not dealing with a sweat house.

## Dating

The section table (Table 10.7) reflects measurements to the left of center on the theory that collapse may have moved the front of the right room appreciably forward, and so increased the apparent span there. Nevertheless the vault-span index at center, 24 percent, is the lowest at the site. Although the partitions may be original and may have relieved the piers of considerable stress, and although the wall height may have been less than that restored, this proportion seems to indicate a late date in building activity here.
10.7 Average Dimension Table: Building (Unit A)

| Section | Table |  | Elevation | Table |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| W | R | $\mathrm{W}^{\prime}$ | Length | Depth | Piers | Doors |
| 0.6 | 2.6 | 0.6 | 9.5 | 3.8 | 1.3 | 1.4 |

### 10.8 Operation NE-3 Object Table

| Position | Sherds | Stucco | Miscellaneous |
| :--- | :--- | :--- | :--- |
| 1. On or in debris on Unit C, center | NE-3-1 | NE-3-2 | NE-3-1 (stalactite) |
| 2. On or in debris on Unit B, i.e., bldg. Floor, central room | NE-3-5 | NE-3-6 |  |
| 3. Same, right end room | NE-3-3 | NE-3-4 | NE-3-3(2 stalactites) |
| 4. Specific position unknown (includes above and excavations | NE-3-8 | NE-3-9 | NE-3-7 (frag. mano stone?) |
| $\quad$outside right end and rear center).  <br>   | NE-3-8 (pumice polisher) |  |  |

Note. Pumice stone worn flat on one side; this and stalactites and mano fragment covered with lime dust, all probably from
stucco or masonry hearting, as, probably, were most or all sherds. Stucco remains adhered to some sherds in all positions, and visible sherds were present in some stucco fragments at Position 1.

This is confirmed by some similarities between the plan here and plans of the low-index group of palaces; and also by what could be seen of masonry style. However, this was confined, unfortunately, largely to the partitions. The masonry similarities are also with that palace group.

Further confirmation of a late dating comes from sherds in the stucco, though of course these sherds might post-date the building itself. Lipped bowls are late in the Acropolis ceramic sequence, as is orange-bar decoration, also seen in fill presumably laid in Structure J-6-1st at about 9.17.15.0.0. This decoration on a lipped bowl, with stucco adhering to the particular sherd, came from the debris in front of the doorway, as did a lipped sherd painted in a bold style similar to that of the monkey bowls. These latter were probably in use at the time of abandonment (The monkey bowls are illustrated in Satterthwaite 1942a).

Two groups of sherds came from general digging in debris, that is, without precise knowledge of provenience. One foot from an orange flanged-bowl is among these, but together with late types. The early type sherd may have come from outside the building, perhaps from fill.

After completing work, a good specimen of daubclay was noted in our dump at rear center, located outside the building and its platform. This was noted as probably from below pavement level, a level which could not be clearly distinguished without a larger excavation. Original surface of the fragment had not survived. Elements of apparent wattle-work or stockade construction were about 1 cm in diameter, with about 2.5 cm clear space between. A clay-daubed wooden building in this vicinity, destroyed by fire and followed by a vaulted one, perhaps much later, is indicated, the sequence not definitely proved. The time-interval may of course have been of any length. Wattle rather than stockade basic construction can scarcely be claimed as certain.

## Abandonment

The stucco was either on the building or, as fragments from an earlier one, was in its masonry. Sherds in the building were few and most were surely, all probably, from the stucco. No other objects were recovered inside the buildings, except possibly a mano stone fragment, a pumice polisher and two stalactites, which could have been used in the masonry; and the altar. We can say that the Maya left the altar nicely in place, the floors probably clean of other imperishable objects.

## Function

We have not classified this building on a functional basis. Its position, opposite the pyramid temple J-29, and facing on a large plaza, well above plaza level, is as imposing as some of the less important temples, such as Structure U-3. Its situation is more imposing than those of some palaces but less so than those of some others, such as Structures J-1 and R-7. The position seems of no value in speculations as to function. Its plan recalls the local palace type in respect to end doorways and in partitions ending at one jamb of narrow doorways. The staggering of these doorways, one to the rear and one to the front of the longitudinal room axis is unique here, but recalls a similar arrangement at Yaxchilan (Maler 1901, Figure 46; Bolles 1938, Structures 20, 33, 42, 44). The arrangement might be for support of the vault, even if secondary and as a repair, and has no obvious present value for us in determining the function of this building.

The simple rectangularity of the building and the known cross-section of the building platform conform to local practice in palaces rather than in temples. The debris section leaves little doubt that the platform was set back on Unit C. If there was a stairway to the plaza there would thus be a stage not unlike those of the temple pyramids. A column altar, if placed here, would probably have been found, despite the obvious collapse of the top of Unit C. But of course a portable altar might have been removed at
any time. The situation of the center room and possible substructure arrangements thus are suitable for ceremonies quite similar to those indicated for a temple, if we eliminate the use of fire of which portable altars never show evidence. However, such reasoning is not convincing.

There were no fires in either of the rooms excavated. The amount of door space in the known end room does not suggest suitability for sleeping. The central room-plan seems just as badly planned for sleeping accommodations, and the altar shows at least occasional ceremonial use, as in the nearby Structure F-3. We must remember that there may have been originally only one large room. In either case this building seems more like a palace than anything else, and while benches are absent, as in some palaces, there is no reason for suspecting an ordinary dwelling function. A possible fragment of a grinding or mano stone, from Position 4, was covered with lime dust and does not help us. It probably was used as wall material or in stucco work.

Everything considered, this building hints at a late merging of temple and palace function. But adequate sampling of small mounds might suggest a special classification for it. It is an argument against presuming at present that all "house-mounds" were dwellings.

## Future Work

Because of the unusual plan, the presence in position of the altar and the apparent lateness of this structure, it should have been determined whether there were a front stairway and left end doorway, whether the building platform is correctly restored at the ends, whether there is more than a mere structural sequence between platform and outer walls, and between those and the partitions, and whether inset corners are present on Unit C. These questions could be answered with three or four man-days of digging in untouched parts of the mound (Tables 10.5 to 10.7).

## Masonry Notes

Fills
Not seen.

## Outer Building Walls

Tabular stone, in very bad condition. At door jambs large well-squared tabular blocks showing bonding. Three of these at right end (southerly) door measured (in cm) $38 \times 26 \times 21,47 \times 23 \times 17$ and $55 \times 20 \times 14$. The long dimensions alternated in the face of the wall, jamb, wall. Heights are given last. In the opposite jamb two comparable blocks measured $38 \times 20 \times 25$ and 33 x $26 \times 18 \mathrm{~cm}$, respectively. The larger scale drawing of Figure 10.8 is of the first jamb, made to scale from a rough sketch. The inside corner, between the large stones 1 and 3 , was formed of several small stones and mortar. No data on chinking. Stump at center of rear wall indicated absence of rubble-masonry wall-hearting (Fig. 10.10).

## PartitionWalls

Photograph (Fig. 10.11) shows tabular stone with high proportion of short thick blocks and much chinking; irregular blocks and chinks prominent. Corner bonding seems to have been absent on these walls, which are not bonded to main walls.

## Concrete

No notes made. All floors undoubtedly concrete.

## Plaster

Floor in building in good condition, covered with white finishing plaster turning up to walls; no gray or yellow mortar noted below this and undoubtedly absent, unless on earlier floors.

## 3. Structure O-18, Linton Satterthwaite

## General Remarks

Within the main ceremonial groups, mostly made up of buildings known to be temples, palaces, ballcourts and sweathouses, the map of the site shows a fair number of low rectangular mounds. Their blank tops reflect failure to excavate and, without digging, inability to deduce anything concerning buildings. It is likely that many, perhaps all, are ruins of low platforms supporting buildings at least partly of masonry. Most of these
structures can be approached from a main court or plaza. Only one such, Structure O-18, has been examined with a little excavation. By way of exception, this is the only one in this situation at which the contours of the debris showed what sort of building had fallen to ruin. Of the others we can say only that they are not the ruins of vaulted buildings. So far as masonry is concerned, this one consisted only of a building platform and masonry piers as indicated in Figure 10.13.


Figure 10.13 Isometric reconstruction of Structure O-18, based on minor excavation and contours of debris; alternative reconstruction at head of stairway based on position of Lintel 8 , found as if in semi-position as face of masonry block; roof of structure presumably thatch.

The writer made very minor excavations here in 1931, attracted by the presence of Lintel 8 at the surface. No catalogued objects were recovered. In 1935 Cresson cleared a little more around certain piers in order to get measurements sufficient for the reconstruction of the figure, which is largely in broken line, but not for an accurate complete plan.

Before excavation no masonry showed anywhere, but twelve humps of debris were disposed symmetrically along either side of the otherwise flat-topped mound. One of the humps was sketched as having a height of 50 cm and a diameter of about 2.5 m .

Three humps were lower and harder to distinguish, but the others appeared to contain similar quantities of debris. We concluded that the masonry rectangles within investigated humps are the stumps of piers, which rose to roof height, though in the figure they are shown as cut down to surviving height.

No remains of walls or base-walls were found. This circumstance supports our inference that walls (probably base-walls), connecting similar piers at the nearby sweathouse Structure N-1, were absent there in an earlier phase. On the evidence, and unless there were walls of perishable materials, we must imagine the building of Structure O-18 as merely a thatch roof supported on masonry piers.

No plaster survived, but the level of the floor surface could be made out. Scantiness of protective debris is a
sufficient explanation for the absence of surviving plaster, which presumably covered floor and piers, and sure evidence for absence of a vaulted roof.

We did not dig at the center, but there was no special mound of debris there such as should have been evident if this had been a sweathouse, like the nearby Structure N-1.

## Dimensions

Cresson's measurements of piers are given [in Table 10.9] (those in the first two columns apply to the two completely known stumps shown in solid line in the figure).

Table 10.9 Structure O-18 Masonry Pier Measurements

| Façade side | 1.0 | 0.9 | 1.0 |
| :--- | :--- | :--- | :--- |
| Inner side | 1.0 | 1.2 |  |
| Northeast side | 0.9 | 1.2 | 0.9 |
| Southwest side | 0.9 | 1.2 |  |

The notes fail to distinguish degrees of reliability, and we can guess that a difference as great as 0.3 m in adjacent sides of the pier in column $B$ is partly due to the beginning of disintegration. It is apparent that square piers were intended, though probable that they were very carelessly laid out, and not well standardized as to size. One inter-pier space (between piers in same façade)
was measured as 3.7 m . A check measurement covering four piers and spaces shows that in the façade, 0.9 m for pier spaces and 3.7 m for inter-pier spaces gives a correct average result.

We have only one available measurement of the roof-span, that is, the distance between inner faces of opposite piers, and for which roof beams must have been unsupported. This is 3.2 m . Since this is a simple single-range structure placed where there was no space limitation on its depth, it is probable that the particular dimensions noted above reflect the designer's idea of the degree of massiveness necessary for a stable structure of the desired depth. The wall-span index of this report is, in fact, always figured for the weakest part of the building, that is, one uses the thickness of a pier rather than a long wall, if there are piers. So we may speak of the wall-span index of this structure, though there were no walls properly speaking. It is 30 ; similarly the interpier spaces may be considered as doorways, yielding a pier-door index of 26.

The piers here are somewhat less massive than is usual with vaulted or non-vaulted palaces and temples, but they are not so slender as at Structure $\mathrm{N}-1$. On the other hand the inter-pier spaces are about 70 cm greater than at the latter structure, where these are comparable.

The known corner pier is set 73 cm in from the end and 60 cm in from the northwesterly edge of the platform, while two others are set respectively 55 and 50 cm back from the edge. Again one suspects carelessness in laying out the plan.

## Roof-Type

The above combination of low indices was probably applicable to a thatch rather than a beam-and-mortar roof, since very heavy beams would have been required in order to obtain rigidity. On the other hand, a thatch roof hanging low over the sides would seem appropriate to so narrow and open a building, which otherwise would have afforded little shelter when rain was accompanied by wind. While there is no definite physical proof of thatch rather than beam-and-mortar roof, the thatch variety of non-vaulted roof is surely highly probable.

## Stairway

The building is at the extreme southeasterly edge of the West Group Plaza which, in this region, was built up with pure rock fill. As a result a sharp and presumably terraced rise separates this plaza from that of the East Group. The building can be said to face either plaza, and protruding debris shows that an impressive stairway led down from it to the East Group. The four top steps were located by excavation, their positions indicating an angle of ascent of about 25 degrees, with risers of the usual height of 25 to 30 cm . As reconstructed, the height reached is 6 m ,
an approximation based on reading the map. The amount of projection of the stairway debris, in relation to this height, confirms the other evidence that this stairway, like that of the nearby Structure K-2, was not a steep one.

It covered the central inter-pier space of the building, and part, possibly all, of the adjacent inter-pier spaces, but not the whole building. In Figure 10.13, the narrower possibility is assumed, and an alternative reconstruction at the top is suggested. The latter is a possibility, perhaps a probability, discussed under Sculptured Fragments.

## Contemporaneity of Components

The steps were encountered while running a trench in toward the platform, the cut being about 1.5 m below the level of the platform-top. The trench was continued to a point 2.5 m within the platform itself, without recognizing any retaining wall behind the steps and, more surprising, without encountering a floor or working surface at plaza level. Therefore the stairway, the platform, and what may be a secondary extension of the plaza may be taken as contemporary. Whether the piers may have been significantly later was not determined. The possibility should be allowed for, since buildings later than their platforms are not uncommon, including the palace Structure J-2 on this same plaza.

## Sculptured Fragments

We were led to make the above-mentioned cut by the presence of "Lintel" 8, which protruded above the surface. Another fragment, "Lintel" 9, came from our cut into the platform fill, where it certainly had been re-used as fill material. Both pieces are described and illustrated by Morley (1938:3:208-210; 1938:5, Plates $142 \mathrm{c}-\mathrm{d}$ ). Each is undoubtedly part of a vertically placed panel, not of a lintel. Each shows the turtle-backed form of some panels, and each lacks the required bearing surfaces and adequate thickness for a lintel. The thickness of "Lintel" 9 , and of "Lintel" 8 at the bottom, is 13 cm at the top the latter is 9.5 to 10.5 cm thick.
"Lintel" 9 is a small fragment from an upper right corner with glyphs, while "Lintel" 8 is a considerable slab with both left corners intact. It is very badly eroded, but a good deal can be made out. The panel was 71 cm high, and of some uncertain length which cannot have been less than the maximum length of the recovered fragment, 74 cm . If we restore with the proportions of "Lintel" 12 as a model, the length comes to about 1.5 m . This would be reasonable. Our fragment would then be a left half showing one of two nearly square sunken areas around relief carving, as we assumed at first. But it would also be reasonable to use the proportions of "Lintel" 4 as a control, and the length could then be only the minimum sure 74 cm . Other known models would place it between these extremes.

Though one piece cannot be fitted to the other, the two fragments called "Lintel" 8 and "Lintel" 9 might come from a single panel, so far as dimensions and designs are concerned. At each end there would have been double columns of glyphs of about the same size, joined at the top by one (possibly by two) rows of glyphs and (possibly) with a single row of glyphs on the lower border. However, on stylistic grounds, Morley denies that these fragments are from a single slab. Though nothing but traces of the glyphs on the large slab could be made out, this leads us to reconsider our original opinion that both were reused as building material.

When first seen, the "Lintel" 8 fragment stood at a steep angle, right-side up, its top at the level of the platform floor, but about 45 cm outside the line of the southeasterly platform face. Its buried bottom was about 25 cm still further away from that line, at the level of the base of, and in line with, the riser of the second step from the top. The latter step was seen on one side or the other of the slab, but not at the position of the slab itself. (We here count a presumed edge of the plaza terrace, functioning as a step to the platform, as the top step, though it was not found surviving here). The field drawing of the cross-section fails to show the platform intact behind this position, though it may have been missed. Base and top of the carved slab were approximately level, and the carved side faced out, away from the platform. The end and bottom edges showed the turtle-back form, but the top edge was eroded so badly as to produce an irregular cross-section.

At the time of the excavation here both the workman and the writer were inexperienced in following badly disrupted masonry close to the surface. The above facts are not readily explainable on the hypothesis that "Lintel" 8 was a re-used slab set horizontally in the masonry of a step, or of the terrace, or of the face of the platform. Being about opposite the middle of an interpier space, it almost surely did not fall from a pier. Sure proof is lacking, but probably it was set into the face of a masonry block such as is suggested alternatively in Figure 10.13. If it was, then a companion block and panel on the other side, perhaps also a central one, are near certainties. There were three panels, probably in similar positions, at Structure O-13, where all three fell face down and were found only by excavation. It is quite possible that two additional panels, in good condition, are yet to be found here.

The writer made a careful drawing of the recovered part of "Lintel" 8, showing details not clear in the photograph (Morley 1938:5, Pl. 142c). A throne with tapering legs and a flat table-like top is a certainty. Something, probably a seated human figure, rests at the (observer's) left end. A considerably wider mass of badly eroded relief at center and to right of center
shows that something rested on the table-top there, perhaps another human figure or figures. No evidence was recorded indicating that a back-screen had been depicted. As on the famous "Lintel" 3, the legs of the throne do not appear to rest on the lower border, but on a plinth-like element, which is part of the scene. There is some suggestion that figures may have been carved before this element, as if seated on the border itself. However, this analogy to "Lintel" 3 is far from certain.

The sunken area, from which rises the relief of the throne, is 54 cm high and 48 cm wide. If we consider that the original length of the panel was the same as the maximum surviving length, this area was symmetrically placed, with only a minor discrepancy. But I could not satisfy myself that there had been a double column of glyphs on what would then be part of the right border, in fact, this seemed quite doubtful. While the stone may have been nearly square, that hypothesis is correspondingly doubtful.

Traces of a double column of glyphs were quite clear at the bottom of the left border, and reasonably certain traces of glyphs appeared on the upper border, less certain ones on the lower border. The blocks seemed to be about 7 cm high and 6 cm wide. An L-shaped panel of low relief, doubtless remains of completely eroded glyphs, was placed in the upper right-hand corner of the sunken area, its edges 2 or 3 cm from the margins. The vertical column measures about 29 cm in height, and about 6 cm in width. The horizontal part, measuring up to the vertical member, is about 7 cm high and about 22 cm long. Apparently there were glyphs here of the same size as those of the borders. The left border, where fully preserved, is 15 cm wide, the upper one 10 cm wide and the lower one 7 cm wide.

It is practically certain that a double column of glyphs appeared on the right border whether or not we have part of it on our slab. Using $6 \times 7 \mathrm{~cm}$ per glyphblock, we can make an estimate of forty blocks in pairs of columns on either side and at least eight more on the upper border. Thus there were probably at least forty-eight blocks in the main inscription. In addition, there were probably nine blocks in the L-shaped panel, besides (possibly) others on the lower border. If, as seems most probable, this panel was carved for use here in conjunction with one or two others, the approach to this probably thatched building may have been dignified with a very considerable inscription on its stairway.

## Dating

The platform, stairway and piers of Structure O-18 are later than the carving and destruction of the small fragment of "Lintel" 9. The platform and stairway are probably contemporary with "Lintel" 8 ; if so, the
piers were also contemporary with that carving, or else secondary to the platform, hence later. It appears to be certain that none of the three architectural components can be earlier than either of the carved panels.

The depiction of legged thrones, carved, painted or in stucco relief, is a fairly wide-spread trait at classical sites, but apparently not in contexts suggesting early dating within the classical period. The legged throne on "Lintel" 8 thus has a certain chronological value. At this site actual thrones were certainly being erected during the latest phases of the latest architectural period of the Acropolis, but there are no data on which to base a reliable estimate of when they first appeared, and so were available as models for sculpture. A legged bench without back screen was placed in the nonvaulted palace Structure R-7, and almost certainly a similar one was removed from an early predecessor of the final palace Structure J-12, on the latest level of the Acropolis. The latter also was non-vaulted, even in its latest phase. There is evidence, then, that legged thrones appeared here before masonry vaulting, hence a very considerable time before abandonment. So far as the design on "Lintel" 8 is concerned, our structure may belong in a pre-vault period, yet long after the foundation of the site.

Morley placed both lintel fragments in his Middle Period, between 9.10.0.0.0 and 9.15.0.0.0, but in each case with a question mark. The glyphs on "Lintel" 9 are well preserved. When methods of stylistic analysis of glyphs are fully perfected, a reasonably precise early limit for dating this structure may become available. At present one can only say that there is no evidence for an extremely early local dating of this very simple building, and that apparently it was still in use at the time of abandonment.

## Function

At first we were inclined to classify this building as a palace, since those buildings characteristically present more or less open façades, and are placed on building platforms of similar size and proportions. Like our Structure O18, two palaces are served by imposing stairways on one side. Those two (Structures J-2 and R-7), like many other palaces, may also be said to face in two directions, and non-vaulted, perhaps thatch-roofed palaces occur.

This building surely is closer to the palace type than to anything else, but it is placed in the unclassified category because of the extreme size of the inter-pier spaces, the lack of end walls, and the lack of either a back wall or a medial wall. The entire lack of masonry walls is unique in our series at the site, and presumably indicates a different function. One might guess, considering its openness and ready accessibility, that it was a shelter for commoners or traders, rather than for priests. In speculating on its use, however, the probable presence of inscribed stone panels in the stairway should not be ignored. What is needed is the investigation of several of the similarly placed platforms, and more thorough attention to this one. In it we have a strong hint of a palace-like but distinct type of structure in the total make-up of the main ceremonial groups.

## Masonry Notes

## Fills

Pure broken rock, noted only to depth of 1.5 m below building platform floor; large size; fill wall at southwesterly side of trench with slight negative batter as seen from trench.

Walls and Piers
Tabular stone.

## 4. Structure O-7, Linton Satterthwaite

## Preliminary Remarks

Two factors make this stepped-top low mound an exceedingly interesting one. Structure O-7 is unique in having at least twenty-one associated round altars, and despite its very modest architectural pretensions it faces the largest and most elaborate temple and the greatest collection of sculptured monuments at the site (Fig. 10.14; and site map, Figure 1.1). Almost certainly it lacked a building. In respect to the imposing position,

Structures O-7 and O-13 face each other across the East Group Plaza, and there is no evidence of any structures between them. However, only the great temple rises directly from the level plaza floor. From Structure O7, the present surface slopes down about 10 m in 65 m before reaching the lowest and level part of the plaza.

Interest in this little mound is heightened by good evidence that ceremonial use was made of it after the general abandonment of the site as an architectural center. On it was constructed a small artificial mound containing
crude cists. At least one of these was not a burial cist since it contained a small erect rectangular stone column (Figs. 10.18, 10.19). There is good evidence that others contained cremated human remains, and that intentional disturbance of ancient round altars played a part in the burial rites of the cist-builders. Presumably these people were Indians, and there was nothing to suggest they were recent Lacandon, though the Lacandon left their typical censers elsewhere at the site.


Figure 10.14 Isometric reconstruction of Structure O-71 st, as seen from left rear corner. Original positions of two of seventeen disturbed altars suggested, others not shown. Altars in solid line found where shown.

Twelve of the drum-shaped stones now classified as altars were visible on the surface of the mound, disposed in two groups of six each so as to suggest that they were elements of two round columns that had fallen. Such columns at a Classical site would have been just as unique as a large collection of altars, and superficial excavations by the writer, in 1932, were intended to determine this point. We think the data summarized [Table 10.11] show that these twelve stones, like additional ones later encountered, were altars.

Retaining walls at and near the front were visible without excavation. Elsewhere excavation was necessary to show parts of features appearing in solid line on the Plan of Figure 10.15. This included digging into a probably artificial special mound of debris in the neighborhood of the features numbered 1,2 and 3 on the plan. These are the cists believed to be postabandonment in date. To avoid confusion we shall refer to this special mound as the secondary mound, or as Unit 4.

Before excavation the highest part of the mound (i.e., of the ruin as a whole) appeared as a broad ridge of debris along the rear (southerly) edge. Further still to the rear there was a drop of about 1.4 m to the level surface of the corridor leading to the South Group Court. The ridge was partly obscured by large trees, but it surely ran
nearly, if not entirely, from one side of the mound to the other. On its front side this ridge dropped only about 0.8 m ; and did so only on either side of center. For several meters in from either side, flat surfaces led forward from the base of the ridge to a well-defined down-slope of debris running from side to side, after which a broad level area at the lower level ran across the entire front. There was little or no debris on the flat surfaces. It was perfectly apparent that we were dealing with a steppedtop platform, but that if it supported a masonry building, the later had no masonry walls within 5 m or so of the sides of the higher rear portions, and none on the lower front portion. The possibility was considered that the ridge at the rear was the ruin of a masonry building wall which functioned with perishable side and front walls. Excavation showed that such a building wall would have been flush with the rear of the platform, and 1.4 m thick. This hypothesis is rejected as highly improbable and we conclude that the ridge is the ruin of a bench-like third level of the platform, reconstructed as Unit B in Figure 10.14. Its top, not found, could not be expected to survive. No plaster survived anywhere, even where debris afforded some protection.

As may be noted in Figure 10.14, we have labeled the main higher rear level of the platform Unit C. This is what was found exposed at the surface on either side of center only. At the center a deposit of earth and stone lay on it. This, Unit 4, the secondary mound, formed a sort of tongue of debris, which projected forward from the transverse ridge at the back. In the sections of Figure 10.15 the dotted surface lines pass through this deposit in each direction, the longitudinal one on a line about 1.4 m forward of the face of the bench-like Unit B. It was more sharply defined on the left side (right in the figure). Erosion had probably flattened out the front and right sides since, on the latter, the cists had been partly exposed.

The possibility has been considered that this special mound of debris is the ruin of a diminutive masonry building on a platform too large for it. This would be expected in a sweathouse, but in excavating Cists 1 to 3 the bases of its walls should have been encountered. If there were any, we missed them, and such a building is difficult to reconcile with Unit B, whether one accepts the reconstruction as a broad bench-like feature or postulates a very thick high wall instead. We have concluded that this special mound of debris was heaped up purposely to cover the cists, rejecting the alternative hypothesis that the cistbuilders found it already present, and dug into it.

On the plan (which is rectified), the three cists are shown in solid black, in relation to architectural features which they must post-date. The cross-sections of this figure were made with care, but without control by the leveling instrument.

Table 10.10 Structure O-7 Scheme of Temporal Sequences

| Str. <br> O-7-2nd | Stepped-top Platform, single step up | Units D, D' |
| :--- | :--- | :--- |
| Str. | Main higher rear level of final platform (combined with earlier Units, double | Unit C |
| O-7-1st | step-up) <br> Narrow, bench-like highest level at rear <br> Bench (or small stairway?) <br>  <br>  <br> 21 to 24 or more round stone altars | Unit B |
| Probable caches | Unit A |  |
| O-7-2nd or 1st | Cist 1 (with small rectangular column) | Unit 1 |
| Str. | Cist 2 | Unit 2 |
| O-7-Cist | Cist 3 | Unit 3 |
| Latest | Probably artificial secondary mound over cists | Unit 4 |

## Unit Designations and Temporal Sequences

The sides of all of the cists consisted of thin slabs set on edge. They extend down to the level of the top of platform fill, and also upward above the presumed level of the floor material itself. Cist 3 was covered with small irregular slabs and was filled with earth and stone, which supported them (Fig. 10.19, upper left). It is so placed that what we know of it may be part of a longer affair on the front-rear axis, and with an assumption of disintegration of lime mortar one may argue that it is really the ruin of a masonry bench which was faced and covered with slabs. On the map of the site that is suggested in broken line. But it then would become a remarkable coincidence that a slab-covered bench, the only one known at the site, is also provided with a special stone bottom, and that it is within a special deposit of debris containing slab cists which cannot possibly have been benches. We conclude that it belongs with Cists 1 and 2 in time, and that it should not have been suggested on the map of the site as of the time of abandonment.

Believing that the special mound containing cists is non-structural, and knowing that one altar was re-used as part of Cist 1, the cists and the mound are assigned to a post-abandonment period. This is called Structure O-7-Cist Period rather than Structure O-7-1st, to avoid an implication that cists and mound were contemporary with architectural periods labeled -1 st at other mounds. To emphasize the lack of continuity, numbers instead of letters have been used to distinguish units of this postabandonment period.

In the region of Cists 1 and 2 we penetrated the fill of Unit C, the main higher rear level of the platform, which was elsewhere at the surface. Here the floor
material had been removed by the builders of the cists, who reached to the top of a layer of large to mediumsized broken rock forming the fill. Earth, presumably floor material, filled the interstices. Probably this resulted from the secondary cist building, since rubble of such size was not ordinarily used at this site in solid fills. This rock fill was a very shallow one, resting on a thick layer of earth and crushed stone only about 30 cm below its top. No plaster was noted here, but a mere temporary working surface so close to the final desired surface would be unique and inexplicable. Therefore we conclude that at first there was a stepped-top platform with the more usual single step-up, and that the fill of Unit B rests on the higher rear portion of this earlier platform. We rank this as an early period, rather than phase, because, though the front part remained in use to the end, the more important rear portion was almost completely blanked out.

## Discussion by Periods

## Structure O-7-2nd

We know nothing about this period not already noted in justifying its separation from Structure O-7-1st. A 70 cm exposure of the front edge of its higher rear portion surely forms the step between the two levels in the next period, and (as we reconstruct in Figure 10.14; Table 10.10), an exposure of its left edge forms the step on the left in the next period. The tread of this is 40 cm , so the rear portion of the platform in this earlier period was probably 80 cm longer than in the next. It may be noted that in Figure 10.14 we look from the left and rear.

Table 10.11 Positions and Dimensions of Altars

| Position | N in Group | Diameter | Height |
| :---: | :---: | :---: | :---: |
| Group 1. Flat, in line on Corridor surface, close to left half of rear face of platform (Figs. 10.14-10.16). | 7 | $\begin{aligned} & 0.4-0.5 \\ & (5) \end{aligned}$ | $\begin{aligned} & 0.2-0.3 \\ & (7) \end{aligned}$ |
| Group 2. Scattered on surface, flat, at angle, or on edge: <br> a. On Unit C of platform or above it on secondary mound, somewhat left of front-rear axis (Figs. 10.15, 10.17). | 6 | $\begin{aligned} & 0.4-0.5 \\ & (6) \end{aligned}$ | $0.2-0.3$ <br> (6) |
| b. On Units C, D I and D, somewhat right of front- rear axis, farther forward as a sub-group (Fig. 10.15). | 6 | $0.4-0.5$ <br> (6) | $\begin{aligned} & 0.3-0.4 \\ & (6) \end{aligned}$ |
| Group 3. Flat, resting directly on fill stones of Unit C, indicating excavation of floor material (Section, Figure 10.15). | 1 | 0.5 (1) | 0.3 (1) |
| Group 4. On edge resting directly on fill, stones of Unit D, reused as back of Cist 1 | 1 | 0.5 (1) | 0.2 (1) |
| Sub-total (sure association with platform) | 21 |  |  |
| Group 5. On surface to right of platform, approximate positions indicated by x in Figure 10.15. | 2 | 0.5 (1) | $\begin{aligned} & 0.2-0.4 \\ & (2) \end{aligned}$ |
| Sub-total (probable association) | 23 |  |  |
| Group 6. On surface of down-slope, 12 m in front of platform | 1 | 0.5 (1) | 0.2 (1) |
| Total (possible association) | 24 |  |  |

Note: Many altars in bad condition; apart from Group 1, some original heights may have been greater.

## Structure O-7-1st

As to this period, the drawings and prior text tell most of what is known, but some further textual remarks are required.

## Absence of Stairway

The form of the platform is such that, as an architectural entity, it must be held to face toward the East Group Plaza, and by analogy with local structures in general, there should have been a stairway at the front. The front retaining wall stood to full height, and a masonry stairway rising the necessary 1.5 m should have left a special mound of debris projecting from the wall. There was none, and therefore there was probably no front stairway. On the right side, ruin was more complete, so that the same negative evidence is less convincing. At the right rear a special little mound of debris projected from the rear. Within it a rather certain remnant of side-wall was made out; this was on the right side, though it is shown in Figure 10.14 as if on the left side, where less certain evidence of a corresponding side-wall was noted. The amount of debris seemed insufficient for that of a stairway rising to the top of the rear of the platform (to Unit B) and we have restored it as a bench (Unit A).

Probably there was no stairway, access being from the surface of the corridor to the main rear level of the platform by way of the broad single step there at the side.

## Rear Bench-like Level (Unit B)

The surface of this element as reconstructed would not have survived, nor was it seen. The reconstruction is a matter of inference from the following facts. Its front face stood in good condition to a height of 60 cm . No rear face could be found forward of the rear of the platform, though the wall of the latter, protected by debris of Unit A, rose 60 cm from the corridor floor. Under these circumstances we have only negative evidence, but good evidence, that the rear wall of Unit B was continuous with, or at least flush with, the rear wall of the platform (cross-section, Figure 10.15). If these two faces were those of a high masonry rear wall of a building, it was 1.4 m thick. This is scarcely believable in the context.

## Twenty-Four Round Altars

These drum-shaped stones are about 50 cm in diameter, much larger than the portable altars found in stela cists and on the floors of unclassified vaulted buildings (Stela 8 and 9, Structures F-3, F-4). They are non-characteristic of the site as a whole, and though in bad condition were examined with some care.

Descriptions, and Positions as Found
The dimensions, so far as recoverable, are summarized in [Table 10.11], by groups corresponding to positions as found. The numbers in parentheses give the number of each group measurable in the dimension


Figure 10.15 Plan of Structure O-7, all period numbers are unit designation of cist period.
in question, usually the total number of altars. The dimensions tabulated are minimum-maximum for the group. In form, these altars are to be thought of as drumshaped, with equal diameters for upper and lower flat faces, and with straight sides apart from a tendency to bulge very slightly in the middle (Table 10.10).

The range of heights runs from 20 cm to 40 cm , but 20 cm to 30 cm covers most examples. The diameters vary but little from 50 cm , except in Group 2b, where they run from 40 cm to 52 cm . This is one of the two groups which presented the deceptive appearance of a fallen column.

Group 1 , revealed by excavation, definitely proves that as of the time of abandonment the Maya had placed seven of these altars together, and that small variations in height are of no significance. Probably the height depended on the thickness of a natural stratum of limestone from which a given altar was cut. This is indicated by six
examples in which one flat face was smooth but not worked. Presumably all these were bottom surfaces left as they came from the quarry. Two of these six came from Group 1, which had not been disturbed, and four from Group 2a. These six account for a range of 10 cm in height, from 23 cm to 33 cm .

So far as dimensions go, it is clear that all twentyfour altars belong to one lot, and since some were not from columns, presumably none were. There is only one type, unless some were carved. Five of the seven in position surely had plain tops. Elsewhere one could not be sure which face was the top. One altar in Group 2a was artificially smoothed on one face, smooth but not worked on the other, so we know that at least one plain altar occurred on the platform itself. In all other cases one side was broken or eroded so that sculpture might have been present, but the evidence lost. In the field the writer


Figure 10.16 Row of seven altars in position on corridor; trees are on ruin of Unit B at rear of platform.
imagined that some eroded faces bore traces of sculpture. In no case was this certain, and all may have been plain.

## Original Positions

It is certain that altars were ranged in a line just behind the platform (Group 1, shown in solid line in Figure 10.14). We have 17 others found in disturbed positions to account for. Of these we first consider the 14, which were on the platform (Groups 2a, 2b, 3 and 4).

Three of the round altars of Group 2b were found on edge, while one in Group 2a was found partly on edge, leaning against another. Within either group there is no patterning in the final arrangement, yet obviously they had been rolled by human agency into the positions in which they were found (Fig. 10.15). The single altar of Group 4 was carefully placed by the cist-builders, but it was used as a mere structural stone at a time when the floor material of the platform had been dug out. The single altar of Group 3 also lay directly on the stones of the platform fill, so presumably it reached its position after cist-building had begun. In horizontal position it belongs with the six altars of Group 2a, and at least two altars of that group definitely rest on Unit 4, the mound of debris, which covered the cists farther to the right (left in Figure 10.15).

The simplest explanation of the disturbance of altars on the platform is that all of it was the work of the cist-builders, who may have wished to destroy some ancient pattern of altar arrangement for supernatural reasons. The bad condition of many may in part be due to a certain amount of intentional breakage, as well as scattering. One face of the altar of Group 4 was entirely split off, and other faces were described in our notes as broken, rather than as eroded. The postulate of intentional scattering and breakage is perfectly consistent with the non-disturbance of the row at the back, since those altars may already have been largely buried by debris. Granting this explanation, we can imagine that one of the two altars of Group 5 was rolled from the platform and down the already ruined slope at the right, thus accounting for our finding it at the surface there. The more forward stone of this group, and the single one of Group 6, presumably also came from the platform, but, if so, these were probably intentionally rolled some distance from it. Being on the surface, they surely had been disturbed.

If the purpose was as supposed, there was no reason for placing any disturbed altar (except the re-used one) at the precise point at which it came to rest. A fair presumption arises that the heavy stones


Figure 10.17 Rule on surface of Unit 4, excavated part is beyond nearest altars; looking down and toward right showing eight altars of Groups 2a, 3, and 4 in position; rectangular column replaced in Cist 1.
were rolled about on the level or downward, but not upward. Hence at least the two altars of Group 2a on the cist-covering mound, Unit 4, probably came from the bench-like element at the rear, Unit B. These two are restored there in Figure 10.14, in accordance with this strong hint that Unit B served as a bench on which altars were placed. But since there are six stones in Group 2a, and the single one of Group 3 seems to belong with it, there is some probability that there were seven other altars on Unit B, left of the center axis.

We have no clue as to the source of the re-used altar (Group 4) but it was buried before the scattering of some, probably all, of those of Groups 2 a and 3 . Since it was intentionally placed for a purpose, the fact that it is closer to Group 2a than to Group 2b is meaningless. It may have originally belonged with Group 2a and 3, making eight instead of seven for that combined group; but it may just as well belong with Group 2b. Thus it is quite possible that there were three groups of seven altars each: one at the rear of the platform, one on a rear bench of the platform left of center, and another somewhere else on the platform, probably to the right of the axis and possibly also on the bench-like Unit B. Known positions for the three altars not on the Platform (Groups 5 and 6) might or might not eliminate this hypothesis. A search further down the slope toward the plaza might reveal enough others to make up a fourth group of seven.

It is a curious fact that at least one group of seven is certain, others are possible, and seven was an important number in Classical Maya mythology and, perhaps, in their ritual calendar.


Figure 10.18 Rectangular column replaced in Cist 1 after removing earth from around it; note round altar at rear of cist; floor slab resting directly on fill stone of platform.

It must be conceded that the foregoing analysis of altar positions is involved and full of unprovable assumptions. The general conclusion is that Structure O-7 was a stepped-top platform specially designed for open-air ceremonies involving many rather small round altars, some or all of them unsculptured. This conclusion is correspondingly not proved. It is offered as a hypothesis to be applied to similar mounds elsewhere, if they are encountered. Certainly this mound, whatever it was, increases the range of differing types of structure to be expected in Classical Maya ceremonial precincts.

## Structure O-7-2nd or 1st Caches?

Below-floor caches of small ceremonial objects, usually in pottery containers, are very common at the site, and the most common objects in them are eccentric flints and obsidians. There is good evidence that such deposits were made here, but in which period is very doubtful.

## Caches?

Three eccentric obsidians were found aside grubbed around the most easterly of the altars on the step formed by Unit D1 (Position 2 of Table 10.13), while another was in debris on this step, only 2 m from the easterly edge, where the risers formed by Units D1 and C were both found to be intact, at least at their bases (Position 3, Table 10.13). The only plausible explanation of the positions of these objects is that they came from disturbed caches. At these positions it is hard to imagine that the disturbance was caused by collapse of masonry. It could be laid to uprooting of
large trees, and such trees might have stood on either Unit C or D. It seems just as likely that we have here further evidence that the cist-builders dug into the floor of the platform and, finding cached objects, scattered them as well as altars.

## Structure O-7-Cist Period (PostAbandonment)

Reasons for assigning the cists and their covering mound to a period of their own have already been given. As postabandonment features they have a peculiar interest.

## Cist-Containing Mound (Unit 4)

It is simplest to suppose the cists were built first, and that the bulk of the mound was then heaped up over them; if not, there was excavation into the mound in order to place the cists at its base. The material of the mound was not noted in any detail. It was solid earth and stone, including a number of large broken rocks. One of these appears behind Cist 1 in Figure 10.19. There was no depression to indicate excavation into the hearting of the platform to obtain mound material, and such fill-stones as this probably came from the bench-like Unit B to the rear. In the main the material of Unit 4 was presumably floor material and wall stones from the platform.


Figure 10.19 Excavated part of Unit 4, looking down and to left; at right of photograph note Cists 1 and 2, probable cover slabs removed; altar of Group 3 at upper right; large fill stone, loose, behind Cist 2; Cist 3 at upper left, with cover slabs in place.

Only one edge of the Unit 4 mound was still well defined. This edge was quite steep, so originally the other side and the front edges need not have been much beyond Cists 1 and 2. Assuming this, Unit 4 was about 4.5 m wide and about 3.3 m deep, and the altar of Group 3 was just in front of it, and not under it. On this assumption, Cist 1 and its column may have been quite close to the axis of the mound. Either Cist 1 (and, on the above assumption,
the secondary mound as a whole), or Cist 3, may have been close to the axis of the main mound formed by the ruin of Structure O-7-1st, but not both. Probably, without careful measurements, the cist-builders followed an ancient tradition of placing important constructions at rear center of a rectangular area, thinking of the ruined platform as part of their own crude but new creation. Because of these hints at intentional symmetry during the cist period it is likely that the unexcavated half of Unit 4 contains a cist or cists in good condition. More careful work there may definitely confirm the scant but important evidence that the compartments of Cist 2 were for burial of cremated human remains. This evidence consists of a human molar and fragments of burned bone from near Cist 1 (Position 4, Table 10.13).

Cist 3 differs from Cists 1 and 2 in important particulars, to be noted below. It cannot be said that, they do not pertain to different phases of the cist period, since an earlier mound covering Cist 3 may have been extended to provide for those further forward, or vice versa.

Cist 1, 2 and 3
Cists 1 and 2 had partly collapsed, and not very careful excavation contributed further damage before details were recorded and photographs made. Cist 1 was probably covered with a very large slab, which lay in front of it by the time the photograph of Figure 10.18 was made. The cist contained only the rectangular column of Figure 10.19, plus soft earth, which could have washed around it with the cover intact. On the other hand, Cist 3 was found filled with stone and earth, which lay on its floor of stone blocks and below its slab top. The slabs of the latter seemed to be in position. They are too small, thin and irregular to have formed the top of a large hollow construction.

Cist 3 was therefore a solid affair when completed; but since it was apparently at one stage an open stone floored and stone-sided box, and covering slabs were finally provided, no term other than cist seems appropriate. The postulate that it was immediately filled accounts for its comparatively good condition, while the alternative postulate that it was originally a slab-clad masonry bench fails to account for its special floor. A major difference between Cists 1 and 3 is then that the former but not the latter provided a hollow space within the mound. Nevertheless what may be called a non-functional cover was supplied to Cist 3.

Cist 2 was also found filled with earth and stone (from fist size to double that size), but no cover slabs were recorded about this deposit. Below it, at the base of the cist, two small irregular slabs were recorded. If these were floor-slabs, like those of Cist 1, a dozen or so more should have remained in place. Next to them, also flat
at the base of the cist and at the end next to Cist 1 , was a slab measuring 50 by 25 cm , with parallel sides, lying at an angle of about 45 degrees to the rear of the cist. It is probable that this and the other two slabs noted at the base of this cist were cover-slabs let down when the front side collapsed. This cist was probably a hollow affair like Cist 1, but unlike the latter, with a floor consisting only of the tops of fill-stones of the platform.

The large stone, supposedly a slab of Cist 2 , and the much wider one of Cist 1 , are undoubtedly fallen capstones brought from some rained vaulted building the nearest of which was Structure O-12. This extra effort confirms the belief that they were cover-slabs for unfilled cists. The larger is wide enough to be used longitudinally to cover both Cist 1 and the space between it and what we have labeled Cist 2.The smaller slab could have fallen from a transverse position next in line. It is possible and even probable that this was the arrangement, and that we missed back and front slabs of a second compartment covered by the larger re-used capstone. Therefore, Cist 1 was probably only one compartment in a single structure formed by what we label Cists 1 and 2, though it was specialized as to its floor and contents.

Considered thus, the over-all interior dimensions of Cists 1 and 2 combined were about 2 m by 0.4 m , with a height of about 0.4 m . There was probably a compartment about 0.2 m by 0.4 m at the right end (left on the plan); next were four more or less square compartments, about 0.4 m to about 0.4 m on a side.

No evidence of compartmentalization was noted in Cist 3. Without it, slabs large enough to bridge the gap of 1 m between front and rear, would have been very hard to come by. This probably accounts for the immediate filling of this cist. Its interior height was about the same as that of Cist $1,0.4 \mathrm{~m}$.

The two supposed cover-slabs were the only structural stones of considerable size encountered. They were about 10 cm thick, as was the supposed partition slab forming the right side of Cist 1.The floor slabs of Cist 3 were as much as 20 cm thick, doubtless blocks from ruined retaining walls. Apart from the re-used altar forming the back of Cist 1, all other stone entering into cist construction consisted of irregular slabs about 0.5 cm thick. It is probable that all or most of this had to be transported from a ruined vault, and there may have been a conscious selection of thin slabs to save weight.

## Rectangular Column

This object appears in Figure 10.18, where it and the cist-slab on the observer's right have been replaced after excavation. Everything in the photograph was found undisturbed. On brushing out a deposit of soft earth from around the column, we had simply lifted it out. It undoubtedly stood free within a complete and covered box of slabs that to the rear being the re-used round altar.

The cist-builders certainly used the column for some ceremonial purpose, but probably it also is a re-used piece dating from Classical times, the broken-off lower end of a column altar. A digression seems in order, to justify this statement. Column altars were set vertically in the floors of temple buildings, or of niches within them, and also outdoors in floors of pyramids, basal terraces and plazas. The exposed portions tended to have round or oval cross-sections, but the buried parts were sometimes rectangular in cross-section, or rectangular with rounded corners and a tendency to bulge out from this form. The fronts and sides always show evidence of contact with fire, but this was of course absent on the buried portions and probably always for some distance above it. Buried sides were at least rough-tooled, and sometimes the buried end was also. Characteristically, one diameter is somewhat greater than the other, and characteristically the stone tapers toward the base. This is especially noticeable when viewing such stones from the front, at a right angle to the longer diameter, and the tapering, though slight, tends to continue from the exposed top to the buried bottom

Several column altars have been found in situ, broken off near floor level, perhaps by falling trees. The column of Cist 1 meets all requirements of such a stone, as outlined above. If we turn it upside down its top becomes a fractured surface at a noticeable angle to the long axis, and showing no workmanship.

The diameters are much less than expected, but they are almost identical with those of an unusually small column altar found in place in the platform temple Structure O-15, broken off close to floor level. Evidently there were two classes of these altars in respect to size, and we have here a second example of the smaller size. At its base (top in the cist) diameters are 11.9 and 13.9 cm ; at the broken end, 12.4 and 15 cm . Lengths of the fragment are 25 and 26.5 cm , depending on where one measures.

As found in the cist this column would have leaned noticeably to one side if the slab on which it stood had not been given a slight slope (as it was). It is possible that we find two slabs as flooring here merely to compensate for the irregular base of the piece as it was used.

It is known that column altars were sometimes left in place so that new constructions covered them, and they have never been found, broken or otherwise, in positions proving re-use as building stones during Classical times. Such small column altars as this one probably do not come from pyramids, and collapse of lesser structures would not throw a column altar to the surface as debris, since they seem always to have been placed well back from the edges of their structures. The weathering on this piece is very slight, suggesting, on the contrary, that it remained in place and was protected by debris. There is a certain presumption, therefore, that the cist-builders saw some
supernatural virtue in it, and dug it out of a floor in which they found it embedded.

## Dating

The regular alignment of the seven round altars of Group 1, largely buried by surface debris, is fair evidence that Structure O-7-1st was in use up to the time of abandonment. The buried floor material by which we identify a Structure O-7-2nd shows that it was not the first structure on this spot.

The cist-builders were probably not modern Lacandon, for there was no sign of their characteristic censers, such as were left in the West Group (Structure $\mathrm{J}-2)$. The secondary mound labeled Unit 4, with its cists, may have considerable antiquity, but several factors reviewed below indicate a considerable time gap between abandonment of the site by the Classical Maya and the time of this secondary small mound.

The mere disrespectful handling of cult objects does not prove such a gap, since there was intentional breakage and scattering of stone thrones probably at the time of abandonment (Structures J-6, J-11, J-18). But in the case of the round altars here, a similar procedure was accompanied by activity of a constructive nature, since the disturbance of altars began before the secondary mound was completed (the re-used altar), and ended when (or after?) it was finished (the altars on the secondary mound). A time-gap is the most plausible partial explanation of this distinction between altar disturbance and throne destruction.

Such a gap must also be inferred from the placement of the secondary mound, a non-architectural feature on what had been an architectural unit in a very prominent part of the site. Further, almost surely this took place after the neighboring buildings had at least begun to fall into ruin. Otherwise it is extremely unlikely that the specialized capstones could have been obtained without great effort. There is also a certain probability that a broken column altar could not have been found ready to hand before a tree had grown and then had fallen on it. The break is a clean one, not the sort produced by
gradual weathering. Of course, the breakage might have been intentional.

A circumstance confirming existence of a time-gap is the fact that both smooth and eroded faces were found on two of the three round altars, which stood on edge. One of these leaned slightly, but the eroded face was the better-protected one. Two eroded faces were also found on each of two altars which lay flat on the platform. These conditions are best explainable on the theory that erosion of altars occurred before as well as after the disturbance. It probably had not occurred by the time of abandonment, since the protection by post-abandonment debris seems to account for smooth tops on five of the seven altars of Group 1, while a smooth surface was found on only one of the seventeen other altars not afforded that protection. As noted before, ruin of the platform before the time of the cist-builders will also account for their failure to disturb the altars of Group 1.

We may conclude with considerable assurance that the Cist Period was a post-Classical one and, less surely, that it was a pre-Lacandon one. A single small burial mound does not amount to a reoccupation of the site, but it does tend to substantiate the view that the region was not depopulated at the end of the Classical or "Old Empire" period.

## Function

Structure O-7-2nd must remain unclassified because so little is known of it. We have considered it to be a stepped-top platform rather than a low platform on a basal platform because of the relatively great depth of the front element, and absence of a stairway.

The same reasoning applies to Structure O-7-1st. If our reconstruction of the narrow bench-like Unit B at the rear is correct, and if altars did rest on it as we suppose, we have in this period a three-level platform which might be called a new local type of temple. We place it in the unclassified category because our adopted definition for the term temple requires evidence for a belief that the structure was designed for public practice of religious rites and ceremonies, while our reconstruction of Structure

Table 10.12 Average Dimension Table (Str. O-7-1st)

| Unit | Height | Length | Depth | Slope |
| :--- | :--- | :--- | :--- | :--- |
| D | $1.5+$ | $12.0^{*}$ | 3.8 | 21 deg. |
| D $^{\prime}$ | 0.3 | $12.0^{*}$ |  | V |
| C | 0.3 | $11.2^{*}$ | 4.9 | V |
| B | $0.8^{*}$ | $11.2^{*}$ | 1.4 | V |
| A | $?$ | $3.0^{*}$ | $1.0^{*}$ | $\mathrm{~V}^{*}$ |

Note: Starred dimensions are approximations based on reconstruction; letter $V$ means approximately vertical.

Table 10.13 Object Table

| Position | Sherd | Figurine | Eccentric Obsidian | Miscellaneous |
| :---: | :---: | :---: | :---: | :---: |
| 1. Surface and superficial debris, horizontal positions not specified. | E-7-1 | $\begin{aligned} & \text { E-7-6 } \\ & \text { E-7-11 } \end{aligned}$ |  | E-7-5 (shell) <br> E-7-9 (pottery rectangle) <br> E-7-10 (nodule, hematite?) |
| 2. Debris on step (Unit D'), 10 m from left side. <br> 3. Same, 2 m from left side. |  |  | $\begin{aligned} & \text { E-7-3 } \\ & \text { E-7-2 } \end{aligned}$ | E-7-2 (pottery disk, pottery "rosette") <br> E-7-4 (flint knife) |
| 4. Near Cist 1 (probably from earth removed from Cist 1 or 2, or from space between them). <br> 5. Upright in Cist 1, surrounded by earth. |  |  |  | E-7-7 (fragmentary burned bone) <br> E-7-8 (human molar tooth) E-7-12 well-worked small rectangular column) |

O-7-1 st cannot be absolutely guaranteed. Before freezing the temple label to it another example should be found in association with altars or other cult objects actually on the third level at the rear.

The position of the platform, and the altars, show that it served the temple function within our broad definition, and there are no positive reasons for doubting that it was designed for this purpose. The bench-like third level, Unit B, is the best reconstruction permitted by the data, and there is good reason, short of proof, that some of the altars stood on it. Unit B, as reconstructed, has its best analogy in known temples-the typical roomlength rear sills, and the room-length rear bench of Structure K-5-3rd. These probably were for cult objects other than altars. We have a platform without masonry building on the temple-indicating pyramid of Structure J-3. The form of that platform is different, but it also shows three principal levels, in addition to broad steps (Table 10.12).

## Masonry Notes

Fills
Of Unit D, pure broken rock, medium size, observed at surface only; of Unit C, shallow layer of broken rock, closely packed, large to medium size, earth in interstices probably absent originally (seen below Unit 4); of Unit 4, not noted as differing from usual debris except for few large broken rocks.

RetainingWalls
Tabular stone.
Concrete
Crushed stone remains, probably of floor of Unit D I where buried by Unit C; also on Unit C to right-and left of Unit 4.

Plaster
None surviving; probably on all walls and floors.

## 5. The Plazuela of Structure V-1, Linton Satterthwaite

## Preliminary Remarks

The mound of Structure V-1 is the only one in the peripheral areas where the interior has been investigated by more than a single narrow trench. As of the time of writing this fact gives to the findings an interest out of all proportion to their intrinsic value, since for the Maya area as a whole the peripheral house mounds have received scant attention by excavation.

Four periods of construction were found, the latest with three subfloor burials. These are attributable to the occupation by the Classical Maya, and there was probably a post-occupation period when additional burials were made. Something was learned of the buildings of the next to latest and of the latest periods. Each differs significantly from anything found elsewhere at the site, and the latest may well have been the dwelling of a person of rank. We leave it in the unclassified category until such time as more peripheral mounds are excavated and comparisons can be made.


Figure 10.20 Isometric reconstruction: StructuresV-1-3rd-A and B.

This final building was placed on what we shall call the rear wing of an L-shaped platform. Structures V-2 and V-3, which were test-pitted only, were placed opposite the right wing of the $\mathrm{V}-1$ platform so as to form a small court, open at the front (Fig. 10.23). We have called this assemblage a plazuela, and for the present do not intend the term to imply anything more than a court or plaza which is small by comparison with those of the main ceremonial groups. The term is borrowed from Thompson. It applied to several other groups in the peripheral area of this site, and when these are better known, perhaps it will be possible to substitute a more informative label. As shown in the figure, the three mounds forming the plazuela are set on, or partly on, a basal platform. This may be taken as a local adaptation to the terrain, in order to give a level court where the bedrock slopes gradually upward toward the rear.

Except at the front of the basal platform no walls showed before excavation. There was a small depression in the surface of the rear wing of the V-1 mound, with a partly exposed slab at its bottom. This proved to be the rear or northeasterly cover-slab of Burial 1 , one end of which had slipped down. Noticing this, the writer was led to investigate. One thing led to another, but it was never considered that we had time to make a proper excavation of the structure as a whole, even in its latest phase. We did however, satisfy ourselves as to the main features of the latest building, and learned something of the plan of the building preceding it.

In general it may be said that excavation was chiefly by trenching and pitting, and that the trench system was sufficient to expose what is shown by solid lines in the plans and sections which we publish. A somewhat peculiar choice of trench-lines results from our initial and primary interest in burials, the architectural findings being by-products. All trenches, and Pits 1 to 5 , were dug during the first (1931) season when the writer and workmen were inexperienced; Pit 6 was done by an experienced worker at the end of the last (1939) season, but at a time when he could not be closely watched.

So far as architectural form is concerned, the results are fully summarized in the plans and isometric reconstructions. The reconstructions, especially those of the earlier periods, depend in considerable degree on inferences from the sections. As a general rule, levels were controlled with the instrument. The right angles on the plans are arbitrary rectifications, necessary because of failure to record certain key measurements made with the tape. The parallelogram forms of Figure 10.25a are largely in broken line, hence not to be taken as certain.


Figure 10.21 Isometric reconstruction: Structure V-1-2nd-B.

## Unit Designations and Temporal Sequences

The four periods of Classical occupation are made up of at least seven phases, one in the earliest period and two in each of the later ones, as listed in the Scheme of Temporal Sequences (Table 10.14). During the latest two of these periods there was considerable complexity in the types of fill, and, since we are dealing with a kind of mound new to us, it seemed wise to reflect this fact in the cross-section drawings (Figs. 10.26-10.33). Primary distinctions are indicated by different hatchings: vertical for pure rock fills, and broken-line vertical for semi-solid fills (perhaps originally pure rock), with white for solid fills. Diagonal hatchings indicate deposits of black and red clay, both probably of natural origin.

Within the white areas of solid fill it has been convenient to distinguish separable deposits. This is done with series of lower case letters preceded by numbers, which reflect positional groupings on the drawings. This scheme of deposit identification is in addition to the usual one of capital letters as labels for units of a structure when considered as completed architectural forms. Thus, in Figure 10.26, Units D and E are differentiated for descriptive purposes as supplementary and building platforms; but they are a single structural unit, the hearting of which, where cut by this composite section, consisted of pockets of pure rock fill and of solid materials identified as Deposits la, 2a-2c, and 3.

Several units are labeled in this deposit system, but are believed to have been floors, rather than parts of heartings of platforms. These floors are further distinguished by lines of crosses in the section drawings.

Either or both of the hatched (clay) layers may have once functioned as occupation surfaces, but there is no convincing evidence for it. They are pure stiff clay in spots, but contained small stones at others. Where seen, the black clay rests on the red, and a few bone fragments and sherds were found in it; but it underlies a prepared floor in which stone is mixed with the same black clay as the binder, so the few cultural inclusions probably date from the time of the prepared floor. The red clay was sterile where examined, and such clay, as seen at a few other places, appears always to lie directly on bedrock. We are thus inclined to believe that, on any section, which shows red clay, the first structural surface above it probably dates from the time of the first settled occupation at this spot. However, at Pit 4, (Fig. 10.32), the upper part of the clay deposit was dark brown running into red below. This seems like a nonsignificant distinction, but unless it results from use of the red clay as an occupation surface, the right wing of the platform of Structure V-1 dates in part from the very earliest period though the rear wing does not. In the scheme of sequences we have ignored the clay layers and may be missing an earliest period when outdoor base-surfaces were, at least in part, gently sloping natural ground.


Figure 10.22 Isometric reconstruction: Structure V-1-2nd-A.

The prepared floors, marked with crosses in the sections, were all base-surface floors resulting from leveling operations, including construction of low broad platforms. In Figures 10.26, 10.27, 10.30, and 10.31 it will be seen that Deposits le, 2g, 4b and 5a are at about the same level, and hence we might consider them all as different exposures of one contemporary earliest floor. Since the first three of these deposits rest on the red clay, as to these this is the only reasonable inference. But Deposit 5 a is at a point where the red clay is appreciably lower, and Deposit 5a overlies a prepared floor represented by Deposit 5c. There is little doubt that Deposit 5c at the lower level, and Deposits le, 2 g and 4 b at the highest level, belong together in time as surfaces of a basal platform system This was later leveled up, by the floor of Deposit 5a, to produce a single level for the plazuela as in Figure 10.23. For reasons to be given, the floors immediately above the red clay also preceded the earliest building complex at the rear, so we assign them to a period labeled "Pre-Plazuela." Very probably these floors served buildings from the beginning, but this was not established. Parts of these earliest floors, at both levels, continued to serve during the next period (Deposits 5c and le, Figure 10.20); so far as we have evidence, part of the higher earliest floor was in use from first to last (Deposit 2e, Figures 10.20, 10.21, and 10.23).

Presumably the second step in the development of this part of the site was an extension of the broad basal terrace system further up the slope. Evidence of this is the floor of Deposit 2e. In Figure 10.26 it overrides the earliest on-clay floor for some undetermined distance, thus establishing a difference in time. Probably the rear of the earlier basal platform ended along an irregular line as determined by varying levels of natural clay and/or bedrock. Possibly this new unit in the stepped base-surface system should be considered as defining a secondary phase of the earliest Pre-Plazuela period, but we have assigned it to Structure V-1-3rd-B, which it certainly served, since it is the only possible such surface for the main platform of that structure (Unit N, Figure 10.27). The available data require us to reconstruct Unit N as in Figure 10.19, so that, from front to rear, it straddles the new basal platform

Table 10.14 Structure V-1 Scheme of Temporal Sequences

|  |  | Unit Num. | Figure | Num. |
| :---: | :---: | :---: | :---: | :---: |
| Pre-Plazuela V | Prepared floors (pavements of base surfaces) at lower front and | Deposits 5c; <br> le, $2 \mathrm{~g}, 4 \mathrm{~b}$ | Iso. 20 | $\begin{aligned} & 26,27, \\ & 3031 \end{aligned}$ |
| Str. V-1-3rd-B | Main platform with crude on-edge masonry | Unit N | 20 | 27 |
|  | Prepared floor (pavement of additional basal terrace) | Dep. 2e | 20 | 26,27 |
|  | Probable Building Platform | Unit M, M' | 20 | 28 |
| Str. V-1-3rd-A | Probable narrow leftward extension of Main Platform | Unit L | 20 | 26 |
| Str. V-1-2nd-B | Main platform, new | Unit K, K' | 21 | 24 |
|  | Building platform, new | Unit J | 21 | 24 |
|  | Building walls (thin, possibly base-walls); jamb of front doorway distinguished as $I^{\prime \prime}$, front wall of narrow right room distinguished as I' | Unit I, I', I' | 21 | 24 |
| Str. V-1-2nd-A | Composite bench against front wall of narrow right room (secondary narrow extension distinguished as G') | Unit G, G' | 22 | 24 |
|  | Extension of building toward right | Unit F | 22 | 24 |
| Str. V-1-1st-B | Supplementary Platform (probable projecting stairway to plazuela level distinguished as E") | $\begin{aligned} & \text { Unit E, E', } \\ & \text { F" } \end{aligned}$ | 23 | 25a |
|  | Probable rearward and forward extensions of Main Platform | Unit X, 3' |  | 26 |
|  | Building Platform, structurally continuous with Unit E (low forward projection distinguished as $\mathrm{D}^{\prime}$; apparent extension of this around right end distinguished as $\mathrm{D}^{\prime \prime}$ | $\begin{aligned} & \text { Unit D, } \mathrm{D}^{\prime} \text {, } \\ & \mathrm{D}^{\prime \prime} \end{aligned}$ | 23 | 25a |
|  | Building walls (probably base-walls; those of right room distinguished as $\mathrm{C}^{\prime}$ ) | Unit C, C' | 23 | 25a |
|  | Masonry block, probably low bench for fireplace | Unit B | 23 | 25a |
| Str. V-1-1st-A | Probable raising of floor of Supplementary Platform resulting in elimination of Unit $\mathrm{D}^{\prime}, \mathrm{D}^{\prime \prime}$ | Unit A, A' |  | 26 |
| Post- <br> Abandonment Occupation? | Low irregular heaps of debris on floor of latest building, probably over shallow burials |  |  |  |

Note. Strs. V-2 and V-3, and right wing of Str. V-1 platform, not assigned temporal positions. Str. V-2 probably no earlier than floor of Deposit 5a and probably shows two periods corresponding with Strs. V-1-2nd and V-1-1st.
of Deposit 2e. This arrangement saved a great deal of labor, since once it was decided to build so far back (and so far up the slope), a great deal of filling would have been required to bring the entire base surface to the necessarily high rear level, and the straddling principle seems to have been acceptable to the end.

In the secondary phase of this period, Structure V-1-3rd-A, a known wall, Unit $L$, is reconstructed as a retaining rather than as a free-standing wall, though this is not absolutely certain. It rested on the new and highest basal platform unit and ended against Unit N , and so is later than that. Apparently it is the front face of a narrow lateral extension of Unit N , that is, of the main platform of Structure V-1-3rd-B, as suggested in Figure 10.20.

With the foregoing explanations of reasoning respecting base-floors it is felt that a casually interested reader can get a good idea of the rest of the sequence of architectural forms from the Tabulated Scheme, and the
figures referred to in it. For more detail one may turn to the Discussion by Periods and Phases.

As always, broken-line portions of reconstructions may not be quite correct, and this is especially true of Structures V-1-3rd and V-1-2nd as shown in Figures 10.20 to 10.22 .

Alternative extensions of the little that is surely known are possible, but they could hardly upset the conclusion that each of the four main structural periods distinguished represented substantial changes from what had existed before. The reconstructions, with all their doubts, make it clear that a low peripheral mound may or may not be a house mound, as of a particular period, and that in such mounds lies much of the history of the development of Maya architecture. Among the peripheral mounds there is just as much promise of stratigraphical control as one expects in the large mounds of the main ceremonial courts and plazas.


Figure 10.23 Isometric reconstruction: StructureV-1-1 st-B (locating Pits 1-6).

## Discussion by Periods and Phases

## Pre-Plazuela Period

As noted before, a basal platform system of broad low terraces, forming at least two levels, falls in this period. The lower and forward level is represented by the floor of Deposit 5 c , and the higher rear level by the floor of Deposits $1 \mathrm{e}, 2 \mathrm{~g}$ and 4 b . It was convenient to describe briefly these floors when showing that they require a separate period of their own. Here their label, PrePlazuela, is explained, and their composition is discussed more fully.

The miniature court assemblage implied by the term Plazuela appears to advantage in Figure 10.23, and it may also be seen in plan on the map of the site. It is clear that if we remove the rear wing of the L-shaped V 1 mound, and also eliminate Structures V-2 and V-3, our plazuela as such ceases to exist. The levels of the floors seem convincing enough evidence that Structure V-2 (and therefore probably Structure V-3) post-dates the lowest of the earliest floors, that of Deposit 5c. Figure 10.26 shows clearly that the higher of these earliest floors, as known by Deposits le and 2g, were earlier than Unit K, the main platform forming the rear wing of the L-shaped
complex of Figure 10.23. So there can be no doubt that our earliest floors pre-date the plazuela, at least in its known form.

We cannot be so sure that the plazuela assemblage idea was absent in the Pre-Plazuela period; Pre-Plazuela for our period means merely earlier than the known plazuela. The latter probably had not appeared even in the succeeding period of Structure V-1-3rd, since the left end of this structure is not far from the front-rear axis of the final small court. So, in the sense in which we use the term, we probably have two Pre-Plazuela periods, the later of which can be more particularly designated as that of Structure V-1-3rd.

It is a matter of interest that the floors of the PrePlazuela period appear not to have been of lime concrete. This is perfectly certain for that portion of the higher level represented by Deposit 1e, where the binder used is stiff black clay. Elsewhere the base-surface floors of this and later periods consisted of broken stone and earth. Ordinarily, horizontally disposed deposits of crushed stone and earth have been found only in exposed positions, and we have usually taken them to be the remains of lime concrete floors, the lime having disappeared after centuries of leaching by the rains. We know that some out-of-door floors were finished with lime plaster, since


Figure 10.24 Plan: StructureV-1-2nd-B and $-A$ (locating Sections $A-B$ to $K-L$ and Burials 1-3).
this survived at protected spots. But here at Structure V-1 parts of our early floors were very well protected. This is true for Deposits 2 g and 4 b of the Pre-Plazuela period, and for Deposit 2e of the Structure V-1-3rd-B period. Deposits 2 g and 2 e were not only buried deeply, they were actually under the well-preserved lime-concrete floor of Structure V-1-2nd-B. Lack of finishing plaster and of recognizable lime in the body seems convincing evidence that the earth forming the binder of these floors never contained burned lime of the usual amount, while the fact that part of one of them surely contained only clay makes it practically certain that no lime was used. It may be that what we described as earth was of a clayey nature, specially selected for the purpose, but clay as the binder was noted only for the black clay portion of a PrePlazuela floor.

Field sketches suggest that in these clay-and-stone or earth-and-stone floors there was a greater amount of sizable angular stone fragments than is usual in the crushed stone of local lime-concrete. They also indicate that the stone was more closely packed, so that the binder was quantitatively of less importance. It is possible that, with sufficient attention to protected deposits, it may become feasible to distinguish exposed remains of this type of floor from exposed remains of lime-concrete floors.

So far as the evidence of this plazuela goes, in the earliest and next earliest periods outdoor prepared basesurface floors did not contain burned lime, and this may be true for such floors in all periods at this locus. Properly recorded evidence of the type of floor used for buildings is available only in the case of the latest two of the four structural periods, where lime-concrete was surely used (Structure V-1-2nd) or probably used (StructureV-1-1st). Those floors were at indoor positions.

It would be unsound to conclude that the Pre-Plazuela and Structure V-1-3rd periods predate knowledge of or use of lime-concrete in floors generally. The building platform of Structure V-1-2nd, with its concrete floor, rested on a main platform, Unit K, which seems to have been surfaced with a mere dirt floor, without even a special layer of crushed stone; while the probable building floor of Structure V-1-3rd was finished with lime plaster, and the walls of the main platform of that period almost surely were so finished. A problem for future operations is indicated. In the meantime this mound indicates that differences in floor material may reflect differences in the position of the floor, the differences may be functional rather than temporal. At any one locus we have to consider outdoor base surfaces, outdoor platform surfaces, and indoor platform or building surfaces. For


Figure 10.25 a. Plan: StructureV-1-1st-B (locating Sections A-B and Burials 1-3); b. longitudinal Section A-B through Strs.V-1-3rd, -2nd, and -1st and Burials 1-3.
the site as a whole, in any one of these situations there may have been contemporary differences as between the main ceremonial groups and peripheral assemblages such as the one here considered.

## Structure V-1-3rd-B and -A

All that we know of architectural form during this period is shown in Figure 10.20, supported by the crosssections of Figures 10.26-10.28. The higher base-surface toward the rear, the floor of Deposit 2e, is taken to be a rearward extension of the basal platform system of the prior period. It may really belong with that period, as a secondary phase. We assign it to this period on the theory that need for it was first felt when it was determined to place Structure V-1-3rd so far to the rear that it would have rested in part on unprepared sloping ground unless the area of level base surfaces was extended. As may be seen in Figure 10.26, the higher of the two earlier surfaces must have ended against the natural slope not far to the rear of the point where we exposed it on Section E-F, probably about under Unit L. Turning to Figure 10.20, it
will be clear that the main platform of Structure V-1-3rdB, Unit N, certainly extended some distance, and probably a considerable distance, further toward the rear.

Possibly when this third and higher base-level was established at the rear, a two-level base surface arrangement was maintained by raising that at the front, thus blanking out the floor of Deposit 5c. Instead, the burial of Deposit 5c by deposit 5a is first shown in Figure 10.21 on the theory that this was more probably connected with the earliest definite plazuela grouping of mounds.

The evidence for a secondary phase of the period under discussion, Structure V-1-3rd-A, consists only of the wall labeled Unit L. In Figure 10.20 this is assumed to be a retaining wall for an extension of the rear part of the main platform, Unit N . It is barely possible that we saw only one face of a free-standing wall of a building. If our reconstruction is correct, in cutting Section E-F of Figure 10.26 we should have noted the top of the platform extension, and did not; but this top may have been missed because, like the later Unit $K$, it lacked special surfacing


Figure 10.26-10.33 26-Composite front-rear section (Sections C-D and E-F). 27-Longitudinal section through units of all structural periods, with cross section through Burial 1 (Section G-H). 28 —Rear-front section through units of all structural periods, with section through Burial 2 (Section K-L). 29_Longitudinal section through units of StructureV-1-1st and narrow right room of StructureV-1-2nd$B($ Section K-L). 30—Front-rear section of Pit 6 through units of all structural periods. 31—Section of Pit 5 through floors of plazuela.

32-Section of Pit 4 through right wing of main platform of StructureV-1.33-Section of Pit 2 in mound of StructureV-2.
material. The nature of the secondary phase is in some doubt, but the fact of its existence is not.

The relation of Unit M to Unit N leaves little doubt that Unit $M$ was a building platform We saw too little of it to expect to encounter positive evidence of the building, even if such remains. The presumed building platform floor appears in our notes repeatedly as the red floor, in contrast to the gray floor of the next later period, that is of Structure V-1-2nd-B. Both red and gray floors were surfaced with lime finishing plaster. The notes are not specific as to whether the color notations
refer to the plaster or to the body of the floor, and since stone-and-clay floors appear as base-surfaces in this V-13rd period, and since the soil immediately over bedrock is red clay, the red color note may possibly refer to the body of the building floor. A clay-and-earth building floor is something to look for in the future, but it is improbable here. Having specifically identified a black clay-and-earth floor as such it is unlikely that we should have described a red clay-and-earth floor merely as red. The color was probably that of paint applied to the finishing plaster, since fragments of thick red-painted gray plaster were found in

Table 10.15 Objects Recovered with Burial 2

| Tooth, cuspid, inlaid with jadeite disk, and apparently filed | With 6 other teeth, among skull fragments |
| :--- | :--- |
| Tooth, cuspid?, inlaid with iron pyrite disk | Region of the knees |
| 17 jadeite beads, diameters $5.5-7.5 \mathrm{~mm}$ | Just below jaw fragment |
| 15 shell discoidal beads, diameters $3.5-6 \mathrm{~mm}$ | Just below jaw fragment |
| 1 shell labret | Just below jaw fragment |
| 1 bone or shell rosette | Near the beads |
| 1 bone or shell labret | Between lower leg bones |
| 1 sting-ray spine | Near hand bones on right(northwesterly) side |
| 1 shark's tooth (?) | Near hand bones, right side |

the fill of Structure V-1-2nd close to where this rested against the main platform of the V-1-3rd structure. They were above black clay, probably in Deposit 1c or 1d of Figure 10.26 , and they probably came from the V-1-3rd structure when it was being buried.

The floor of the building was therefore not only plastered but almost certainly it was painted red. The recovered loose fragments must have come from this floor, or else from an outdoor retaining wall of the main or the building platform, since the surface of the main platform appears to have been of mere earth (Fig. 10.28, where a surface at the base of the building platform must have been penetrated, yet was not recognized). But since no plaster was found in position on well-protected portions of the retaining walls it is probable that only the indoor floor was plastered and painted.

One is tempted to speculate on the nature of the presumed building. Charcoal and burned daub-clay were found in Deposit 2d" of Figure 10.28, that is, close to the building platform. Burned daub-clay with stick impressions, but without the charcoal, was found in Deposits 2d and 2d' of Figure 10.26, which lay against the main platform. This showing is insufficient for postulating the burning of the $\mathrm{V}-1-3 \mathrm{rd}$ building. The daub clay and a little charcoal probably went to a dump after some other building burned, and were brought here as inclusions in the partly solid fill of the next period. They show only that daubed palisade buildings were known at the site during or before the V-1-3rd period. The building here may have been of this type, with or without base-walls, but there is no positive evidence.

In Figure 10.21 we have labeled the top of a retaining wall equivocally, suggesting that it may belong to the end of the building platform of this period (Unit M). At Burial 2, and in a trench approaching it from Burial 1, we did not find the gray floor of Structure V-1-2nd, which is expectable a few centimeters above the red floor. This suggests that the later building platform was built so as
to incorporate that of Structure V-1-3rd, but not so as to bury its surface; and it maybe that the old building platform was extended to the rear and to the left (at a higher base-level but at about the same top-level), but not to the right nor to the front. In that case the wall in question functioned first as the end wall of the building platform of Structure V-1-3rd, and later as part only of the end wall of the Structure V-1-2nd building platform. Accepting this as a possibility, by no means proved, we have a hint that the building platform of our earlier period was about 7 m or 8 m long. The depth suggested for it in Figure 10.20 is entirely hypothetical.

## Structures V-1-2nd-B and - $A$

Knowledge of the platform units of this period depends largely on the published section drawings, and more information might require changes in Figure 10.21. The limits of the building platform are especially important, since these control the size and proportions of the building. While we know the positions of the rear of both the building and its platform, there is doubt concerning the precise position of the front of the platform (Unit J). This arises through failure to find the front wall itself on Section C-D of Figure 10.26, and failure to distinguish the top of the main platform on this section, as was done on the rear Section E-F of the same figure. The main platform is so deep that without this information one may doubt whether it can be said positively that the larger left room of Structure V-1-2nd-B opened onto the main platform rather than into an additional room in front of it. We can be sure there was no such front room unless it had a mere earth floor instead of a plastered lime concrete one like that of the rear portion, and this is improbable in the highest degree. In the figure the front of the building platform is probably placed a meter or so too far forward, if anything.

There results an extraordinarily deep main platform in relation to the depth of the building platform, with

Table 10.16 Average Dimension Table: Platform Units

| Str. V-1 Phases | Unit | Height | Length | Depth | Slope |
| :--- | :--- | :--- | :--- | :--- | :--- |
| V-1-3rdB | N | $0.9^{*} / 0.6$ | $?$ | $?$ | 12 deg.* |
| V-1-3rdB | M | 0.60 | $?$ | $?$ | $?$ |
| V-1-2nd-B | K | $1.2^{*} / 0.9$ | $?$ | 11.3 | 12 deg.* |
| V-1-2nd-B | J | 0.25 | $?$ | $?$ | V |
| V-1-1st-B | K, X | $1.2^{*} / 0.9^{*}$ | $28.0^{*}$ | $13.0^{*}$ | $?$ |
| V-1-1st-B | E | 0.7 | $?$ | $11.0^{*}$ | $?$ |
| V-1-1st-B | D | 0.8 | $15.0^{*}$ | 6.0 | $?$ |
| V-1-1st-B | $D^{\prime}$ | $0.4^{*}$ | $15.0^{*}$ | $11.2^{*}$ | $?$ |

Note: Starred dimensions are approximations based on reconstructions; the letter $V$ means approximately vertical.
very extensive exposures to rear and front. This seeming disproportion was planned, since building platform and main platform are structural units, built at the some time (Units J and K, Figures 10.26-10.29). The large exposed areas of the main platform were nothing more elegant than leveled-off tops of solid fill, so far as our records indicate. At the rear the line of this dirt floor was indicated by a change in color, but we failed to note a similar line at the front (Fig. 10.26). However, at Pit 6, dug partly for this purpose, a change in color was noted at just about the expected level (Fig. 10.30, Deposits 4a and $4 a x$ ).

The building was evidently quite long in relation to its depth, the proportions probably being not unlike those expectable in palaces. The plan is only imperfectly known, but it was certainly so peculiar that at present it belongs in the unclassified category. At the left of the known portion, as indicated in Figure 10.21, there was a room 2.7 m deep. We here refer to this as the left room. It may have been 6-7 m long, and certainly was more than 3.5 m long. If it was approximately square, then there may have been two such rooms, each with a doorway. For descriptive purposes we will ignore this possibility, considering it the only left room, either nearly square with one doorway or longer, with two doorways.

At the right rear corner of this room much was destroyed when the chamber for Burial 1 was built, but it is certain that a passage only 50 cm wide led to the end of a chamber, 5.5 m long, the "right" room. This was only 1.2 m deep. Secondary features of the next phase make it reasonably certain that there were no other openings into this chamber, at least at floor level.

The secondary activity constituting Structure V-1-2nd-A is illustrated in Figure 10.22. It included two episodes in this right room. First, Unit H, apparently a bench, reduced the depth-at-floor-level to about 80 cm , but this was only for about 1.8 m at the left end;
later, a narrower extension of this bench along the front wall reduced the depth of the rest of the chamber to 90 cm . Units H and G both rest on the plaster floor of the room, and plaster on the end of Unit H showed that the narrower secondary feature was the later of the two. Though we have restored these as benches, we cannot be absolutely sure of their character, since no part of the top of either had survived.

As may be seen in Figure 10.28, the plastered floor of the original narrow right room curved up noticeably to the front wall. At this point the wall itself was missing, doubtless as a result of Maya excavation for Burial 2; but a fragment of wall plaster, facing rear, had adhered to the fill of the bench placed against it, so there is no question of the correctness of our broken line reconstruction of the wall, Unit 11 at this point. The fact that the floor curved up to it, with only one layer of finishing plaster, is good evidence that the peculiarly narrow right rear room, without the benches, was part of the original plan.

There was some sort of extension to the right of the building, as evidenced by the wall labeled Unit F in Figure 10.22. This has been assigned to the phase of the supposed benches, but it might be earlier or later. In the drawing this wall is considered to be the rear wall of an additional room on the right, but we failed to record positive evidence that this wall was not part of the original plan. If the platform wall further front does not mark the original end of the front portion of the building platform in this period, then we may be incorrect in placing Unit $F$ in the secondary phase of the benches. At the rear the original building platform surely did end as shown in Figure 10.21, as is proved by the section of Figure 10.29. The latter section shows also that the rear part of the ends of the original building platform and building remained exposed until buried by the fill of Structure V-$1-1$ st, so there is no doubt that Unit F was the rear wall and not an interior wall of the extension, whether this
was a secondary one or not. Yet it is well forward of the rear wall labeled Unit 1. Possibly in the beginning, but probably only in the final phase, the outline of building platform and building was that of a modified rectangle, not of a simple one.

Unfortunately we failed to expose the front face of Unit F, the supposedly secondary rear wall to the right, and do not know its thickness. The building walls assigned to the original phase are of great interest because they were only 35 cm thick. It is not possible to decide positively whether they once rose to roof height, or were base walls. They were plastered, but where tops were seen these were uneven, without surviving original surfaces. Nevertheless the best guess would seem to be that they were base walls. If they once rose to roof height it would have been necessary to cut them down to make way for the floor of Structure V-1-1st, which was only 1.15 m above their bases, but it would not have been necessary to cut them down to a maximum surviving height of about 50 cm . However, the possibility of stonerobbing weakens the inference.

The fill of Structure V-1-1st, which obliterated this structure, contained evidence of clay-daubed construction somewhere in the neighborhood; but just as in the case of the fill of this V-1-2nd period, there was no evidence of burning perishable-material walls at this particular spot. Whether the walls were partly perishable or allmasonry, considering the thinness of the known masonry at the base, and the considerable depth of the left room, it seems probable that the roof was of thatch, rather than beam and mortar. Certainly it was not vaulted.

There was no hint of color on the plastered floors or walls of this period.

## Structures V-1-1st-B and -A

During this period we have to consider not only a structure and a modification of it, but also three sure numbered burials and a fourth doubtful one, not given a number. The burials are described under their own heading, and the assignment of Burials 1-3 to this period is justified under Dating.

Structure V-1-2nd-B completely blanked out known parts of the prior Structure V-1-3rd-B and -A. The structure of this still later $\mathrm{V}-1-1$ st period is also new in the main,
but apparently at the left end it made continued use of a small part of the old main platform Unit K (Fig. 10.23). Most of that old main platform and presumably all of the old building platform and building were buried under Units E and D, which we call respectively a supplementary and a building platform. As shown in Figure 10.26, the front and rear walls of the supplementary platform were set flush with those of the old main platform. Artificial fill against the rear of that main platform is best explained as part of a rearward extension of the old main platform to maintain the separate identity of the supplementary platform at the rear. In the reconstruction this fill (Deposit 3) is thus interpreted and also labeled "Unit X?" and a similar forward extension at the front is assumed on either side of the stairway. Here Deposit 1c is taken to be part of the architectural Unit X. The projecting stairway, Unit E" (over-riding Unit X) is based on a corresponding projection of debris and on the partial cut through it, shown in Figure 10.26.

The main platform, thus reconstructed, is analogous in a vague way to the pyramid of a temple, but it is the supplementary platform, which now provides stage-like surfaces before and behind the building platform, and it is the front one of these stages which is connected with the court by the stairway. The amount of exposure of this platform (as compared with the main platform in the preceding period) is reduced by setting the building platform further to the rear, and by the much greater depth of the platform, which includes a broad steplike element at the front, labeled D'. As reconstructed in Figure 10.23, at the level of this front projection the building platform takes on a modified rather than a simple rectangular outline. The portion which causes this complication in the design is labeled D" in the figure, and much of it is purely hypothetical.

So far as known, the latest phase, Structure V-1-1st-A, consisted in raising the top of the supplementary platform to the level of the lower portions of the building platform. This is known only on the section of Figure 10.26, where it is clear that there was such a secondary raising (Unit A) and that it probably extended forward to the head of the stairway. If this raising was general, it reduced the visual height of the building platform, which then appeared as a simple rectangle. But this is uncertain, and this phase is not illustrated.

Table 10.17 Structure V-1 Building Units: Section Table

| Str. V-1-Phases | Unit | W | R | W $^{\prime}$ | Length | Depth |
| :--- | :--- | :--- | :--- | :--- | :--- | :---: |
| V-1-2nd-B (left) | I | 0.4 | 2.7 | 0.4 (base) |  |  |
| V-1-2nd-B (right) | I $^{\prime}$ | 0.4 | 1.2 | 0.4 (base) |  |  |
| V-1-1st-B | C |  | $4.2^{*}$ | 0.8 (base) | 14.5 | $15.0^{*}$ |

Note: Starred dimensions are approximations based on reconstruction.

Table 10.18 Operation SE-1 Object Table: Time of Abandonment?

| Position | Sherd | Figurine | Miscellaneous |
| :--- | :--- | :--- | :--- |
| 1a On floor of Unit D of Str. V-1-1st | $-21 ;-27$ |  | -27 (whorl) |
| 1b Near surface, probably on or above floor |  |  | -7 (fragments of stone vessel) |
| 1c Probable debris at NW corner of Unit K |  | -42 |  |

So far as is definitely known, the building itself remained the same during both phases, but it is possible that the small right room is a secondary addition. The rear wall may not be structurally continuous throughout, and the front wall of the right room is known to be structurally discontinuous with respect to the wall of the main or left room, which it abuts. Thus it is perhaps not unlikely that there were some changes in the right room. However, there is a high degree of probability that a right room existed from the first, since in digging for the section of Figure 10.29, we did not encounter an old and buried end of the building platform near the right wall of the larger room (Unit C in the figure). There is really no reason to suspect that Figure 10.23 misrepresents the original plan except that at the right a division into a porch-like front and a room-like rear portion may have been delayed until a secondary phase.

A left main wall is reconstructed on the basis of a not very marked rise in debris level along this line; there was certainly no right main wall, and no continuous front wall along the front of the building platform. The wooden posts suggested there seem the only reasonable solution. Postholes were not searched for. At the front of the left room there were very dubious hints that there may have been low blocks of masonry, but if so, they could have been no more than bases for posts.

The walls survived to a maximum height of about 50 cm . The rear wall of the left or larger room was about 75 cm thick, the transverse wall at its right side was about 50 cm thick, and the front wall of the small right room was about 60 cm . Nevertheless it is practically certain that these were all base walls only, and therefore that the building as a whole was mainly of perishable materials.

This is indicated by the paucity of debris, well illustrated in the sections of Figures 10.25a and 10.26 , and by the character of the thickest of the walls themselves. This also is illustrated in Figure 10.26. The front and rear faces are of tabular stone, presumably laid in lime mortar. But they retained a hearting of small broken rock, apparently without mortar, and certainly without the scattering of irregular tabular stone expected in such heartings. The latter, with mortar, tend to bind facings and hearting together. These facings seem to have acted as retaining walls for pure rock fill in the tradition
of platform building, rather than in that of free-standing walls. Carried to roof heights, despite the considerable thickness, they would have been very weak unless the hearting was in fact concrete. If these were concrete walls, it is unlikely that the mortar would have completely leached out even at the base; or that they would have fallen to pieces down to a nearly uniform height as in the section of Figure 10.25a.

A single fragment of daub-clay was found in such a position that it probably lay on the building floor, but at a point where this had disintegrated. Since this might have been from within the floor material itself, and such remains were not plentiful, it had best be taken to mean merely that the perishable parts of the walls of this building may have been daubed with clay and, of course, may then have been lime-plastered. The base walls and floor were finished with lime-plaster, as proved by a survival in a protected region near the locus to Burial 2, and we considered the floor material itself to have been lime concrete.

The right room shows a very interesting feature, the bench labeled Unit B in Figure 10.23. Trees had completely disrupted its surface, but the height of about 50 cm was determinable by positions of specially selected large slabs, which capped the walls. The hearting consisted of broken rock and earth, which may have worked into it since abandonment. Parts of this solid material consisted of pockets of soft gray powdery material such as had been encountered nowhere else at the site, and which presumably was wood ash. While the bench may have been an altar, the burning of copal incense in pottery censers, as in the temples, will not account for this ash. Either full-scale fires were built in the hearting at the time of construction, or they were built on the surface of the finished bench.

## Post-Abandonment Period?

The notes describe the surface of the mound as a bit hollow in the region, which later was defined as that of the left and larger room of the latest building. A lack of this impression of concavity in the surface at the right doubtless resulted from the close proximity of walls and the bench there. The hollowness of the surface over the left room (to the right in Figure 10.25a) was occasioned

Table 10.19 Operation SE-1 Object Table: Time of Burials 1-3

| Position | Sherd | Figurine | Miscellaneous |
| :--- | :--- | :--- | :--- |
| 2a In Chamber of Burial 1 | -2 |  | -1 (human bone fragments) |
| 2b In cist of Burial 2 |  | -10 a (human bone fragments, teeth, jade and shell ornaments) |  |
| 2c In or above cist of Burial 2 | -18 | -11 |  |
| 2d In cist of Burial 3 <br> 2e Above cist of Burial 3 | $-28 *$ |  | $-30 ;-31$ (bone fragments, adult and child) |

by the absence of debris except close to the walls. The presence of such debris near the walls accounts for a minor mound which was noted before excavation, and which turned out to contain the front wall of the right room.

The subsequently known plan does not account for a spur of this latter mound, running off at an angle from it to a point beyond Burial 2. Certain humps had been noted about 2.5 m to the right of Burial 1 (left in Figure 10.25a). These were about where the spur seems to have terminated, and certainly well out from any wall of Structure V-1-1st. These notes on original contours are not very definite but they show clearly that if the longitudinal section of Figure 10.25a had been taken about 1.5 m further forward a greater depth of debris would appear above Burial 2.

The spur and humps were very likely a single feature. Notes during actual digging refer to humps only. They consisted of stone and earth debris resting on gray remains of the floor of Structure V-1-1st. Since natural disintegration of the walls of that structure does not account for them, they were probably man-made, or else were caused by the uprooting of a long-vanished large tree. A single human tooth was found under one of the humps, about at floor level. This tooth suggests a burial at a level, which would have required the heaping up of debris on the floor, and since we have a similar post-abandonment situation at Structure O-7, that is the preferable hypothesis here. It receives some confirmation from the presence of human remains, which may be from a shallow burial above the chamber of Burial 1, though there the teeth and bones were below floor level, and there were no humps. The situation there is described in more detail under Doubtful Burial. In both cases green workmen may have missed crude burial cists. Had these been missed at Structure O-7 the evidence for post-abandonment burial there would be little better than here.

## Burials 1, 2, and 3; Doubtful Burial

The evidence discussed under Dating leaves little doubt that Burials 1, 2, and 3 were made from the floor of the
building of Structure V-1-1st, some time after Structure $\mathrm{V}-1-1 \mathrm{st}-\mathrm{B}$ was built, and before abandonment. We thus have three sub-floor burials in a presumably late Classical Maya period. The term sub-floor is used in the sense that the floor was in use up to the time of the burials, and presumably thereafter. Bones and artifacts receive only preliminary attention here.

Each had its burial structure, distinguished here as covered burial cists (Burials 2 and 3) and a covered burial chamber (Burial 1). The implied distinction between cist and chamber lies in a greater vertical distance between the floor of the chamber and its cover. The term burial vault is reserved for structures, which employ the corbel idea or Maya vault in a more definite manner than was the case with the Burial 1 chamber. The two cists here considered may be called body-sized, to distinguish them from the small cists of Structure O-7.

## Burial 1

The chamber was somewhat irregular in plan and also in cross-section (Figs. 10.25a, 10.25b). The left side and both end walls were vertical, but the right side wall (observer's left in the figure) sloped inward somewhat in the manner of corbelling, especially where the chamber was widest. The two side walls supported capstones in the manner of sloping vaults on buildings, and the overhang of the right wall was such as to maintain a constant cap exposure of about 60 cm from one end of the vault to the other. At the bottom the chamber varied between 70 and 85 cm in width. Those cover slabs, which were sketched in place had bearings of only a few centimeters on either end, and could not have been used unless at least one of the walls sloped inward. Therefore the crude corbelling on one side only was probably intentional and necessary to get a slightly wider floor than the available cover slabs would otherwise have permitted. This is interesting, since in the cist burials no such width was required. The length, about 2 m , was also somewhat more than an extended burial of an adult Maya would have required.

No definitely prepared floor could be identified, but the bones lay about 50 cm below the cover slabs and presumably had been placed on leveled-off earth and


Figure 10.34 Plan and section of Burial 1, showing locations of certain bones after removal of many fragments.
stone fill at this level. The walls extended an additional 20 cm or more downward so that structurally the chamber may be taken as about 70 cm high, though as used it was only about 50 cm high.

## Position of the Body

There were fragments of bone nearly everywhere at the burial level. The more important ones were sketched in position as in Figure 10.34. The letters in this plan are for descriptive reference here only. The skull and a humerus were near B , the pelvis with apparently articulated femora were near C , the tibiae near D . At C the indication was of burial in the flesh, lying on the side. Under this hypothesis, skull and lower leg bones appear more or less where expected, but if this was an articulated and
undisturbed burial, why are the upper ends of the tibiae about 15 cm from the knee position as indicated by the femora? It soon becomes evident that we are not dealing with an undisturbed burial in the flesh. At E, in the far corner beyond the leg bones, was a vertebra and a rib fragment, while other vertebrae and rib fragments appear near A, at the other end beyond the skull, along with a variety of other bones, including a scapula.

However one accounts for these scattered positions, it is certain that they date from ancient times. All cover slabs were in place except the rear one, and only one end of this had dropped down. Below them was a mound of stiff clayey soil and some stone. This lay on the bones, and partly filled the chamber. This covering resulted in rather good preservation of bone material, so that decay does

Table 10.20 Operation SE-1 Object Table: Time of Burials 1-3 or of B-1-1st-B

| Position | Sherd | Figurine | Miscellaneous |
| :--- | :--- | :--- | :--- |
| 3 In fill of Units D-E, possibly moved for burials | -10 | $17 ;-37 ;-29$ | -29 (obsidian fragment) |

not account for the observed amount of fragmentation. The surface of this mound formed two humps, as if thrown in from above before the cover slabs were placed (Fig. 10.34). This form, as well as the quantity and nature of the soil itself, proves that it was not washed in around the partly fallen cover slab at one end. After that slab had slipped from one bearing, rodents could enter and burrow into this mound, but there was no recorded evidence that they had done so, and they would scarcely have carried rib fragments and vertebrae to opposite ends of the chamber, nor would they have deposited all transported fragments at a single level, leaving the upper part of the mound and its surface sterile.

The simplest explanation of the facts would seem to be that the body was first buried in the flesh, with the head to the rear; that later, before decay of bones was far advanced, the chamber was opened and many of the bones were scattered; they were then covered with clayey earth brought for the purpose, and the cover-slabs were replaced. This would account for the semi-correct positions of some bones only, including the articulated femur and pelvis. It might account for absence of offerings and ornaments with a body for which a fairly elaborate burial structure had been provided. That is, they may have been provided but removed later. If there was no reopening of the chamber we have a very unusual burial indeed.

## Other Data

It was possible to observe in the field that the skull showed artificial frontal flattening. Seven teeth were recovered. Several of these were filed, one (not an incisor but an upper cuspid) in notched Sun God style. The remains, which are fragmentary, are in the University Museum.

No offerings of imperishable materials were found. Bones of a small rodent were encountered in the soil at the rear end, below the partly fallen cover slab. They were in a small area at one level somewhat above the burial level. Presumably this animal died a natural death here, though just possibly it was an offering of some sort made during the partial filling of the chamber.

## Doubtful Burial

Another burial may have been made after the cover slabs of the Burial 1 chamber were last put in place. Conceivably the apparent disturbance of the bones of Burial 1 might
have been connected with such a later interment. The evidence suggesting another burial in the same region consists of a few human skeletal fragments which were not observed in place, but which seemed to come from positions in part at least above the cover slabs of Burial 1, and about at their level. Since the tops of these slabs were about 50 cm below the V-1-1st floor level, a second subfloor burial was feasible here.

When the partly fallen cover slab of Burial 1 was first lifted out a human jaw fragment appeared. It was from an individual heavier than the subject of Burial 1, as we determined later. More fragments of human bone fell out as undisturbed cover slabs and the upper stones of the left (southeasterly) wall of Burial 1 were removed. Included were fragments of long bones and skull.

In the field as we proceeded we could not find additional bones in place by probing in the sides of our cut, and concluded that these human fragments were merely scattered in the fill of Structure V-1-1st. It may be, however, that failure to take off the fill above the Burial 1 chamber in horizontal layers resulted in loss of evidence of a shallow burial here. If there was such, since the surface of the mound was flat and level in this region and well above the bones, it probably dates from the time of Structure V-1-1st, rather than the post-abandonment period.

## Burial 2

The body-size cist of this burial is illustrated by the plan and section of Figures 10.24 and 10.25, and the section of Figure 10.28 , which latter is longitudinal with respect to the cist. The cover slabs were broken to irregular forms and piled two or three deep, except at the front (the foot end of the burial). Here the cover was a single specially worked slab measuring 60 by 55 cm . That end of this slab, which lay at the end of the cist had been carefully chipped to a semi-circular form, as if to give a neat symmetrical appearance to the covered cist. Elsewhere this impression of a neat job was totally lacking.

The cover slabs were supported by a single course of rough stone which outlined the cist except at the rear or head end, where supporting stones were missing. The cist was about 1.8 m long. At the head end the outlining stones or walls of the sides were parallel and about 45 cm apart, but from about the middle to the foot end the enclosed space tapered somewhat irregularly to a minimum width of about 20 cm . There seems little doubt that the cist was
planned to contain the body of an extended burial, head to the rear of the building within which it was placed, and with no useless space at the sides. The tapering was not required by the size of the specialized cover slab at the narrow end.

The latter, and the lowest cover slabs, elsewhere, were about 20 cm above a poor quality plaster floor. Probably the intention was to provide an air space between floor and cover, so that fill would not come in contact with the body. However, this space was found filled with fine sterile soil except at the foot end, where this deposit was not deep enough to reach the underside of the large cover slab there. Presumably, elsewhere percolation around the irregular cover slabs was sufficient to make the filling of the cist complete, and there is no reason to suspect that the deposit of soil on the bones dates from Maya times, as was the case at Burial 1.

The white plaster floor was very rough and uneven, apparently nothing more than a thin layer of lime mortar spread over the carelessly leveled soil of solid fill into which excavation for the burial had penetrated. The plaster had disappeared at many places, but was perfectly definite at others. This floor, lacking a lime concrete body, was only a few centimeters above the red floor of Unit M, the supposed building platform of Structure V1 -3rd. One imagines that the builders of the cist were ignorant of this fact. Desiring a plastered floor they could have had one ready made with just a little more digging.

In Figure 10.28 it is apparent that at the depth to which they did reach they very likely would have found the later and also excellent gray floor of Unit J of Structure V-12nd, if that floor extended over the area of the earlier red floor of Unit M. Since they did not use the gray floor it is probable that they did not find it. This confirms our own failure to find the gray over the red floor in approaching Burial 2 from Burial 1, and strengthens our suspicion that the earlier floor continued to be used as part of the floor of the later and larger building, the slight differences in levels of known parts being non-significant.

Whatever the reason for it, the floor of this cist was plastered when it was built, and the quality was such that, without disturbance of the cover slabs, the evidence of anything more than a dirt floor had begun to disappear. Therefore it would be unsafe to reason that what seemed to have been mere earth floors in other burial structures were unplastered, if the conditions for preservation were similar.

## Position of the Body

Disintegration was so far advanced that nothing but teeth and bone fragments could be salvaged. In some cases it was clear that bones lay directly on the plastered floor. Considerable sections of long bones and various other fragments of the skeleton could be observed in the soil,
and were drawn and photographed before being largely destroyed in the process of removal.

Bones of hands lay close to the walls on either side, between 80 and 90 cm from the head end of the cist. Fragments of lower and upper arm bones led straight from hand bones along the left (southeasterly) wall of the cist to the region of skull and jaw fragments. Lower ends of a radius and ulna indicate a corresponding extended position for the other arm (the right arm if the body lay on its back). However, the humerus of the supposed right arm was displaced toward the center, perhaps in agreement with the fact that the skull and jaw fragments were somewhat to left of center. The skull and jaw fragments, with seven teeth, lay within an area about 25 cm in diameter, the nearest being about 10 cm from the head end of the cist, and about 5 cm from the left wall. Femora, pelvis, vertebrae and ribs had completely disappeared, but fragments of the tibiae were found in expected position for an extended burial.

An eighth tooth was found near the indicated knee position, so some minor disturbance by rodents, or possibly by washing, is a possibility. But there is little doubt that the body was laid out in the flesh, extended, head to the rear, hands at the sides; perhaps the torso was twisted somewhat.

Some few data indicate convincingly that the subject was an adult. The lower end of one tibia had survived and was 1.5 m from the head end of the cist. Since skull fragments reached to within 10 cm of that end of the cist, and one must allow for feet, a stature not less than 1.4 m seems indicated. A check on this is the fact that one arm was something more than 40 cm in length, not counting wrist and hand bones.

## Ornaments and Offerings

The subject was probably a man of some consequence, or, perhaps more probably, the wife of such. This is indicated by the list of recovered objects given (Table 10.15). The positions of the jadeite and shell beads suggest that they belonged to a necklace or necklaces. The presence of two supposed labrets of shell, and of the shell rosette which probably belonged with them, also indicates the burial of a costumed body. Though one of the labrets was far from its expected position, so was one tooth. These are both small light objects, which rodents could have moved.

The sting-ray spine was in the same position as a group of them in Burial 5, so it is probable that this and what we took to be a shark's tooth were intentionally placed near a hand, probably the right hand.

The list (Table 10.15), and especially its inclusion of jadeite and inlaying of teeth, is good evidence that the subject was no commoner. The inventory is, however, very modest as compared with that of Burial 5 in the central region of palaces on the Acropolis.

## Burial 3

Since this was a burial of an adult and child one imagines it was of a mother and child. As with Burial 2, we are here dealing with a body-sized cist, but there was a small extension to one side to accommodate most of the child's body (Figs. 10.24 and 10.25a). We will refer to this extension as the small cist. It was not independent, since it opened into the main or large cist. The small cist was destroyed at its foot end by our excavations. The large one tapered irregularly toward the foot end, perhaps more than is indicated on the plan. At this end the supporting single-course wall consisted of thin slabs set on edge. These had collapsed, making precise delineation of the original cist floor difficult.

The main cist was about 2 m long and had a maximum width of 37 cm , a minimum width of 26 cm or less, and an interior height, which we took to be about 10 cm at the rear or head end. The small cist, opening from the larger one, was probably about 80 cm long and about 25 cm wide. If the floor was plastered, this must have been a mere coating on earth, as at Burial 2, since there was no evidence of it.

As at Burial 2 there was here a puzzling lack of uniformity in the selection of cover slabs. A single heavy slab, which had been cut to a nicely rectangular form, covered the main cist from the head end (toward the rear of the building) to the region below the juncture with the small cist. A large corner piece of this slab was missing, or it would have covered the child's head, which projected into the main cist. This slab measured 1.6 m in length and 0.7 m in width. A photograph indicates a thickness of between 10 and 15 cm . One suspects this stone came from some torn-down building, but cut stones of these dimensions have not been found in place. Small slabs of irregular shape, disposed with little care, covered the small cist and that part of the main one not covered by the large slab. Although these smaller cover slabs did not fit nicely side by side, there was only one layer of them.

The slipshod nature of the covering over the small cist should be considered together with the fact that the bones of the child found in it were fragile but almost perfectly preserved, probably because they were buried in a deposit, composed of earth and an occasional small stone, which filled the cist. Possibly this had percolated in, but we did not think so, and there is at least a suspicion that the body (but not the head) of the child was purposely covered with fill, and that consequently the slabs over this did not need to provide complete coverage.

On the other hand there is good evidence that most if not all of the large cist, especially the part covered by the single large heavy slab, was intended to keep earth from coming in contact with the body. This large slab had cracked in two, apparently after being placed in position. This, and the partial collapse of supporting slabs
at the foot end, may have been due to the weight of an ancient large tree. When the slab was lifted, some bone fragments were at once visible and others adhered to the under-side of the slab, showing that nothing had filled the space between body and cover. Other fragments in the main cist were covered to a slight depth with soil, which presumably had percolated in.

## Positions of the Bodies

The skeleton in the main cist was in even worse condition than that of Burial 2. Recorded skull fragments lay in an area about 20 cm in diameter, in this case on the long axis, and reaching to within about 10 cm of the head end of the cist. Our notes fail to state the number of recovered teeth. A jaw fragment lay about 40 cm from that end, being somewhat isolated from the rest of the head bones, but still about on the long axis. A humerus, lacking its upper end only, lay parallel to the left (southeasterly) side of the cist, about 7 cm from it and so disposed that the elbow was about 70 cm from the head end of the cist. Remnants of hand bones lay about 37 cm below this elbow, indicating that the arm was fully extended at the side. But there were also finger bones a little below the elbow. Assuming that the body was on its back, the right arm was probably flexed to bring the right hand over the left forearm. Interpreting thus, the left hand may have reached to and actually touched the head of the child. However, there were apparently two finger bones 1.1 and 1.2 m from the head end of the cist, and close to the opposite or right side of the cist. Unless these had been carried by rodents both arms would seem to have been extended at the sides, but then the apparent presence of finger bones at an elbow is unexplained.

Fragments of upper and lower leg bones were noted more or less continuously along the right tapering side of the cist between points 1.2 m and 1.7 m from the head end and a point about 1.3 m below the probable position of the shoulder; while two or three toe bones could be made out about 10 cm further down. Since these bones were crowded together on the right side they gave the impression of a body laid out on its side. This probably was the case, unless the child's head lay actually in the lap of the adult. Otherwise room was lacking for both head and pelvis. It is probable that in this region the clearance between floor and cover slabs was more than the 10 cm we estimated at the head end, and sufficient for either of the suggested positions.

While there is considerable doubt as to precisely how the adult body was disposed, we can be fairly sure that the legs were extended, and the head was to the rear.

The child was certainly buried in the flesh, extended on the back, arms at the sides. The cist was evidently too short for it, so that the entire head and a little of

Table 10.21 Operation SE-1 Object Table: Time of V-1-1st Construction

| Position | Sherd | Figurine | Miscellaneous |
| :---: | :---: | :---: | :---: |
| 4a In fill of Units D-E, no disturbance suspected | $\begin{aligned} & -13 ;-14 \\ & -15 ;-16 \\ & -33 ;-36 \\ & -40 ;-50 \end{aligned}$ | $\begin{aligned} & -23 ;-24 \\ & -25 ; 40 \end{aligned}$ | -22 (fragments of "Lintel" 10;-32 (whorl, sherd disk, incised bone awl?); -34 (flint point and fragment); -35 (bone bead?; broken flint blade, pumice); -40 (bone and obsidian fragments); -44 (burned daub-clay with impressions); -51 (sample of plaster) |
| 4b Same, possibility of surface mixture | -5; -6 |  |  |
| 4c Same, possibility of mixture from V -$1-2$ nd | -8 |  |  |
| 4d Same, possibility of mixture from V-1-2nd or V-1-3rd | -19 |  |  |
| 4e In fill of Unit X <br> (Deposit 3) | -4;-54 | -3; -4 |  |

the shoulders lay within the main cist. All trace of the skull had disappeared, but the lower jaw occupied its expected place between the ends of the humeri and at the end of the vertebral column. Lower leg and foot bones were missing, but this was doubtless due to destruction in digging. Most other bones were successfully cleared with small tools, though they were badly damaged in the course of removal. The complete decay of the skull, in contrast to other bones, supports our inference that the small cist only was filled with earth at the time of burial.

The field sketch shows the top of a femur about 40 cm below the top of the left humerus, with the vertebral column rising 25 cm from the pelvis to the jaw. As sketched, the pelvis measured 19 cm from side to side. The skeletal material from this burial was sent directly to the National Museum in Guatemala.

## Ornaments and Offerings

One of the adult's teeth was inlaid with a jadeite disk, so the subject, whether female or male, was presumably a person of some consequence. But there were no personal ornaments and no offerings of imperishable materials.

## Other Data

The head end of the main cist, with its large cover slab, extended 32 cm under the front wall of the right room of Structure V-1-1st. A cover slab of the small cist extended 30 cm under the wall separating the left and right rooms of that building. Therefore, if the burial post dates those walls, about 30 cm of cutting into the fill below them was necessary.

## Dating

At this mound we have the double problem of considering probabilities as to dates of a series of architectural structures, and also as to the dates of burial structures. The datings of the two sorts of structure are not unrelated in theory, since the burial structures and their contents are pertinent to speculations as to the function of the architectural unit in which they were made. However, it is convenient to consider them separately.

## Architecture

Lacking any indication to the contrary, we assume that Structure V-1-1st-A was still in use as of the time of abandonment of the site as a whole, and presumably this was when the main ceremonial groups were abandoned, or at least not before then. So far as we can tell, the building itself was then in the form illustrated in Figure 10.23 for Structure V-1-1st-B. Since the building was probably mainly of perishable materials, it may have been repaired or rebuilt many times, without detectable evidence in the surviving original base-walls. The plan, then, seems late, but it might have appeared a considerable time before abandonment, and may even have become old-fashioned by that time. However, this type of plan first appeared at this spot late enough to allow for the use and destruction of a carved stone panel, "Lintel" 10. In preparing the platform units for Structure V-1-1st-B the builders had almost certainly thrown this fragment in the fill of Unit E, from which it was pulled by the pick of a workman who showed us the supposed spot immediately afterward. This was at level 0.9 m, in Deposit 3 of Figure 10.26. If he was mistaken as to the precise spot, then the piece may have been in the retaining wall of the fill from which he

Table 10.22 Operation SE-1 Object Table: Time of V-1-2nd Construction

| Position | Sherd | Figurine | Miscellaneous |
| :--- | :--- | :--- | :--- |
| 5a In fill of Unit K | $-20 ;-41$ |  | -41 (Obsidian fragment) |
| 5b Same, surface or earlier mixture possible | $-26 ;$ |  |  |
| 5c Same, mixture from V-1-1st possible | -52 |  |  |
| 5d Same, mixture from earlier deposit possible | -54 |  |  |

thought it came, but not at a lower level. It was surely part of the Supplementary Platform Unit E, which was structurally continuous with the building platform, Unit D.

Building and platform of the latest structural period (V-l-1st) were therefore later, perhaps much later, than the carving of "Lintel" 10, which preserves for us only a few glyphs. Eventually further development in dating by glyph styles may give a reliable approximate datum point in the Long Count after which Structure V-1-1st-B must have been built. Morley's choice for this point is 9.10.0.0.0, with two question-marks.

A cursory examination of sherds, from this excavation shows a single item, which suggests a date for Structure V-$\mathrm{l}-1 \mathrm{st}$-B long after the middle of the baktun. This is a small spheroidal foot, probably from the distinctive composite silhouette form of bowl illustrated in Cresson (1937, Figure 1). There are reasons for thinking this was a type traded in very late in the local time-scale, but of course a single example of the foot only is an unsatisfactory basis for reasoning. Its number indicates that it was included in the fill of Units D-E (SE-1-36 at Position 49 of the Object Table).

The complexity of the fills of Structure V-1-1st and V-1-2nd suggests the bringing of earth as well as broken rock to the spot during each of these periods. This would be likely to cause a mixture of sherds of different periods in a single deposit, so the presence of probably early sherds of flanged bowls in the latest fill does not argue against a late dating for the fill. Assuming such mixture of sherds we can conclude that both Structure V-12nd and V-1-1st post-date the introduction of negative painting on pottery, which is represented in both fills. But this style of decoration had appeared by the time of Structure K-5-3rd, an atypically large temple, which must have preceded 9.12.5.0.0 by some unknown but probably considerable time. So far as this ceramic control is concerned, Structure V-1-2nd may be as early as, or earlier than, that temple.

It is a fair guess that StructureV-1-3rd is considerably earlier than Structure V-1-2nd, since the latter seems to mark a decided shift in the position of the front-rear axis and probably the first appearance of the plazuela assemblage at this spot.

The floors of the Pre-Plazuela period comprise the first signs of structural improvement at this spot. They are so near the South Group Court that it is unlikely that they are any younger than the time of beginning the use of that court for stela erection. Otherwise we should have to postulate a ceremonial court of considerable size, with stela, with an exceedingly small number of structures in peripheral areas.

It appears probable that this mound results from structural activity and use spanning the entire time of local Classical Maya occupation. A fair guess would be, I think, that this lasted through the first eighteen katuns of baktun 9 . With reference to this local period of occupation the four structural periods were probably very early, early, middle and late. If such terms are unsatisfactorily vague, at least they show that peripheral areas of low mounds present the same opportunities for working out significant change in architectural design, as do the ceremonial groups at the center.

## Burials 1, 2 and 3

These three burials of the Classical Maya period can all be dated as certainly after Structure V-1-2nd-A, as a glance at the section of Figure 10.25a will show. The burial structures were placed in the later fill of Structure $\mathrm{V}-1-1$ st. The only questions are whether some or all of them may belong to an unrecognized period before this filling was completed as a platform for the late building; and, if not, whether some or all of them were made after completion of Structure V-1-1st-B (or A) by excavating through the floor. There is little doubt that all were made in the latter manner, dating from after the completion of StructureV-1-lst-B, and before the time of abandonment. Two or three factors have a bearing on this conclusion.

Theoretically, there might have been a period when fill was heaped up over the ruins of StructureV-1-2nd for the purpose of providing a burial mound, more or less formless. This might explain the stratified nature of some of the V-1-1st fill, as illustrated by Deposits 1a, 2b, and 2c in Figure 10.26. But neither there nor elsewhere was anything recorded which suggests long exposure of any surface between the floors of Structures V-1-2nd and 1 st. Further, if there was a period of burial-mound use, it seems unlikely that all burial structures would be oriented

Table 10.23 Operation SE-1 Object Table: Before V-1-2nd

| Position | Sherd | Figurine | Miscellaneous |
| :--- | :--- | :--- | :--- |
| 6 In Deposit 4b, mixture from V-1-2nd possible | -55 | -56 |  |

with their long axes running parallel to the front-rear axes of the structural periods. In the case of Burial 1, this might result accidentally through encountering a buried wall of Structure V-1-2nd, but the correspondence in the other two cases cannot be thus explained. In all cases the head was to the rear, rear with respect to the architectural features, and this is not to a cardinal point, even approximately, but about 33 degrees east of true north. The common orientation of the burial structures, and of the bodies within them, is best explainable by supposing they were chosen with reference to that of the V-1-1st building.

There is a hint that Burial 3 was made before the walls of that building were in place, since it partly underlies two of its walls. However, it is perfectly possible that this burial was crowded in the angle between the two V-1-1st walls so that the excavation for it need not cut the front wall of the building platform, nor extend in front of the doorway to the small right room with its bench. To get it where found, a little undercutting of the walls was all that was required.

On the other hand, the fact that Burial 3 does partly underlie the walls of the V-1-1st building indicates that it pre-dates the abandonment. In providing for Burial 2, a buried wall of Structure V-1-2nd was cut through. In providing for Burial 3, if the building walls of Structure V-1-1st had fallen to ruin, presumably they would also have been cut through, or else avoided by shifting the selected position a little.

We conclude that these burials are sub-floor ones, made from the floor of Structure V-1-1st while that was in use, hence late in the total period of occupation at the site.

## Function

A glance at Figures 10.21 and 10.22 shows why the building of Structure V-1-2nd, in each of its phases, is left in the unclassified category. It was not cleared sufficiently to eliminate a wide variety of possible reconstructions. However we can reason in a negative manner from what little is known. It does not fit into what is known of local types of temples and sweathouses, and we have information on a fairly large sample of those functional types. The same cannot be said for local dwellings, but it is difficult to imagine the peculiar long dead-end passage or room of Structure V-1-2nd, in either of its phases,
as an adjunct of a dwelling. Probably this building, if completely known, would call for setting up an additional functional type, or for defining palace loosely enough to include it.

The building of Structure V-1-1st, which followed is entirely different from what preceded it here, and also from anything known thus far in the main ceremonial areas, which are well sampled. It is also different from anything thus far known in peripheral areas, but these have not been properly investigated. From what little is known, however, it appears that areas peripheral to the main ceremonial courts and plazas may nevertheless also contain ceremonial buildings, at least of the palace and large sweathouse class, while the size and form of some mounds suggest the presence of platform temples.

Structure V-1-1st dominated its little court or plazuela, and a ceremonial function should not be ruled out a priori. However it seems more likely that we have here the first excavated example of an upper-class dwelling in this part of the Classical Maya area. Unlike the known types of late temples and palaces, it provides one large room of a depth reasonable for dwelling purposes. This room measured about 8 m in length, and was at least half this in depth. An overhanging thatch roof probably gave some shelter above the forward-projecting element of the building platform, and in front of the small right room it probably provided a covered porch-like space. While so far as real proof is concerned, the bench in this room may have been an altar, the evidence of known local temples is against this interpretation. Fires in them were probably confined to copal-burning in pottery censers, typically about column altars. While benches of similar proportions are common enough in palaces and sweathouses, they were probably thrones, and fires were not burned on them. Here such a bench may have raised a cooking fire to more convenient height, just as did an earth-filled wooden box-like construction on legs in our camp kitchen.

There may have been an additional building hard by on the right wing of the substructure there were surface indications that excavation might show base walls there. Structures V-2 and V-3 probably also were platforms with small buildings, largely or entirely of perishable materials. The entire assemblage, if not Structure V-1-1st alone, could surely have accommodated a sizable family, even with retainers.

Table 10.24 Operation SE-1 Object Table: Miscellaneous Positions

| Position | Sherd | Figurine | Miscellaneous |
| :--- | :--- | :--- | :--- |
| 7 Test Pit 1 | -9 |  | -9 (Obsidian fragment) |
| 8 Test Pit 2, Dep. 7a, probably fill of latest Str. V-2 |  | -39 | -39 (Obsidian fragment) |
| 9 Test Pit 4, Dep. 6b, fill of right wing of V-1-1st platform | -38 | -38 |  |
| complex | -43 | -43 | -43 (Obsidian fragment) |
| 10 Test Pit 5 | -46 | $-47 ;-48$ | -49 (Modeled clay |
| 11 Test Pit 6, clearing surface | -12 |  | fragment) |
| 12 Position not recorded |  |  |  |

Finally, the sub-floor burials were of persons of some rank, and high rank of the occupants would explain the expenditure of labor in platform-building at a dwelling site. Among these burials was that of an adult and child, presumably a mother and child, and this would not be expectable in a ceremonial building, since women seem to have been more or less excluded from important ceremonial functions.

We conclude that Structure V-1-1st probably was a dwelling, though not that of a commoner. But it seems safest not to label it formally as such on the basis of a single known example (Tables 10.16 and 10.17).

## Masonry Notes

During the digging of this mound little attention was paid to types of masonry. So far as known, the faces of all walls were of tabular stone, laid horizontally, except the upper part of the face of Unit N , the main platform of the V -1-3rd period. As noted elsewhere the upper course of this was of stones laid on edge. The stones were unusually large, about 40 cm high. Sketches indicate they may have been crudely shaped to approximately rectangular outlines.

In considering free-standing masonry walls here, it should be remembered that possibly all of them were base walls only. This seems to explain the fact that the hearting of the walls of the Structure V-1-1st building was pure rubble of small size. There is no proper record of a cross-section of the building walls of the earlier V-1-2nd period, but they were too thin to permit this platform style of construction.

The probable use of earth-and-stone and clay-and-stone floors has been discussed. This is clearest
in the earliest periods, and, so far as we know, this sort of floor may have been confined to out-door base surfaces. The evidence is good that in the V-1-2nd period at least, the tops of platforms where exposed out of doors might be described as mere dirt floors. But the floors of building platforms of this period were plastered. The body of these V-1-2nd building floors was lime-concrete, and that of the later V-1-1st floors was considered to be disintegrated lime-concrete. Use of lime-concrete for building floors very likely extends back to the V-1-3rd period, but notes on this are unsatisfactory. Perhaps we should not merely assume that a finishing coat of lime-plaster would be applied only to a lime-concrete floor.

The burial structures have been described. They were crude affairs, but in constructing the chamber of Burial 1, apparently there was conscious use of the corbel idea. Burial 2 shows that the floor of a mere body-size cist might be plastered, though apparently without the care necessary for a good smooth surface.

The complex nature of the fills during the V-1-2nd and -1 st periods is sufficiently indicated in the crosssection drawings. Where pure broken rock was used it was not of large size. Such stone was probably merely dumped in place. In theory this might have been within fill walls of large broken rock, or of tabular stone, but we encountered none.

The repeated use of sherd-containing solid earth as well as broken rock for fill material here suggests that ceramic controls may be more plentiful in excavations in peripheral areas than they have been in main ceremonial groups (Tables 10.18-10.24).

# - 6. Sub-Acropolis Structures 1, 3 and 4, Linton Satterthwaite - 

## General Remarks

In 1933 trenches were dug into Structure J-7, the open platform on the northeast side of Court 1 of the Acropolis. A connecting tunnel was driven under and behind Room 3 of Structure J-6 where Structure J7 forms its base surface. A deep pit, here known as Pit 1, was sunk in the court floor next to the rear edge of Structure J-2, on the southwest side of the court. In 1937 the trench-and-tunnel system was deepened somewhat and, connecting with it, a large deep pit (Pit 2) was sunk in the court. These excavations, with others, served to establish six main architectural periods for Courts 1 and 2 of the Acropolis, which we call Acropolis Periods I to VI, Acropolis I being the earliest.

In the region where Structures J-6 and J-7 are at the surface, a considerable number of buried structures were encountered, including remnants of three buildings. In this section of the report these buildings are singled out for description. The system of excavations, as such, the platforms not proved to be building platforms, and recovered objects, will be covered elsewhere.


Figure 10.35 Isometric reconstructions: Sub-Acropolis Structures 1,2 and 3.

Figure 10.35 shows what is known of two of the buildings, Sub-Acropolis Structures 1 and 3, and their relation to one of the platforms and a stairway (SubAcropolis Structure 2). The third building is known only
by a remnant of thick wall (Sub-Acropolis 4, shown in the cross-section of Figure 10.36).

## Structure and Period Designations

The labels used for these and nearby buried structures are in a system differing from that generally used in this report. Also, the Roman-numbered Acropolis periods into which various separate structures are fitted run forward in time. This is a departure from our usual plan of numbering and lettering in reverse time direction, when dealing with periods and phases of particular single mounds. We hope and believe these six periods will accommodate future discoveries of ceremonial buildings here, and though they do not apply to the site as a whole, they do refer to a substantial part of it. It should be noted that Acropolis in these period designations refers to a complex of ceremonial architecture. There may well have been a Pre-Acropolis period when this hill was devoted to other uses.

As time went on, destructions and fillings radically changed the Acropolis plan, so that horizontal relationships between buried and surface structures are meaningless. For instance, one platform lies partly below Structure J-6 and partly below Structure J7. So we have simply numbered the units buried by later Acropolis fills in a special series of Sub-Acropolis structures, the particular number having no special significance, spatial or chronological. Having thus identified a particular buried structure, if it shows sequential periods or phases of its own, these are labeled in the manner adopted as standard for the report, so that here as elsewhere a Phase B precedes a Phase A in time.

In field notes various labels were applied to these buried structures, and the Sub-Acropolis designations are here adopted for the first time, to eliminate confusion. Sub-Acropolis Structure 3 has been referred to in print as Structure 3 of the Sub-Court I Level (Satterthwaite 1937a). In the notes it was called House A, while Sub-Acropolis Structure 4 was called House B, and both were sometimes referred to as features of a J-7-Sub-2 stratum or level. When confusion is not likely, in the text the short term Structure 1 will be used for the fuller Sub-Acropolis Structure 1, and so with the others. The mere absence of one of the square-letters of the map is sufficient indication that the designation is in a special series. Similarly "Period" with a Roman numeral always refers to an "Acropolis Period."


Figure 10.36 Cross section of Sub-Acropolis Structure 3 and remnant of Structure 4.

## Assemblage and Speculations on Function

As may be seen in Figure 10.35, all we know about Structure 1 is that it was a low masonry platform, which supported a building or buildings with wooden posts, apparently without walls, and presumably with a roof of thatch. It may or may not have been a long shelter analogous to Structure O-18, with posts instead of masonry piers for support of the roof. It is interesting to note that here as there a broad-tread stairway (part of a platform complex labeled Structure 2) leads down to a lower level. These two units were reached only by tunneling. The floor of our tunnel was too high to show positively that the stairway of Structure 2 reached down to the base level of Structure 3, but there is no reasonable doubt of this, nor of the fact that the three structures, two buildings and a stairway were in simultaneous use during Period I. There is no available evidence as to which building is the earlier within the period.

The lower building, Structure 3, was revealed by open trenching and by Pit 2. During Acropolis Period I, it was at the edge of a high terrace as shown, from which at some point a stairway presumably led down to the lowest floor shown in the figure. This floor was seen at the base of the terrace in Pit 2, where a secondary floor, with finishing plaster, had raised the base-level about 13 cm . This latter may indicate only localized resurfacing. Both floors turned up to the terrace facing. In Pit 1, outside the area depicted in Figure 10.35, a single floor, at the same approximate level, establishes the fact that this Sub-Court I floor extended forward at least 14 m . It could not have extended in that direction more than about twice this distance before connecting with terracing and a presumed stairway dropping about 6 m to the West Group Plaza. Yet bedrock was encountered
just below the base of the high terrace revealed in Pit 2, and shown in the figure. From these facts we can infer that the structures shown in the figure formed units in an Acropolis-type of assemblage, and that already in Period I this had begun to obliterate a substantial portion of a natural hill.

In view of the very great emphasis on palaces in the final Acropolis assemblage it seems extremely likely that any buried buildings of sizes and proportions similar to the palaces of the final period were of the same functional type, so long as what is known of them does not indicate a radically different plan. Reasoning thus, the partial reconstruction of the earliest phase of Structure 3 (Structure 3-C) in the figure may be taken as that of a probable early palace. However, the presence of the medial wall, so characteristic in palaces at the surface, is a matter of inference, and it is deemed wisest to keep Structure 3 in the unclassified group. At the known end the medial wall is thought to have been removed to give a modification of plan in a final Phase A.

Sub-Acropolis Structure 4 is known only by a small portion of a heavy vertical wall, which like the walls of Structure 3, had been cut off by the Maya. Its base overlapped and rested on the edge of the high terrace, opposite the corner of that structure, as shown toward the right in Figure 10.36. It could not have been built until, in this neighborhood at least, the early base-level revealed at Pit 2 had been raised to the level of the top of the terrace. Our evidence is that the whole of the terrace face and of the Sub-Court I floor was buried at one time, and not first at this side only. Therefore it is possible that in Acropolis Period II Court I appeared at this approximate final level but in an early form with the old Sub-Acropolis Structure 3 at its rear, and with the new early palace-type

Table 10.25 Average Dimension Tables: Platform Units

|  | Height | Length | Depth | Slope |
| :--- | :--- | :--- | :--- | :--- |
| High Terrace | 3.3 | $?$ | $?$ | 70 deg. |
| Bldg. Platform, Str. 1 | 0.6 | $?$ | $?$ | $?$ |
| Bldg. Platform, Str. 3 | 0.8 | $13.5+$ | 5.9 | 84 deg. |

building at the front, on the platform of Structure J-2 in its known narrower original form. The known wall of Sub-Acropolis Structure 4 may well be a remnant of the end wall of a long palace type structure facing on this same court, from the side, though we certainly cannot be sure of this. A suspicious circumstance is that what must be the outer face of this wall seemed to run straight down to the base surface, and not to the expected plinth formed by the projection of a building platform. Another point to consider is its thickness of 1.3 m , which might be for support of a roof-comb on the rear wall of a temple.

Doubts as to the nature and position of Structure 4 do not militate against the impression that Acropolis Period II saw the further development of an Acropolis type of assemblage of buildings which included palaces, and that by this time, if not from the first, these long buildings were being grouped to face on courts at the level of the bases of their low building platforms. There can be no doubt that the two buildings, Structures 1 and 3, continued in use through Period II, after which, together with Structure 4, they were partly razed and their remnants were buried by a continuous deposit of fill. The original narrower building platform of Structure J-2, like Structure 4, seems to belong in Period II. While that platform was never completely abandoned, the original building on it was razed. In speculating on a complete plan for Sub-Acropolis Structure 3, one may reasonably consider what little is known of the original J -2 building (Structure J-2-2nd) since there was probably a period of contemporaneous use. There is good evidence that the design of Structure J-2 in original form included a medial wall meeting a transverse wall, as in our reconstruction of Structure 3-C. However, the early J-2 transverse wall may have served a transverse end room, rather than being the end wall of the building as a whole, as in Structure 3C.

## Stone Robbing

Evidence that structures about to be buried were used as quarries for contemplated new construction is provided by the exposure of the high terrace wall in Pit 2 (Figs. 10.35 and 10.39). As we worked down in this pit it was found that the facing broke off irregularly on the line clearly visible in the photograph, until the surviving
facing was only two courses high, at the bottom of the pit. The terrace was a comparatively high one ( 3.3 m ) but it sloped back 20 degrees from the vertical. At the irregular edge of what survived the stones were firm and undisturbed and lay in approximately one plane and there is no reason to suppose there had been a collapse here. Stone-robbing on a considerable scale is indicated.

One imagines there was a stairway built against this terrace, to connect the floor at its base with the basesurface of Structure 3. Exposures of the wall on either side of such a stairway would be more attractive sources of building stone than the part buried from the first by fill of the stairway. Hence there is a certain probability that the stairway was at one side of the position of Pit 2. The existence of stone robbing during Period II, when this terrace was buried, confirms an inference that it occurred again when Structure 3 was abandoned, and raises the question whether complete disappearance of the medial wall of that structure requires any other explanation. Reasons for not attributing that disappearance to stonerobbing are given in the detailed discussion of the structure.

## Discussion by Particular Structures

## Sub-Acropolis Structure 1

Our tunnel uncovered only an L-shaped portion of the surface of this structure, which lay well behind (northwest of) the eventual position of Room 3 of Structure J-6. The early platform was coated with good white finishingplaster, on which lay a deposit of stone, earth, and burned daub-clay, 20 cm or a little more in thickness. This deposit was more or less flat and level on top, the upper surface being at first followed in from the top of the retaining wall of Sub-Acropolis Structure 5, a Period III platform about 50 cm high, not illustrated. Following this surface merely required lifting off the stones of the pure rock fill of Sub-Acropolis Structure 8 of Period IV, also not illustrated. Though no plaster finish was anywhere found on this surface, there is little doubt that the deposit in question was the body of the floor of Structure 5, which buried Structure 1. The presence of burned daub-clay
indicates the burning somewhere of daubed wooden structures before the beginning of Period III, but there was no evidence that either Structure 1 or Structure 5 had been burned.

Digging down through the presumed floor material of Structure 5 revealed the plastered floor of Structure 1. Digging down from the base of the retaining wall of Structure 5 revealed what must be the base-surface of Structure 1, that is, the surface of Structure 2, which was plastered; undercutting the Structure 5 wall enabled us to follow this plastered floor in to a point nearly if not actually below the nearest exposure of the floor on Structure 1, but without encountering the Structure 1 retaining wall, which should have connected the two. Thus Structure 1 is probably at least structurally later than the base-surface to which it is assigned. Stonerobbing may account for our failure to find the Structure 1 retaining wall where expected, and where we place it in Figure 10.35. Conceivably, it may have been further forward.

Allowing 25 cm for the thickness of this wall, in the position of Figure 10.35, a post-hole was found with its center about 2.8 m back from the edge of the platform. The post-hole was 1 m deep. Below the upper portion, passing through the Structure 1 floor, its sides consisted of pure rock fill. Failure to note a second, lower piercing of a floor by the post-hole indicates that the floor of Structure 2 did not extend this far under Structure 1. It is possible, therefore, that the higher and the lower plastered floors, those of Structures 1 and 2, respectively, belong in a single phase of Period I, the lower unit being first floored and plastered a little beyond the planned position of the missing wall of Structure 1.

Having reached a post-hole we turned our tunnel at a right angle, hoping to pick up another posthole, which was found, at a distance of 5.8 m from the first. As it happened, for much of its length a straight line between the centers of the two known holes ran within 25 cm or so of the somewhat irregular forward (SE) side of our tunnel, which could not safely be widened after we realized that its direction was wrong by a slight amount. Hence it is possible that there was a third post, between the two known ones, especially if their alignment was poor. If not, considering the wide spacing, it may be suspected that we happened to chance on holes of two posts pertaining to two buildings on the same Structure 1 platform.

Table 10.26 Structure 3-C,

| Average Dimension Tables: Section Table |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| W | R | M | $\mathrm{R}^{\prime}$ | $\mathrm{W}^{\prime}$ |
| 0.7 | 1.6 | $0.9^{*}$ | 1.6 | 0.7 |

Note: Starred dimension is approximation based on reconstruction, existence of wall inferred.

The indicated thickness of the posts is about 25 cm , similar to that of main-posts selected by local bush-house builders for our largest camp structure. The evidence is clear that the posts were set up before pure rock fill was piled around them. Presumably, they were propped upright in the proper places while pure rock fill of the planned platform was rising about them, so that they were fixed before the floor was laid. An alternative possibility is that the platform was significantly earlier than the building, its fill being of the pure rock variety. In that case excavations of considerable size were required to reach the required depth, after which rock was packed around the posts and the floor, body as well as surface, was patched. Failure to note patching of the finishing plaster argues against this interpretation, and implies that the building as well as the platform of Structure 1 was part of a single plan, which included the broad tread stairway of Structure 2.

## Sub-Acropolis Structure 3

As may be seen in the reconstruction drawing of the Acropolis, or on the plan of the site, eventually Court 1 was flanked by two high platforms, Structures J-5 and J-7. The latter concerns us here. It appears in final form in Period IV, its open top reached by a stairway from the court. The court itself reached its final level in Period II, without the higher level in the area at the side, which was finally occupied by Structure J-7. But in Period III this latter area was raised to about half the final height by a platform designated as Structure J-7-2nd, its retaining wall rising from the court a little behind the position of the later and higher wall of Structure J-7-1st.

Apparently the plan for Period III required that this elevated surface at the side of the court, together with a rearward extension of the court floor at its base, should run well to the rear of the position of Structure 3. To get the face of Structure J-7-2nd where we found it, and a clear court surface before it, it was necessary to remove all but the extreme left end of the building of Structure 3 (observer's right in Figure 10.35). Except at this end it was also necessary to cut down the height of the building platform, which otherwise would have projected above the Court 1 floor, though that was itself raised somewhat. The left end of the platform and building were behind the line of the new platform, Structure J-7-2nd, and so a substantial part of the building could be merely buried by its fill. The early building platform begins to survive to full height just behind this line.

Evidently a part only of Structure 4 was behind this line, so that though it also was cut off, remnants of both Structures 3 and 4 were preserved for us.

The height of the new platform (Structure J-7-2nd) was such that the remnant of the building of Structure 3 had to be cut down, or it would have projected above the
top of the new platform. It cannot be said that destruction of this building was everywhere just enough to make way for the new design, but this was the case at the left front corner, where the building had been cut down just enough to make way for the floor of the new platform.

From the foregoing it may be said that the idea of flanking Court I with a raised platform on the northeast side dates from Period III, and destruction in this period accounts for the large amount of broken line in our partial reconstruction of Structure 3 in Figure 10.35. The building platform was over 13.5 m long, but we do not know how much longer. Figure 10.39 shows that along the front much of its wall was cut down to the base course only. At the left, this remnant breaks off entirely.

The destruction was more than seems to have been required by the new plan for the court, the floor of which was about to be raised. In part the destruction was doubtless a matter of stone-robbing for new construction, unworked stone and fill materials being exchanged for building stone. Similar evidence of stone-robbing at the end of Period I has been noted. The existence of this motive for tearing out masonry, which might have simply been buried should be borne in mind whenever (as below) one suspects partial destruction in order to change the plan of a building which was to continue in use. Also to be borne in mind is the fact that we have convincing evidence that the latter sort of destruction could occur, notably at Structure J-9, where burial was never contemplated.

## Phases 3-C, 3-B, 3-A

The existence of more than two phases for the Structure 3 building is somewhat dubious, and so are the preferred interpretations for the three we have allowed for. Because of the special interest in so early a building, and of changes suspected in it, facts and reasoning are presented in some detail. What we think the sequence probably was is as follows:

Phase 3-C
A long double-range palace with medial wall reaching the end walls (i.e., without wall-jamb doorways as in most palaces at the surface, but, in this respect, like Structure J-9 in an early phase). Floor B is its floor.

Phase 2-C
A new floor (Floor A), 5 cm to 10 cm above the other. (Such a thickness probably means more than mere resurfacing, but in the surviving portion of the building there were no constructional additions or changes.)

Phase 1-C
Continued use of building, with removal of medial wall, or of part of it at one or both ends. Removal at ends only
might have been to introduce wall-jamb doorways, or transverse end rooms, as in known plans of later date. The probability is that destruction of the medial wall extended at least 1.7 m from the left end wall, suggesting more than mere introduction of a doorway.

A reconstruction of what we now call Phase A has been published (Satterthwaite 1937a). That reconstruction was definitely invalidated by the 1937 digging which proved that we are dealing with the surviving end of a long building, and not with the surviving rear portion of a short one. The new interpretations, correct or not, are based on an augmented store of data respecting plastered floors, and a realization that floor-plaster may run under walls which belong in the same phase.

Figure 10.36 gives a cross-section where, it may be noted, we have to deal with a plastered surface labeled Floor X, as well as Floors A and B. Drawings of testpits of a prior year, inserted in the figure, show that we then mistook the surface of the lower Floor B for a mere working surface. Heavy lines represent plaster; wavy extra heavy ones indicate limits of the later digging. We still have to deal with two parallel narrow strips of rough or broken plaster separating rear and front portions of Floor A from Floor X, which lies between them.

In justifying the three phase sequence as probable, the phrase outer walls includes front, end and rear walls, as opposed to the medial wall, which we believe was removed in the final phase. Some stones of the outer walls were seen in direct contact with Floor B, and others were seen on thin beds of mortar which were in contact with Floor B. Turn-ups from Floor B to all outer walls were found. We can thus be sure that the building platform was plastered, and thereafter the outer walls were erected on it. Plastering the walls would then produce what we call turn-ups from the floor to those walls.

The lower courses of the end wall ran continuously from corner to corner. Therefore the supposed medial wall was inserted after the end wall was built, or at least after it had been begun. Failure to tie the two together must be inferred, but this is not outside the local masonry tradition of later times.

The turn-up from Floor B, with wall-plaster to a considerable height, was found forward of the supposed medial-wall position, but neither could be found where such a wall would have abutted it. This is fair evidence that the medial wall existed, and that it was built during the earliest phase, though structurally secondary to the end wall.

Presence of the medial wall in Phase 3-C requires turn-ups from Floor B to its faces, vestiges of which should have survived. As shown in the figure, these are present on our section, in positions indicating a wall thickness of about 85 cm . Of these two turn-ups, the forward one was better preserved and shows the correct direction, and it
merges with a turn-up from Floor A, immediately above it, good evidence that Floor A pre-dates removal of the medial wall. But no turn-up from Floor A at the rear had survived.

This last is readily explainable if the medial wall was based directly on Floor A in the first place, as one would expect. In that case when floor A was laid, failure to keep it perfectly level resulted in the secondary floor of the rear gallery being about 10 cm above the earlier floor, but only about 5 cm above it in the front room. On tearing up the base course of the wall, one would expect the disappearance of the rear turn-up of Floor A, 10 cm above the base. On the front side, where the turn-up was closer to the original base, it would be more likely to survive. The noticeably different levels of the two portions of Floor A are in themselves good evidence of a medial wall surviving into Phase 3-B.

If it were not for Floor X, and the strips of broken plaster, which define it, there would be no reason to doubt presence of a medial wall in two phases, followed by destruction of the building. Since we do have Floor X, Phase C-1 is provided for it. It makes sense as a plaster patch over the former area of the medial wall. The alternatives are to consider it actually a part of Floor A, or to consider it the top of a 10 cm high construction originally placed on Floor B. The later possibility is illustrated in Figure 10.37. While literally possible, it is hard to believe, either as an independent feature, or as a special plastered base for a medial wall (as suggested in the figure).

Neither of these alternatives for Floor X explains the strips of broken plaster separating it from the front and rear portions of Floor A. These strips were very clear, and continuous from the end wall to the points where the building had been cut off. The rear one was about 10 cm wide, with irregular edges; that to the front was about half that width. Our original interpretation accounted for these zones of irregularity as being at the base of thin walls of perishable materials. This does not agree very well with absence of turn-ups on the Floor X side of both the strips, and on the other side of the rear strip. If such turn-ups existed, they had been carefully chipped off. The strips represent some non-understood feature.

Summarizing, I think it may be said that an original medial wall, at least part of it later removed, is a possibility if one allows the dubious reconstruction of Figure 10.37, and a practical certainty if one does not. If one does not, and since Floor X survived to a length of 1.7 m , destruction of the medial wall extended at least 1.7 m from the end wall.

## Roof Type

No direct evidence on the nature of the roof of Structure 3 is available. Speculations following assume the presence
of the medial wall. The dimensions and proportions of what survived seem sufficient for claiming that it was probably not thatch or vaulted, hence that it probably was of the beam and-mortar type.

The surviving remnants of front, rear and end walls were all quite close to 70 cm thick; therefore the indicated medial wall thickness of 85 cm , even after allowing for thick wall plaster, was probably intentional. The distance from front to rear wall was 4 m , perhaps not too much for a thatch roof with or without a medial wall; but it is hard to imagine a reason for making the medial wall thicker than the outer ones if the roof was thatched, whether the central wall helped to carry the load or not.

There is reason to suspect that in some surface temples roof-combs placed to the rear were associated with beam-and-mortar roofs, and there is no valid presumption that in early times they may not have been placed in the center of beam-and-mortar roofed buildings of the palace type. Evidence of suitable stucco decoration during Period II is noted. There is practically no doubt that double half-vaults as well as a comb were placed on the medial wall of Structure J-18, which was somewhat thicker than the outer walls and piers. The extra thickness of the medial wall of Structure 3 is not very great, but comparable, and it is sufficient for an imaginable local type of roof comb. The extra medial wall thickness may be considered as intentional, for a comb, without also assuming a vaulted roof.

If we conclude that the roof was beam-and-mortar, this structure can be fitted into a logical pattern of masonry roof development at the site, in which the beam-and-mortar type appears first. It may well be that quite narrow rooms seemed necessary at first, but that later they were widened somewhat, with heavier walls and heavier roof-beams to maintain the necessary rigidity. Thus one may explain approximately equal wallspan indices for a non-vaulted Sub-Acropolis Structure 3 and for the heavier but more spacious non-vaulted palace Structure J-12 of Period VI. With the introduction of vaulting the problem of thrusts, and the greater weight, may have dictated a return to a small room-width, such as the indicated 1.6 m in this early Structure 3, but not to such thin walls until after a period of experiment seemed to make them safe. Structure 3 is stratigraphically earlier than the heaviest as well as the lightest of the vaulted palaces at the surface, and doubtless actually earlier than the whole vaulted series of the site. If it also was vaulted we have no explanation for variations in spans and wall thicknesses of the later buildings, which seem to require the postulate of steady technological progress. We should have in Period I a vaulted double-range long building with wall-span index of 45 percent followed in Period VI by others with indices ranging from 69 to 28 percent.

## Summary

We reach the conclusion that the roof of Structure 3 was probably of beam-and-mortar, with a centrally placed roof-comb. This is by a process of elimination. The roof probably was not thatched because the medial wall was probably intentionally a bit thicker than the outer ones, in order to give equal stability when carried higher to form a roof-comb. It probably was not intended for vault support because the wall-span index (which is figured for the thrust-resisting outer walls) is so much lower than those of certain probably similar and much later buildings. If our conclusion is correct, the dimensions and early position of Structure 3 suggest that, as in the case of vaulted buildings, other things being equal, the earliest beam-and-mortar roofs were held down to lesser spans than later ones. It tends to substantiate the hypothesis that the comparatively thick walls and narrow rooms of most known lowland Maya ceremonial buildings were not desired for their own sakes but are functions of the desire for masonry roofs of one type or the other.

If it is considered that the evidence for the medial wall is insufficient, of course there was no roof comb, and the roof may well have been of thatch, but possibly could have been beam-and-mortar. Certainly the required span on that assumption was never vaulted at this site.

## Measurement

The face of the end wall lies in a line, which fails to make a right angle with the front face of the building platform by about five degrees. The latter bulges slightly, but presumably the front of the building itself was approximately parallel to the line joining its extreme points. Parallelogram distortion of about five degrees seems indicated, but cannot be proved with only one end known. The fact that front, rear and end walls were measured as very close to the same thickness indicates careful linear measurement in this early period, though one could wish for more data.

## Red Paint

Traces of red paint were noted on interior wall plaster and on plaster of the latest floor (Floor A) near the base of the walls. On the walls at least the color was on the original finishing coat, of the earliest Phase C, but the painting might have been later. It had later been covered by a secondary plaster layer which showed no sign of color, and which presumably dates from Phase B.

## Sub-Acropolis Structure 4

A remnant of this unit, together with the front corner of Sub-Acropolis Structure 3, was first revealed by trenching into Structures J-7-1st and -2nd, at the level of Court I. On its right side this trench, which was being
cut through pure rock fills, reached what proved to be the cut-off end of an exceptionally firm solid masonry wall 1.3 m thick. On the left the trench passed around it, exposing one vertical face looking toward Structure 3. It rose from the same base-surface to a surviving height of 1.4 m . This face failed to be vertical by about 5 cm at the top, surely within tolerated limits for walls intended to be vertical. The opposite face was not exposed, but its line could be seen at the edge of the ancient cut through it, as indicated in Figure 10.36. There it seemed to have been reduced to a lesser remaining height, and our excavation did not reach to the bottom of this other face, which must have been an inner one. What could be seen indicated verticality also.

Despite the extreme thickness when compared with the walls of the earlier Structure 3, there is no reason to doubt this was a free-standing wall, and no reason to doubt that it pertained to a building, but it did not rest on the usual plinth formed by a projecting building platform.

Notes indicate that hearting as well as facing consisted of tabular stone laid in mortar. We have every reason to believe that platforms were never constructed in this manner and it would be very surprising if further investigation failed to show that this is a remnant of a building. In later buildings the amount of projecting plinth is sometimes very little and careless construction may at some points reduce it to nearly nothing, and the walls of low building platforms may be vertical, like those of the probably contemporary Structure J-2-2nd. It is possible, if not probable, that careless construction for a very narrow plinth on a low building platform caused us to fail to note the platform

## Decoration

## PaintedWalls (and Floors?)

Interior red painting of walls and probably the floor of Structure 3 has been noted. Though in deeply buried positions, the fact that only traces survived there gives fair warning that absence of surviving color is no sure guarantee that plaster was originally left white. It was not found elsewhere on the Period I level except on the wall of the platform Structure 2, against which the broadtread stairway ends. Here again the color was red, though the steps themselves were white. The shades of red were not noted in either case, but they probably were not the maroon color noted on stucco.

## Painted Stucco

The evidence for presence of painted stucco relief decoration in Period I or II is unequivocal, consisting of two fragments in the fill of Period III, where it lay above Structure 3. Inclusions such as these, not occurring
in quantity, might come from anywhere in the general vicinity, as part of a lowest deposit of fill, which was solid. However, since at this time there was a tearing down of parts of Structures 3 and 4 here, and they were masonry buildings, it is possible and perhaps probable that one or the other was the source of these fragments. Because of their early position they merit description.

There were two pieces of thick fine rather light gray plaster, obviously from the same source. The gray color of this material is presumably due to charcoal, since in the fractured surfaces of the smaller piece (Cat. no. L-70-196) specks of black can be made out. The larger fragment (Cat. no. L-70-197) was obviously from the same source. It is part of a border or of some other raised flat element, which was 8.5 cm wide. One edge, at a right angle to the face, projected 3.5 cm from a background of the same material. The other edge makes an obtuse angle with the face, and the projection here may have been less, but was at least 1.5 cm . The fragment as a whole is slab-like, and 4 cm thick. The face includes part of a curvilinear design, incised while soft.

The approximately flat and unfinished back surface preserves a negative impression of the surface against which the stucco had been placed. It had peeled off from a fairly smooth flat base in which there were some small irregular depressions, and some puzzling striations. One gets an impression that our fragment may have been laid on another layer of rough-smoothed plaster, rather than directly on stone. It may be that a design, with greater total relief than the 3.5 cm maximum indicated by this fragment, was built up one layer at a time. Nevertheless the evidence, so far as it goes, suggests the stuccoed treatment of a broad flat surface such as a wall or roof-comb.

Parenthetically it may be noted that the smaller fragment, found first, could have been interpreted as evidence of painted but otherwise plain plaster from the corner of a doorway, or from the outside corner of a building. The larger piece shows that decorative stucco can break so that a small fragment can give a false impression that it is merely from wall plaster.

We may also emphasize the doubt as to the particular structure which was decorated with this stucco by noting that a white-plastered fragment of daub-clay, with stickimpression, came from the same fill deposit (Cat. no. L-70-195). Since we have convinced ourselves that walls of this type did not occur in Structure 3, and since there was no evidence of burning on the spot, this specimen probably came from some little distance. This and the fragments of stucco may have first come together in some dump, which was later utilized as a source for fill material. Still later use of the same dump might then account for a third fragment of the same type of ornamental stucco material also found above Structure 3, but in the later fill of Period IV (Cat. no. L-70-194). This particular piece
shows the same speckled maroon paint, but the general form of the design may have been different from that of flat planes suggested by the other two. However we account for the presence of the latter, stucco decoration must have been used in the vicinity of Structures 3 and 4 before they were abandoned, that is, during Period II if not in Period I. There is no positive reason for doubting it was in use in Period I, and on Structure 3.

The boldness of the stucco design as indicated by our remnant suggests exterior rather than interior use, that is, it could have been seen to advantage from a considerable distance.

## Dating

Sub-Acropolis Structures 3 and 4 cannot be precisely dated, in terms of the Maya Long Count, but there are certain controls, which justify considering that they probably belong early in Cycle 9.

It is reasonably certain that Acropolis Period VI began before 9.17.15.0.0, the contemporary date of Throne 1. If we confine ourselves to the stratifications establishing the main periods, much major architectural change must be allowed for in working back to Periods II and I, that is, to the buildings of Structures 4 and 3 and 1. Stela marking dates running back from 9.15.15.0.0 to 9.12.15.0.0 were placed on terraces of the Acropolis. They have not been connected with the period-defining trenches and tunnels. But since each of these terraces buried at least one earlier one, we must go behind 9.12.15.0.0 by some unknown amount for a reasonable date for Period I.

The situation at Structure K-5, at the end of the same plaza on which the Acropolis fronts, suggests that this amount of time is considerable. Markers for 9.12.10.0.0 and 9.12.5.0.0 appear on secondary construction of Structure K-5-1st; we must proceed backward in time from 9.12.10.0.0, through an early phase or phases of Structure K-5-1st and through the period of Structure K-5-2nd to that of K-5-3rd, before reaching the earliest sure temple of the West Group; while Structure K-5-4th shows still earlier important architectural activity on the plaza. Since Sub-Acropolis Structure 3, of Period I, was in all probability a palace, and since in later times palace and temple types seem linked, it is likely that Structure 3 functioned at the time of Structure K-5-3rd or before.

If, from these considerations, we emerge with a guess-date of early in Cycle 9, we have not definitely ruled out late in Cycle 8. However, there is no requirement that Acropolis Period I must start with the foundation of the city, or that it begin as early as the earliest stela, plain or dated. Those are in another section of the city, the South Group, and it is possible that at first the West Group was a peripheral area of minor buildings. In such case the hill in question may have been occupied in a Pre-

Acropolis Period, before the beginning of its modification to provide the acropolis type of assemblage in Period I, a period defined on the basis of major architectural construction. Such a period could be (though it need not have been) contemporary with the earliest dated stela, 9.5.0.0.0.

We have a strong hint that there was a PreAcropolis period on the hill in question in the shape of stiff clay deposits on the bedrock in Pits 1 and 2. In Pit 1 , the top of this clay follows more or less closely the irregular and far-from-level bedrock, and surely had not been placed there intentionally. Presumably here as at Structure V-1, this clay (black at Pit 1, red at Pit 2) is a natural deposit. Yet that at Pit 1 contained definite inclusions of sherds and figurines, as if they had been dropped or had washed there while the clay was accumulating, or, perhaps, had been trodden into a pre-existing deposit while it was exposed and soft. The objects were quite plentiful, 237 items being counted as definitely coming from the clay or the underlying disintegrated limestone itself, the exposed area being only about one square meter. Twenty-two items had previously been catalogued as from about the same level, hence probably also from the same matrix, and no others were found in this pit, indicating that a solid fill deposit above the clay was sterile, or nearly so. This higher deposit was fairly thick and very likely was dumped here during the construction operations of Period I, but it probably was not the source of these objects. On the other hand they can easily be refuse from nearby dwellings or other buildings. Such may have been perched on the hill before it was decided to bury it completely under artificial floors, and turn it into an Acropolis.

Whether we are correct in this interpretation of a Pre-Acropolis Period or not, the sherds in question show presence of flanged bowls before or at the beginning of Acropolis Period I. The on-bedrock deposit here agrees with others elsewhere in placing the earliest occupation in a ceramic period corresponding to the Tzakol at Uaxactún (Tables 10.25 and 10.26).

## Masonry Notes

Fills
These were not extensively investigated. As noted previously, the fill immediately behind the facing of the high terrace supporting Structure 3 appears to have been medium-sized broken rock and earth which had been dumped, not laid up. Where a small section was penetrated (see Figure 10.36) the fill of the building platform of Structure 3 was of tabular stone, without earth or mortar. The stones lay at various angles, providing air-space as in pure broken rock fills.


Figure 10.37 Hypothetical reconstructed section, medial wall of Structure 3-C.

## Walls

Facings of the high terrace and of the Structure 3 building platform wall were for the most part of medium to fairly large tabular stone, usually thick enough to be called tabular blocks. They were laid in dark brown mortar, with little or no chinking. So far as one can judge from slight exposures, stones were selected with an eye toward more or less regular coursing (Fig. 10.39). Figure 10.38 shows the front and end walls of Structure 3. Along the front, so far as it survived, and along the rear for about 1 m from the corner, exposed faces of slabs and tabular blocks were roughly-worked, and laid in regular courses with thin slab chinking stones, as well as dark brown mortar, between the courses. The courses seem to have been maintained by careful selection for thickness of the stones, and this varies from course to course. The central part of the end wall, which does not show clearly in the photograph, is of smaller tabular stone, the coursing less regular. At the corner in-and-out bounding appears, due to placement of corner stones of the second, fifth, and sixth stones, but the amount of their projections into adjacent masonry is not great. The hearting of these rather thin walls contained smaller tabular stone and less than the usual amount of yellow mortar. The inner (and presumably outer) faces were covered with very thick dark brown mortar containing fine crushed stone, and then received a final coat of finishing plaster.

No plaster survived on observed portions of the wallremnant of Structure 4, which did not include a corner. Stones of the outer face were irregular blocks and heavy tablets, faces of the stone being rough-worked. The mortar between facing stones, observed at the same time as that of Structure 3, was light yellow rather than dark brown; it was not so thick, and there were few chinking stones. Here also there seemed to have been some intentional coursing by selection of stones of similar thickness for a given course, though the thicknesses varied from course to course. The hearting was of heavy blocks, laid in not much mortar, like that of Structure 1. Here the mortar was brown rather than
yellow. This wall appears to have been very similar to the earlier one, apart from being nearly twice as thick.

## Floors

The bodies of both Sub-Court 1 floors, at the base of the high terrace, as well as those of the Structure 3 building and of Structure 1, were of lime concrete, coated with finishing plaster. In the case of the Sub-Court 1 floors, the color of the body of each was noted as gray, presumably from charcoal mixed with the lime at the time of burning. For the Structure 3 building the binding mortar, like that forming the body of the exceptionally thick wall plaster, was described as dark brown, almost black, with inclusions of recognizable charcoal. At the time of these notations it was wet. We failed to take detailed notes on the floor material of Structure 1, which was also found in excellent condition.

## General Remarks

Except perhaps for the implication of a less-than-perfect method of burning lime, and probable absence of vaulting, our impression is that the local masonry art was fully developed in


Figure 10.39 Remains of building platform of Structure 3 and of facing of high terrace in Pit 2

Period I. We have in Structure 3 as good examples of wallstone shaping as have been found at the site, and the most consistent selection for size and coursing. This operation also provides good evidence that plastered concrete floors were used early in the local period of occupation, in outdoor as well as indoor locations (Tables 25 and 26).


Figure 10.38 Masonry at left front corner of Structure 3.


Figure 10.40 General view of excavation showing Structure 3 below floor of Structure J-7-1 st and -2nd; remnant of Structure 4.

## 7. Structure P-6, Linton Satterthwaite

## Preliminary Remarks

Structure P-6 is very imperfectly known, yet for several reasons it has considerable interest. It faces on a relatively narrow extension or arm of the important East Group Plaza, and Parris' survey suggested the ruins of a single building about 35 m long (see site map). It was served by a megalithic stairway, more or less accurately centered with respect to the arm of the plaza, but not centered with respect to the building mound. This situation is essentially similar to that at Structure J-6 on Court I of the Acropolis, where the building was a single-range vaulted palace of the built-on type, and similar to that at Structure R-7, where a free-standing double-range palace design is involved, with non-vaulted roofing. Here the building mound, as depicted by Parris, suggested a long free-standing building with a
depth of about 5 m , classified as non-vaulted because of paucity of debris. It was not clear whether the building walls rose to roof height, as at the not-far-distant palacetype Structures S-17 and S-18. The approximately known depth of the platform suggested a single-range building, or else a comparatively narrow double range one covering most of its platform.

On the basis of the foregoing resemblances we originally thought of Structure P-6 as very probably a palace. Further study leads to a strong suspicion that at least two single-range buildings are involved and it now seems wisest not to attempt formal functional classification without excavation, though it may well be that we have here a short palace (or some unknown type of building) flanked by a sweathouse.


Figure 10.41 Isometric reconstruction of Structure P-6.


Figure 10.42 a. Cross section of Structure P-6; b. Hypothetical reconstruction of cross section of megalithic fight of stairway.

The steps of the megalithic lower flight of the stairway were cleared of superficial earth and debris by Mason in 1932 (Fig. 10.44). There has been no further excavation. The only other masonry which showed and which has been recorded was at Points 3 and 11 of the drawings. In 1934, when excavations were not permitted, the writer supplemented Mason's notes by measuring for a crosssection and a longitudinal section, which intersected at Point 4 (Figs. 10.42a and 10.43). These sections were carefully controlled with tape and leveling instrument. Interpreted in connection with the Parris plan, they are thought to justify the isometric partial reconstruction of Figure 10.41. But this is necessarily almost entirely in broken line and is intended only as an aid in visualizing what may have been fact. Various units are lettered for reference, and comment on these that follows explains the basis for a great deal which is purely inferential. The resulting picture affords some additional control in considering the make-up of the site as a whole, and would be useful in planning further excavation.

The cross-section of Figure 10.42a is controlled by 19 located points, and the longitudinal section of Figure 10.43 a by 48 such points. Some eleven of the total of 62 points have been selected and numbered in series for reference and, of these eleven points, several are placed on the isometric drawing also, to show their horizontal positions. In that drawing (Fig. 123), the vertical relationship is true only for Points 3,7 and 11 . For example, Point 8 in Figure 10.41 lies 1.3 m below its true position as shown by Figure 10.43; on the isometric drawing it serves to locate the center of a special mound of debris, much higher than any other and not shown by Parris. It is the presence of this special mound, and its off-center position with reference to the stairway, which leads to the postulate that there were two buildings here, that on the right (left in the figure) being a possible sweathouse.

## Discussion by Units

## Stairways and Lower Terrace (Units F, E, D)

The width of the megalithic steps is restored as 11 m , certainly close to correct. The lowest step was partly buried by about 10 cm of plaza floor material, very likely a secondary floor. Disregarding this, the stairway carried one to the edge of a shoulder platform (Unit E), the total rise being 1.7 m in a horizontal distance of 4.3 m . On the line of the cross-section of Figure 10.42a, the lowest two steps were each 30 cm high at the front, the risers sloping back 10 and 7.5 cm respectively. In each of these cases it was clear that the tread sloped up slightly. The third step was only 25 cm high at the front, and a sketch shows that the riser was battered also. Further careful measurements of particular stones were not made. The photograph (Fig. 10.44) shows clearly that battered risers and sloping treads obtained at least for four steps, all being megalithic (i.e., having risers formed of single stones). The photograph also shows rather clearly that what seems to be a fifth step had its tread flush with the floor of the platform, and that it may not have been quite as high as the others. This step was not allowed for in the partially restored plan on the map of the site. The stones are smaller, and it is less certain that single stones everywhere formed the risers. The photograph also shows that some stones of all steps have crept forward.

Figure 10.42b shows a hypothetical restored crosssection of the lower flight. In this the risers and treads are equalized. This is probably what was aimed at, except, perhaps, for a narrower fourth tread and a wider and lower fifth and final step. The actual measured section is followed in the three-dimensional drawing of Figure 10.41. Even here it appears necessary to postulate five deep-tread steps, rather than the four suggested on the map. As the reconstructed section of Figure 10.42b stands, the front of each step rises 30 cm and slopes


Figure 10.43 Longitudinal section (in overlapping segments).
back 10 cm ; the treads slope up about 3 cm in 86 cm ; the general angle of ascent is about 23 degrees from horizontal. This is surely not far from correct for the two lower steps. On the measured section these treads were measured as 70 and 90 cm , respectively, in each case the front 50 cm being accounted for by the megalithic stone also forming the riser. Crushed stone indicated that the rear parts of the treads were of concrete, presumably plastered.

The debris contours showed the presence of the projecting terrace (Unit E), forming shoulders on either side. The width of this element is restored in Figure 10.41 as 18.5 m , a figure obtained by scaling the original Parris map. Later notes of the writer suggest it may be too great by about 2 m . The indicated combination of vertical ends and less than normally steep battered front is conjectural, the shoulder at Structure O-2 being used as a guide here. Normally steep slopes are postulated elsewhere, without actual evidence.

The presence of a fabricated stairway rising to the principal terrace (Unit C) is quite certain, though no surviving steps were actually seen. Parris' depiction of its mound is the basis for restoring its width as equal to that of the megalithic flight.

## UPper Terrace and Supplementary Platform (Units C and B)

The floor material of Unit B, the supplementary platform, was exposed at Point 3 (Figs. 10.41 and 10.42a), and was there 3.3 m above the front edge of Unit E , the shoulder platform. The precise height of the terrace labeled Unit C is unknown, but a fair interpretation of the cross-section makes this height about 2.8 m ; this, used in the reconstruction, gives 54 cm as the height of Unit B, the Supplementary Platform. The stone of a
wall, seen in position at an appropriate level, locates a probable original left end of this platform (Point 11 in Figures 10.41 and 10.43). The surface line in the latter figure suggests, however, that this unit was subsequently extended 2 m or so further to the left (right in the figure). Considered in connection with the level of the floor and wall stone seen at Point 3, mentioned below, it is fairly clear that the ends of the long flat mound of Parris' plan mark the ends of the supplementary platform, which may not have been close to the ends of building platforms. The positions of front and rear walls of Unit B as suggested in Figure 10.41 are conjectural, with a certain amount of loose control from the cross-section of Figure 10.42a. The depression at Point 5 of that figure became deeper as one moved toward the left (southwest) from the line of the section.

## Building Platforms (Units A and A')

The position of the front wall of Unit A is known by a wall stone seen in semi-position at Point 3. The restored height is 20 cm , probably close to the truth, as indicated by considerable flat portions of the debris line of Figure 10.43 (in the vicinity of Points 7 and 10). In the figures it is assumed that there were two building platforms, (Units A and A'), Unit A being centered behind the stairway. This is by analogy with a somewhat similar situation at Structure R-7. It is then possible to postulate a length for Unit A' such that the high mound at Point 8 is centered on it. Even if we are correct in postulating the second platform A', instead of a single very long one, the precise proportions indicated in the drawings remain mere guesses.

## Buildings

In examining the top of the mound we noted four separable areas of irregular relief, higher than elsewhere. Two of


Figure 10.44 Megalithic lower flight of stairway.
these are clearly represented in the longitudinal section of Figure 10.43, centering at Points 6 and 8, and a third less clearly, at Point 9. There was another hump just to the observer's right of Point 4, of much less longitudinal extent. These points are indicated in Figure 10.41 to emphasize their non-symmetrical positions with respect to Point 10, on the projected axis-line of the stairway. No understandable pattern could be discerned in these irregularities, but there is no question but that masonry constructions, presumably masonry walls, are involved.

Especially puzzling is the distinct mound of Point 8 , measuring about 3 m in either direction, which was observed to contain slabs and good building blocks. Here the depth of debris (above our approximately determined floor level) is 1.3 m , sufficient for vaulted or semi-vaulted construction. But elsewhere this debris depth varies from zero to only about 60 cm , a situation showing absence of vaults and even compatible with ruins of mere base-walls.

## Function

The detailed sections and close examination on the spot make the assumption of a single long building a very
dubious one. It is likely that more than one building is involved; one cannot be sure there were not more than two. If there was any vaulted construction it must have applied to a single small chamber, well to the right of the stairway (Point 8). This construction, vaulted or not, may possibly have been centered on one of two building platforms; if so, it probably was a sweat-room. If not, we have no functional clue at present. A comparatively short building on another platform centered behind the stairway appears to be a possibility, and it may have been of the palace type, but excavation is required to determine both points. Providing two building platforms, as in the drawings, does not yield complete symmetry of debris profile in respect to either of them.

It is clear that the building or buildings associated with the megalithic stairway must be placed in the unclassified category. But it is interesting to note that possibly we may here have a non-vaulted palace immediately next to a sweathouse, as in the Southeast Section. If a sweathouse is present it was only indirectly associated with the megalithic stairway.

# 8. Structure O-2, Linton Satterthwaite 

In making his survey Parris noted megalithic stones in the stairway of Structure O-2, and his carefully controlled depiction of the principal masses of debris showed the shoulders, which seem always to belong with such steps. He shows a flat mound at a higher level, measuring about 5 m by 18 m . As at Structure P-6, the building was probably single-range, or a relatively narrow double-range one, covering most of its building platform The mound appeared to Parris and to the writer to be what is left of a non-vaulted building with masonry or at least partly masonry walls, though no masonry showed here, and minor irregularities of the surface were not studied carefully. Hence we can say little about the functional type of the building, but from its size and proportions it may have been a palace, and very probably was not a temple.

During the closing days of the last season the writer was able to do a very little digging and to make a few hasty notes while working on the neighboring temple, Structure R-16, and these data yield the reconstructed cross-section of Figure 10.45. This is shown almost entirely in broken line because both levels and horizontal distances were controlled with nothing more accurate than a two-meter rule and sighting with the eye, and much depends on inference. However, so far as it goes, it is probably correct within narrow limits, as the measurements were made at short distances.

The left (northerly) side of the lowest flight of the stairway was followed by excavation back to its junction with the shoulder terrace, from which it projected 3.1 m . Unfortunately, on this side the terrace itself survived for only two courses of stone. Even so small a remnant at the base indicated a battered front face for the shoulder terrace. On the right side the top of this terrace was found, about 1.7 m higher than the bottom of the first step on that side (Point 3 in the figure). It was followed down about half way, establishing the slope of the front face as about 58 degrees. Point 2 of the figure is located by projecting downward on this slope; Point 1 is located 3.1 m forward, though that measurement was obtained for the other side. The result is surely not far wrong, and calls for a rise of about 1.7 m in a horizontal distance of about 4.1 m , closely approximating the situation at Structure P-6. The idealized reconstruction of the profile of the steps of the lower flight is therefore about the same as that for Structure P-6. We have assumed equal steps with risers of 30 cm , which slope back 10 cm ; the five treads come out as sloping up about 4 cm in a depth of about 82 cm . The upper one reaches the level of the shoulder terrace. Possibly more accurate controlling measurements would indicate four steps only, the fifth riser being the edge of the terrace itself.


Figure 10.45 Composite cross section of Structure O-2.

Megalithic stones were seen at, and near, each end of the lowest step, which was about 10 m in length. We neglected to note battered riser and sloping tread on these stones, but since they were expected, this failure means they were almost certainly present. One stone was measured as 70 cm from side to side, and 85 cm in depth, and another was noted as 80 cm in depth, thus confirming the assumption of deep treads. Seen in plan some of these stones were tapering or irregular behind the face forming the riser, and the treads were undoubtedly partly formed of concrete.

At higher levels no distinct lines formed by the risers could be made out without excavation. While stones larger than expected in the ruin of an ordinary fabricated stairway were noted, the impression was gained that above the first step there had been no rigid requirement that all risers should everywhere be formed of single stones. For the first step, however, there was no reason to doubt a truly megalithic step in the sense used here, risers about 30 cm high, formed by the faces of single stones.

Parris found no distinct mound for the expected fabricated stairway rising from the shoulder terrace. judging by our cross-section, such a stairway rose about 2 $m$ to the base-surface of the building platform, and what we reconstruct as the fifth step of this second flight was seen in position (Point 4 in Figure 10.45). The failure to note a distinct projection of debris from these steps was probably due to presence of a large tree on the right side and to collapse of the shoulder terrace on the left side. We are free, therefore, to suppose that the megalithic lower and the fabricated upper flights were of equal width, but lack actual evidence.

While the slope of the face of the shoulder terrace is somewhat steeper than the better-known example of Structure J-6 on the Acropolis, it is much less steep than most known terraces at the site, and one may suspect a design similar to that at Structure J-6, that is, a cut-off batter, with vertical sides of the shoulders. However, we have no real knowledge as to this either at this mound or at Structure P-6, and in neither case do we really know that the terrace behind the second flight was normally steep.

Subject to these doubts as to slopes, and a suspicion that all steps of the lower flight should be equalized, Figure 10.41, which applies to Structure P-6, probably also gives a fairly correct idea of the appearance of the stairway of Structure O-2. Here as there, the shoulders probably extended somewhere between 2 m and 3 m on either side of the megalithic flight. This is indicated by the debris, not by excavation and actual measurement.

A number of sherds were encountered while following the left end of the megalithic steps (Field Cat. no. S-27-1). These included apparently untempered parts of a shallow tripod, fine orange bowl with a cross-hatched petal-like area on the upper surface of the bottom; and sherds of an apparently simple silhouette bowl with glyph band, of the same ware. The position was characterized as surface to bedrock, since no floor could be made out and bedrock was very close to the surface. In fact, the base of the shoulder terrace appeared to rest directly on bedrock. There is no reason to suppose the late terrace is as late as undoubtedly late sherds. On the other hand, there is some reason to suppose that the stairway was the first masonry structure to be placed at this spot.

## 9. Structure J-19, Linton Satterthwaite

This is the only building on the Acropolis of which the plan is not completely or largely known. No walls showed, the plan was not dug for, and irregularities on the surface gave no clue. Therefore, it must be given attention here, among the unclassified buildings. The top of the mound was relatively flat, without (according to the memory of the writer) the prominent central hump of ruined sweathouses. Parris drew up his surveyed corner-points of the mound on a scale of one to a hundred. Scaling from this, the mound top measured 7.5 m and 8.1 m at the northeast and southwest ends respectively, while front and rear lengths were 16.5 m and 16.4 m respectively. His drawing appears at reduced scale. The mound is at the outer edge of Court 3, where there is no room
for a much longer structure. From its proportions and position, with the likelihood of a sweathouse ruled out, there is really little doubt that it is the ruin of a palacetype building.

Near the center a cross-trench was dug by an inexperienced workman in 1932. The writer was responsible, but gave the operation little supervision. At this time the planned objective was limited to determining whether the roof had been vaulted, and a negative answer was secured. A hasty sketch of the cut was made with tape and rule only. On this, desirable measurements are missing and must be approximated, since the sketch was not to scale. In particular it has been necessary to assume that all floors were precisely level, and to estimate the


Figure 10.46 Cross section of Structure J-19.
height of the platform labeled Unit B in Figure 10.46. However, the resulting errors in this partial cross-section are surely small in amount.

At the front edge of the mound two court floors were found, which we have numbered, Court Floor 2, the earlier, being 30 cm below Court Floor 1. The earlier floor was surely the base-surface for a platform which we designate Structure J-19-2nd. This was evidently entirely obliterated by the time of the final structure, Structure J-19-1st. Two components of the latter were distinguishable, and are labeled Unit A and Unit B-B'.

The earlier platform (Structure J-19-2nd) was 35 cm high, its front face being found buried 1.9 m behind the corresponding face of the final platform, that is, of Unit B. The floor forming its top was plastered, and this floor was followed back for a like distance of 1.9 m . According to the field sketch, it there failed to continue, giving way to pure rock fill rising from below and reaching a noticeably higher level. Had this situation been due to our inadvertently cutting through the face of the higher rear portion of a stepped-top platform, the masonry of the step should have been identifiable in the cut. Instead, the deep part of the rock fill appeared to be continuous with a shallow deposit of it on the J-19-2nd platform itself, as indicated by hatching in the figure. This was puzzling and unexplained at the time, but it now seems reasonable to consider that what was found is a mere remnant of the early platform. At or before the building of Structure J-19-1st collapse of a probably high system of terracing to the rear could have permitted the rear part of the early platform to slide down the steep slope toward the river. Major repairs
in that quarter, accompanied by the raising of the floor of the court and construction of a new building, would explain what is recorded. Whether this is the true explanation or not, the early platform certainly existed. We do not know its depth but, because of the space limitations, this depth must have been substantially less than that of the corresponding later platform, Unit BB', and it may have been very much less. However, within the indicated space limitation of about 6.5 m , there was ample room for either a narrow double-range building such as the buried Sub-Acropolis Structure 3 or, of course, a single-range one such as Structure S-17 or Structure S-18.

On the field sketch the face of the platform of Structure J-19-1st, that is, of Unit B, was sketched as of about the same height as that of the buried platform. If we take the Unit B height as 30 cm and assume a precisely level Court Floor 2, we shall not be far wrong. On this basis the late platform floor was 25 cm above the earlier platform floor, and 60 cm below the flat top of the mound as it was sketched. The latter was 1.2 $m$ above the base of the early platform face, therefore definitely only 0.9 m above the latest court floor.

As indicated in Figure 10.46, a small area of whiteplastered surface was recognized on the floor of Unit B, just in front of a mass of masonry labeled Unit A, and this plaster was seen to run under the masonry. Probably the floor was generally in bad condition, since neither the plaster nor body material of the floor was recorded elsewhere. However, to the rear of Unit A our sketch shows a definite line at this level, separating the rock fill from the stone and earth above. There is no reasonable
doubt that the floor of the final platform ran at one level from front to rear, reaching a rear face, the upper part of the wall labeled Unit B' being a part of this face. As found, this wall leaned toward the rear, its top at about the level of that of Unit B and about 8.7 m to the rear of it. Since the wall apparently descended beyond the base-level of the earlier J-19-2nd, it is suggested in the figure that the rear face of the final platform was set very close to a terrace wall, and that we failed to distinguish between the two units, a mistake very easy to make with walls, which have begun to fall. Allowing an estimated 40 cm for the rearward displacement of Unit B', the depth of the late platform is estimated at about 8.3 m .

Unit A, already referred to, is a partially known mass of masonry, consisting of irregular blocks resting directly on the plastered floor of Unit B and reaching to within a few centimeters of the surface. This is shown by a photograph as well as by the field sketch. This masonry is structurally later than the platform, and by analogy with situations elsewhere may or may not belong in a later phase. The mass appeared in the side of the trench, and a lateral extension followed the front of it for about a meter in the longitudinal direction. It is presumably part of a pier or building wall, in such bad condition that our workmen inadvertently removed a base-course along the front, which should have survived and been seen. As found, the irregular front of this mass begins 1.1 m behind the edge of the platform, and we suggest a front face for it 0.9 m from the edge. On this basis the depth of the building can be estimated as about 7 m , perhaps a little more, since one may safely assume that the rear wall was close to the rear edge of the platform. Failure to note a medial and rear wall in the trench may be due to unskillful digging, but may just as well be due to an accidental location of the trench so that it passed through doorways. A double-range
building is thus indicated, even though very little of it was encountered.

To the rear of Unit A (the supposed masonry of a front pier or wall) the deposit reaching down to its base-surface (the floor of Unit B-B') was surely very different from Unit A itself. It was labeled earth and stone, and doubt was expressed whether it was fallen debris or fill. Considering this suspicion that it might be fill, as well as its slight depth, it certainly was not debris of fallen vaulting, though absence of slabs in quantity was not specifically noted. Considering the position of the masonry Unit A, which is too thick for a retaining wall, the earth and stone must be debris from a nonvaulted building.

In conclusion it may be said that what little was learned from the trench established the presence of two court floors and of two building periods in the highest of the Acropolis courts. The later building platform was substantially deeper than the earlier one, and almost certainly served a non-vaulted double range building with masonry walls. Nothing was encountered to refute the natural speculation that its walls were fairly massive and that the plan was of the palace type, that is, that the building here was similar to Structure J-20 on the same court, and, apart from less length, similar to Structure J12 on Court 2. Differences in the cross-section dimensions of all three non-vaulted buildings at the surface of the Acropolis may have been very small.

Evidence is lacking, but the earlier platform may have served a similar building of lesser depth in this respect more like the buried Sub-Acropolis Structure 3. Though the latter is unclassified, it was probably a palace. Reasoning from such analogies, one suspects that thorough excavation of this mound might yield stratigraphical evidence for the hypothesis that there was an early period during which room-width of non-vaulted buildings increased.

## 10. Structure J-24, Linton Satterthwaite

This is the largest of three mounds perched on the steep northwest side of Hill J, about 68 m above the Northwest Group Plaza, and about 20 m below its top (see site map). The three mounds are disposed at slightly different levels on a system of broad terracing suggesting that a comparatively flat natural shelf was improved for their reception. Apparently Structure J-24 faced southwest on a tiny court. Though less than 30 m of horizontal distance separates it from the pyramid temple Structure J-29 to the northeast, or from the palace Structure J-23 to the
southeast (at the top of the Acropolis), this structure and its group were effectively isolated from them by the differences in level. The area may have been reachable from the Acropolis group by terracing, or by a mere path around either or both sides of the hill. There was no convincing sign of a stairway leading down to it from the higher palaces immediately to the southeast. On the other hand there probably was a stairway connection with the lower Structure J-27, and thence, via Structure J-28, a probable stairway connection with the Northwest


Figure 10.47 Cross section of Structure J-24.

Group Plaza. One receives an impression, nevertheless, that the group was not planned as part of an important ceremonial assemblage.

In 1931 a trench was cut through the superficial debris of Structure J-24, near the center, to determine if a vaulted building had been present. Figure 10.47 reproduces a field sketch of the cross-section, with interpretive additions in broken line. The original sketch was drawn to scale, but without accurate control of levels.

The slight depth of debris, about 60 cm , and absence of slabs in quantity, proves there was no vault. An upper platform, Unit A, was undoubtedly a building platform since, toward the front, its plastered top ended in a turnup as if to a wall. This turn-up was about 1 m behind the front face of the building platform, but the position
of the front face of the missing wall was not made out. The original sketch and notes show that we thought this wall was similar to the walls of the building of Structure V -1-1st, believed to have been mere base-walls, about 50 cm thick.

There had evidently been considerable destruction of the building platform toward the rear. The reconstructed depth of about 7 m is a mere guess; this may have been much greater or less. It was about 0.3 m high and stood on a main platform about 1.6 m high. The depth of the latter was about 9.6 m if we are correct in considering that Unit B is a secondary addition to Unit C-C'. Parris' depiction of the mound shows that the length of the main platform was probably in the neighborhood of 20 m , and presumably that of the building was something less than this.

## 11. Structure S-5, Linton Satterthwaite

Before excavation, the mound of Structure S-5 was quite similar to that of Structure U-3 in size, height and form, as may be seen by comparing Parris' schematic delineations (Morley 1938:5, Pl. 202 for Structure U-3, and see site map for Structure S-5). Since on excavation Structure U-3, which is in the South Group, turned out to be a platform temple with modified rectangular plan, the debris along the right end of Structure S-5, here reported on, was
removed to see if the same temple-indicating, Peténstyle platform was not also present in the Southeast Section. The answer was negative, and solid-line portions of Figure 10.48 show what was found in place.

The lowest platform element (Unit B) was evidently a simple rectangular, not a modified rectangular, structure. It had slightly rounded corners, obtained in part by rough-dressing certain stones
to achieve curved edges. These were identifiable in the wall proper, and also in the molding, which projects about 8 cm from it, forming the upper 23 cm of the face. No plaster was found, but originally this was probably also relied on to obtain a smooth rounded effect. The height of this platform, including the molding, is only about 80 cm . The wall proper is battered, the slope being about 82 degrees from horizontal, and the face of the molding is battered to correspond.

Considering Unit B as a complete component or main platform, it is clear that another rectangular element, Unit A-A', occupied nearly its entire surface, since the end wall of Unit A-A' could be followed for almost the entire depth of Unit B, on which it rested. The front right corner of this higher component was recorded as sharply rectangular, not as rounded. Fill, rather than fallen debris, was identified behind the face of this unit, showing that it was the face of a platform, not that of a building. It is reconstructed in broken line as a stepped-top building platform. This accords with surviving heights of 40 and 55 cm , at A' and A respectively, in the figure. Since at neither of these points was it clear that the original top of the wall had been reached, the reconstructed heights of about 45 and 70 cm for front and rear portions may be somewhat too little; and it is not impossible that there was only one level, in which case one would raise the front portion, and consider that Unit A was probably a supplementary platform supporting a building platform which was not reached by the excavation. If one does raise the front portion to the level of the rear, as an alternative reconstruction, the way at first seems open to give the resulting one-level upper element the same height as the lower, and to provide it also with a molding. Unit B would then be merely the lower terrace of a two-terrace platform. The debris profile mentioned below, and the sharply rectangular corner of the upper unit seem to argue against this.


Figure 10.48 Partial isometric reconstruction of Structure S-5.

Time was lacking for further digging, but in 1939 the writer made a very hasty examination of this and neighboring mounds, sketching profiles with tape and rule, controlled at extreme points only by readings with the leveling instrument. Figure 10.49 shows the resulting surface-line for Structure S-5, in approximate relation to a broken-line reconstruction of the cross-section of the structure, the latter being based on Figure 10.48. It is assumed that Point 1 of the profile was 40 cm higher than the top of Unit B. Though not determined by an actual reading of level, this cannot be very far out.

It is clear that the maximum depth of the debris is well to the rear of the mound as a whole, though Parris indicated this for the left end only. This maximum depth is about 1 m on the basis of our reconstructed levels; it may easily have been somewhat less, considerably less if we have failed to allow for a building platform distinct from Unit A-A'. In the field we considered that there was no reason for suspecting a fallen vault here, but since the debris depth may be as great as 1 m , the possibility of a vaulted roof is not absolutely ruled out. The digging should have ascertained the floor level at the rear.

The top of an "undoubted pier" was noted at Point 2 of the profile of Figure 10.49, estimated as being 50 cm lower than Point 3. Since this stump of a pier is at the forward edge of the higher portion of the mound, it evidently was in the front face of the building. Whether Unit A-A' is the building platform or not, it probably presented a wide stage-like uncovered area in front of the building, and we have every reason to suppose that the building occupied most of the area which we show in Figure 10.48 as the raised rear portion of a stepped-top platform. Thus, indications are that on the exterior the building measured about 18 m by 5 m .

In Figure 10.49 a one-range building with roof-span of 3.2 m is suggested. This span is greater than that of any non-vaulted building known at the surface of the site, but much less than that of the buried pyramid-temple Structure K-5-3rd. Space is lacking for a double-range building unless it was about as narrow as the buried SubAcropolis Structure 3, which probably was an early nonvaulted palace. In respect to length there is room for a five-doorway building in the tradition of the nearby nonvaulted palace structures J-17 and in J-18; or, of course, for a three-doorway building, in which case the openings may have been very wide, as in the temple Structure K-5-3rd. One suspects that either a non-vaulted palace or a non-vaulted comparatively large simple-rectangular temple stood here, but some unknown type remains a possibility.

In view of the probable depth of building debris there is no reason for doubting that the walls rose to roof height.


Figure 10.49 Composite cross section of Structure S-5.

Figure 10.48 suggests an ordinary stairway reaching the supposedly lower front level of Unit A'. Nothing is actually known about the design of this stairway, apart from the fact that protruding debris indicated its central position and that it covered about one-third of the total length of the platform.

## Objects

Sherds, a figurine head and a figurine fragment were recovered in the digging along the right wall of Unit B. In the field these were catalogued as from Operation SE-13; later, due to a subsequent double use of this number, those at the museum were assigned the field number SE-13X. Two positions were distinguished. SE-13X - 1 and SE-13X -2 are from the forward end of the cut, which reached below apparent base-surface level; SE-13X-3 to SE-13X5 are from a middle portion of the cut, from debris well above the supposed base surface level; sherds from the
first position include heavy utility ware fragments, two or three with apparent remains of white stucco adhering, suggesting possible stucco decoration on Unit B. A small flat-bottomed bowl with slightly flaring sides was almost completely restored from sherds found at the second position. Since these were almost certainly in debris, it seems likely that the bowl was left intact on the structure near its right edge when the site was abandoned, the bowl falling with the partial collapse of Unit A-A'. Late use of similar bowls is well established elsewhere and, though the structure may have been quite old and obsolete at the time of abandonment, there is no reason to suppose it was not in use up to that time.

The yield of sherds was not large in quantity and, since the heavy sherds may here (as certainly at some other mounds) be remains of stucco decoration, the finds suggest some ceremonial rather than domestic use of the building.

## 12. Structure O-3, Linton Satterthwaite

No masonry showed at this mound and there was no excavation, yet a small one-room building is shown in hatched plan on the map of the site. The approximate positions of the walls were clearly indicated by ridges of debris, as at Structure J-12, and Structures S-17 and S-18, where subsequent excavation proved the plan was what such evidence indicated. Here as there, such clear indication of the plan probably signifies a non-vaulted building with masonry walls reaching to roof-height.

Parris' field sketch shows that he located the corners of the broad platform on which this building (or its building platform) rested, but the record available at the time of writing lacks additional measurements locating the approximate positions of the corners of the building. As drawn, the estimated length is about 7 m , the depth about 3 m . One should allow for considerable deviation from these dimensions, which are estimates.

## Appendices

# Appendix 1 <br> Personnel of the Piedras Negras Expedition, 1931-39 

David W. Amram (1901-90; bookkeeper, 1932). As a young man, Amram worked as a radio operator on merchant ships, and during the 1930s, he explored the Chiapas jungle in Guatemala and Mexico for the Academy of Natural Sciences in Philadelphia and the American Geographical Society of New York. Amram was a selftrained archaeologist and cartographer, and spoke fluent Spanish. After he returned from Central America, he prepared maps of the region for the National Geographic Society. He also donated a grasshopper he had discovered, Lethus Amrami, which he named after himself, to the Academy of Natural Sciences in Philadelphia. During World War II, Amram again lived in Mexico, where he worked for the Board of Economic Warfare, purchasing mahogany that was used for the hulls of torpedo boats. He subsequently worked in communications for the Army Signal Corps. In the 1960s, Mr. Amram began a wholesale book business in which he dealt in rare and out-of-print books. During the 1970s, Mr. Amram often played bongo and conga drums in coffeehouses at Bryn Mawr, Pennsylvania (Amram 1942; Cipriani 1990).

Mary Butler Lewis (1903-70; excavation, 1932) was born in Media, Pennsylvania, the daughter of the famous World War I Major General Smedley Darlington Butler. She received her B.A. degree in 1925 from Vassar College, her M.A. from Radcliffe College in 1930, and her Ph.D. in anthropology from the University of Pennsylvania in 1936. Between 1930 and 1935 she worked as an Assistant, and in 1935 as a Research Associate in the American Section, University of Pennsylvania Museum. In 1936 she served as Assistant Archaeologist for the Pennsylvania Historical Commission, and between 1939 and 1940 was Director of the Hudson Valley Archaeological Survey for Vassar College. She held teaching positions at Hunter College (1937-38) and Bryn Mawr College (1942-43). She conducted archaeological field research in West Virginia (1930), Piedras Negras and the western highlands of Guatemala (1932, 1939-41), western Pennsylvania (1935), the middle Mississippi River valley at Brockport, IL (1937), and the Hudson Valley of New York State (1939-41). The University Museum and the

Works Progress Administration (WPA) co-sponsored two Ceramic Technology Projects at the Museum between 1935 and 1943 as part of the Statewide Museum Assistance Program. The first Ceramic Technology Project, developed in 1935 by Mary Butler, analyzed artifacts using chemical, petrographic, and optical methods. Experimental investigations of the composition of various clays, pigments, and other factors important in ceramic technology were conducted, and methods of conserving and restoring metal, stone, ivory, and bone objects were also studied (Keur 1971; Mary Butler Lewis 1970).

Frank Cresson (excavation, 1935-37) received his M.A. from the University of Pennsylvania in 1937. His thesis on Maya and Mexican sweathouses was based on his fieldwork at Piedras Negras. He later attended Harvard University where he wrote a series of manuscripts on Piedras Negras pottery and published his M.A. thesis in American Anthropologist in 1938. In the early 1940s he excavated village sites in southwestern Pennsylvania for the Pennsylvania Historical Commission (PHC). Cresson prepared an important monograph summarizing the results of these WPA excavations which remains a valuable resource for interpreting the WPA excavations, since he had access to field data that is apparently no longer extant.

William S. Godfrey, Jr (1916-80; surveying, drafting, photography, 1939) worked at Piedras Negras during the 1936-37 and 1939 seasons, while an undergraduate at Harvard College. Godfrey was the son of Marian Angell Godfrey Boyer, who was at Piedras Negras during the 1935 season. His senior honors thesis was on the stela of Piedras Negras (1940). After graduation he joined the family business of William Simpson and Sons, cotton merchants of Philadelphia and New York, and later returned to Harvard for his doctorate (1951). His doctoral dissertation was titled "Digging a Tower and Laying a Ghost: The Archaeology and Controversial History of the Newport Tower." He accepted at teaching position at Beloit College in Wisconsin and maintained research
interests in the Vikings in America and the archaeology of Mesoamerica (William S. Godfrey 1980).

MarianAngell Godfrey Boyer (1892-1989; Monument casts, 1935). Her devotion to art, music, archaeology, and nursing made her a leader in Philadelphia's cultural and civic affairs for nearly 40 years. She was married to William Simpson Godfrey, president of William Simpson and Sons, cotton merchants, until his death in 1947, and later to Francis Boyer, former chairman of Smith Kline \& French, now Glaxo Smith Kline. She established her own identity as a volunteer and contributor to such Philadelphia institutions as the Hospital and the University Museum of the University of Pennsylvania, the Philadelphia Museum of Art, the Philadelphia Orchestra, and the Academy of Music. She served on various boards of directors in the Philadelphia area. In the 1940s, after studying anthropology and archaeology at the University of Pennsylvania, she served as secretary (1943-44) and acting director (1945-47) of the University Museum after the death of George C. Vaillant (1901-45). Mrs. Boyer had a keen interest in nursing and worked to upgrade both the standards and pay for the profession. She was a longtime trustee for the National Foundation for Graduate Nursing Education, and she received a doctorate in humane letters in 1964 from Beaver College, where she also was a trustee. Mrs. Boyer also was active with the Franklin Institute, the YM-YWCA, the World Affairs Council, the America-Italy Society, the Franklin Day Nursery, New York's Metropolitan Opera, and the Philadelphia Lyric Opera Company. The University of Pennsylvania Museum's Marian Angell Godfrey Boyer Medal, first given in 1987 at the museum's centennial, was established to honor distinguished service to the museum (Marian Angell Godfrey Boyer 1989).
T. Egan-Wyer (Road and camp construction, 1931).

Mrs. T. Egan Wyer (Housekeeping, 1931).
J. Alden Mason (1885-1967; arrangements, field director, general oversight, 1930-36) was born in Philadelphia and educated at the University of Pennsylvania (B.A., 1907) and the University of California (Ph.D., 1911). He was Assistant Curator of Mexican and South American archaeology at Field Museum of Natural History in Chicago (1917-24), Assistant Curator at the American Museum of Natural History in New York (1924-25), and Curator of the American Section at the University of Pennsylvania Museum (1926-55). The subject of his dissertation was the Salinan Indians of California, but his diverse interests in later years extended throughout the Americas, including fieldwork among the Ute (1909), Tepecano (1911-13), Salinan (1911, 1916), and Papago (1919) Indians, and at Great Slave Lake, Canada (1913),

Puerto Rico (1914-15), Santa Marta, Colombia (1923), Northern Mexico (1929), Piedras Negras (1930-31); Durango (1935-36, 1948), and Cocle, Panama (1940). His interests considered Puerto Rican folklore and archaeology, Piman linguistics and ethnography, Maya, Aztec, and Inca archaeology and prehistory, and the linguistics of South American Indians. In 1911-13 he was chosen to represent the University of Pennsylvania for two seasons in Mexico at the International School of Archaeology and Ethnology in Mexico. In 1930 he was a member of the University of Pennsylvania expedition that used an airplane to explore 10,000 square miles of territory in Central America, making photographs of many parts of the Maya region. He retired from the University Museum in 1958 but served until his death as editor and field adviser of the New World Archaeological Foundation (Butler 1969; Cross 1969; Kidder and Satterthwaite 1968; Reynolds 1968; Satterthwaite 1969). The Mason Papers including correspondence, linguistic material, field notes, and photographs, are at the American Philosophical Society in Philadelphia.

Santiago Mendoza (Representative of the Guatemalan government, 1931-32).

Fred P. Parris (surveying and drafting, 1932-33). Little is known of Fred P. Parris. After his season at Piedras Negras as a surveyor and draftsman, he joined the Carnegie Institution archaeologists Karl Ruppert and John H. Denison in the exploration of Campeche, in southeastern Mexico. They were in the field from January 31 to May 8, traversed some 1,150 miles, 500 on muleback, and located four major and six minor archaeological sites, including Balakbal, Becan, Chana, La Muralla, Oxpemul, Pared de los Reyes, Río Bec, San Francisco, Uaacbal, and Uxul.

Victor M. Pinelo (Representative of the Guatemalan government, 1933, 1935-1937, 1939).

Tatiana Proskouriakoff (1909-85; surveying and drafting, 1936, 1937) was born in Tomsk, Siberia, Russia, to a chemist father and a physician mother. Proskouriakoff was brought to the United States in 1916, where she was raised and educated in Pennsylvania. In 1930 she received her Bachelor of Science from Pennsylvania State University in architecture. She found it difficult to obtain work as an architect during the Depression, and she answered an advertisement for an architecture student to work for Linton Satterthwaite at the University Museum. She joined the Museum's 1936 expedition to Piedras Negras, where her work included drawings of archaeological reconstructions of sites at Chichén-Itzá, Tikal, Yaxchilán, and others. Years later Proskouriakoff observed in the hieroglyphic text of Piedras Negras a pattern of dates and hieroglyphic signs. Through her analysis of these patterns she was able to identify a sequence
of seven rulers for a span of almost 200 years. She also showed that these texts indicated rites of passage and major feats of these rulers. She opened the way for a new approach to the Maya. Today, archaeological projects incorporate glyphic data to help formulate interpretive results, influenced by her studies of the stela of Piedras Negras. For her discovery that ancient Mayans were recording their history, Proskouriakoff was awarded the Alfred V. Kidder Medal in 1962, and in 1971 she was named Penn State's Woman of the Year. She was given honorary degrees from Tulane University and Pennsylvania State University, and in 1984 she received the Order of the Quetzal, the highest honor awarded to a foreigner by Guatemala (Berlin 1985; Graham 1990; Rivera 1987; Rosas 1988; Tatiana Proskouriakoff 1985).

John H. Ross (camp manager, 1932-33).

Linton Satterthwaite (Excavation, 1931-32; Field Director, 1933-37, 1939). Satterthwaite (1897-
1978) was educated at Yale University (B.A., 1920), and after a brief period during which he practiced law, he returned to the University of Pennsylvania Museum. In 1929-30 he was an assistant on various archaeological projects in Texas and West Virginia. He worked on Early Man sites in 1940 in Wyoming and in 1944 near Tranquility, California. Between 1950 and 1953 he worked at Caracol in southern Belize. He received his doctorate in anthropology from the University of Pennsylvania in 1943. From 1934 to 1955 he was Assistant Curator, and from 1955 to 1965 Curator of the American Section. In 1956 he served as epigrapher for the Tikal Project. He was interested in mathematics and astronomy of the prehistoric and modern Maya (Anthropology Newsletter 19,7:3, 1978).

Margaret Conway Satterthwaite (Laboratory, bookkeeping, 1932-39)

# Appendix 2 <br> Piedras Negras: An Opportunity and an Emergency in American Archaeology 

Linton Satterthwaite

## Reconstructing America's Earliest Civilization

More than a thousand years ago, presumably between 250 and 810 A.D., there flourished in what is now Central America a people well advanced in arts and sciences, a people proficient in architecture and astronomy; government and agriculture; sculpture and ceramics. Such was the culture of what is called the Old Maya Empire.

The Maya recorded time more accurately than any other ancient people. Many of their stone carvings (executed on limestone with implements of flint, obsidian and jade, for they had no metals at the time) merit comparison with any of the great schools of art of antiquity. The composition of some is astonishing and compares favorably with the best products of other civilizations. In every way, the Maya were the most highly cultured people of ancient America.

Yet, although some of their carving is strongly reminiscent of Greek art, popular theories of Old World origins for the Maya are universally discounted by the best authorities. They are believed to be pure American Indians who developed all phases of their high civilization in America, without influence from outside.

## Piedras Negras

One of the earliest of the Mayan cities, and apparently one of the richest in its store of Maya art, was Piedras Negras, situated on the Usumacinta River in what is now Guatemala.

Buried for centuries beneath the jungle, which spread over its temples and broad plazas following its sudden abandonment (for reasons not yet determined, and probably not later than A.D. 810), the existence of Piedras Negras was unknown until 1895, when its ruins were discovered by Teobert Maler.

Up to the time the University Museum of the University of Pennsylvania decided to begin excavations in the Maya region, which comprises Guatemala, southern Mexico, Yucatan, British Honduras, and northern

Honduras, no monumental pieces of Maya sculpture had been removed far from their original sites, for most of the Maya cities are buried deep in the tropical forests, distant from routes of travel and from navigable streams.

Piedras Negras, however, lies only a few miles above the head of navigation on the Usumacinta, a large river that drains much of Guatemala, and forms, in its middle course, the boundary between Mexico and Guatemala. It was for this reason and the fortunate additional circumstance that the monuments of Piedras Negras were recognized as probably the finest sculptures of pre-Columbian America, that the University Museum selected this as a site for its work.

## Accomplishments to Date

Since 1930, the University Museum has conducted seven expeditions to Piedras Negras. In the course of the first two regular seasons in 1931 and 1932, the expedition headed by Dr. J. Alden Mason, Curator of the American Section of the Museum, succeeded in removing eight of the best monuments on the site. Under an agreement with the Guatemalan government, which retains title to all articles removed from the ruin, the Museum was permitted to bring four of these monuments to Philadelphia, where they are now displayed in the Mayan hall of the Museum. The other four were shipped to Guatemala City.

Because torrential rains deluge the region through nearly three-fourths of the year, active fieldwork in the field is possible only between March and July. Impassable falls and rapids in the river make it necessary to haul materials by wagon road for about thirty miles. Since the heavy rains wash away both road surfaces and bridges between one season and the next, the removal of large pieces of sculpture requires the clearing of the road and the crating of the sculpture during one season, and the surfacing of the roads, erection of bridges, and actual movement of the monuments during the dry months of the following year.

The expeditions since 1932, headed by Linton Satterthwaite, Jr., Assistant Curator of the American

Section of the Museum, have resulted in the accumulation of much new knowledge of the Maya civilization, and the acquisition for the University Museum of many smaller pieces of the Maya's artistic product.

This year, the expedition force is remaining in Philadelphia, engaged in the publication of its first official report. Many of its accomplishments, however, have been described from time to time in preliminary papers, published at intervals, and in various scientific journals.

The work at Piedras Negras, to date, has cost a total of $\$ 90,000$. The funds with which this work has been supported are exhausted. A smaller additional fund must be raised before the work can be resumed, the task completed, and its full benefits obtained.

## The Challenge To Carry On

If the treasure remaining at Piedras Negras is to be preserved, and if the possibilities developed through the seven expeditions already made are to be fulfilled, it is imperative that the University Museum resume its work in the field in the spring of 1939. The urgency of the situation may be seen in these four major objectives:

1. About thirty stela, or monuments, remain at the ruins. Each year, the heavy rains, the falling of great trees, and the careless depredations of native muleteers and chicle hunters, passing through the area, take their toll of the beautiful carvings and valuable data which were cut into the soft limestone centuries ago, and which remain our most revealing record of this nearly forgotten civilization. The University Museum hopes that it may be enabled to rescue from the jungle the best of these remaining stela.
2. The ten-year term during which the Museum is permitted to continue the loan of the four stela which it has, under the agreement with the Guatemalan government, has nearly expired. It is likely that if more stela can be brought out of the ruin, the Guatemalan authorities may be persuaded to extend the loan of the monuments now in Philadelphia, perhaps indefinitely, in consideration of its share in the additional monuments removed.
3. Aside from the removal of stela, the Museum believes that, providing its present advantage is not lost through any extended absence from the site, it has the opportunity in one or two more seasons of excavation to uncover the solutions to several vexing problems in the study of the Maya people and their times. The Maya, for instance, often built their pyramids and temples one
upon another. In the third level below a typical Maya temple, the expedition has discovered a much larger temple, in many ways suggestive of Aztec origin. Since this is obviously the earlier of the two structures, further evidence of its having been built by the Aztecs might help to substantiate the growing belief that both the Aztecs and the Toltecs were contemporaries of the Maya, rather than representing a later stage in the decline of these people, as was long supposed. Still another subject on which continued excavations at Piedras Negras may throw light is the question as to whether a revolt or some other sudden catastrophe precipitated the abrupt and apparently violent abandonment of the city.
4. Finally, the fact that heretofore no Maya ruin ever has been completely excavated, level by level, down to the bottom, gives the University Museum the challenging opportunity to establish the first chronological record of the stratification of Maya communities.

The personnel of the Museum's expedition in the field, now in Philadelphia awaiting funds to continue the work in which they have accomplished so much, includes Mr. Satterthwaite, as field director; his wife, Mrs. Margaret Satterthwaite, as his assistant in the field; Miss Tatiana Proskouriakoff, architect; and Frank Cresson, Jr., assistant archaeologist. The expedition is always accompanied by a representative of the Guatemalan government.

## The Present Need

The project briefly outlined in this memorandum is one that calls for immediate action. The cost of maintaining an expedition in the field and conducting excavations is about $\$ 10,000$ for one season, and at least two seasons will be required to accomplish the immediate objectives at Piedras Negras. The task of bringing out the best of the fine stela remaining in the ruin will involve an additional expense of about $\$ 7,500$. A fund of about $\$ 27,500$, therefore, will be sufficient to bring out these priceless relics of the ancient Maya and continue excavations through 1939 and 1940.

The University Museum is hopeful that patrons of culture and learning may be found at once who will regard this project as an unusual opportunity to accomplish great ends at a relatively modest cost. Its accomplishment means saving for America the results of many years of arduous endeavor in which the groundwork has been laid, and saving for the world the artistic treasure and historic record of this earliest civilization in the Americas.

# Appendix 3 Maya Thrones and Benches ${ }^{1}$ 

Frank M. Cresson, Jr.

## Thrones and Benches at Piedras Negras

Little is known about the interior furnishings of the ancient Maya buildings because so few articles of household equipment have been preserved to the present day. In fact, the use of one of the most numerous types of Maya buildings, the so-called palaces, is still in doubt, largely because they contain almost no remnants of their original furniture. Whether these buildings were primarily for religious, civil, or domiciliary purposes has not been definitely established.

The most frequently preserved interior furnishings consist of stone altars of various kinds and stone structures which from their probable use as seats may be called thrones or benches. The two terms throne and bench as here used merely distinguish the type of construction. A "throne" has a seat consisting of a large rectangular stone slab supported by legs, while a solid masonry construction of more or less similar size and shape is called a "bench." The thrones at Piedras Negras are further characterized by a "back screen" at the rear of the seat, which may be of masonry or a single stone slab. That the benches served the same purpose as the thrones is suggested by the fact that half the benches have a back screen, usually of masonry, like those with the thrones.

The excavations at Piedras Negras up to the present have revealed four thrones and sixteen benches. These are listed in Tables A.3.1 and A.3.2 in order to summarize certain features of construction and the position of the throne or bench in the building. The number of the building in which each stands is also given. The numbers of the benches and thrones, except in the case of Throne 1 , are not official, but have been assigned merely for the present discussion. It should also be stated that the tables have been compiled partly from masonry and may contain a few inaccuracies.

All of the thrones at Piedras Negras have two legs, the back of the seat resting on a very narrow masonry bench. The legs are usually of a single stone slab, tapering downward or straight, but in one case were built of masonry. The back screen is in one case a sculptured stone
slab; in the other two known examples a masonry wall like those on the benches. The back screen of Throne 2 has a distinctive nick in each end, forming a small ledge.

Throne 1, with its carved back screen and hieroglyphs on the seat and legs, is the only sculptured example (Satterthwaite 1935:23-55). However, Thrones 2 and 3, which were intentionally destroyed in aboriginal times, may also have had glyphs on the edge of the seat. The front of the seat of Throne 2 is missing and all of the seat of Throne 3. The seat of Throne 4 is an uncarved stone slab. There are indications that two other sculptured thrones once existed at Piedras Negras. One is represented by a reused stone slab bearing glyphs (Miscellaneous Sculptured Stone no. 9), probably from the seat of a throne. The other is suggested by the carved stone leg now at the Peabody Museum (Maler 1901, Plate XI).

The existing thrones are all in palaces. Three are in positions of prominence, opposite the central doorway; the fourth is at one side of an end room.

The sixteen benches at Piedras Negras vary considerably in size and proportions, depending partly on their position in the room. However, they may all be grouped together as "large" except for four small, narrow ones, which are only about half the depth of the others. Three of these are in the Palace J-12, the fourth in a sweat house.

Eight of the benches have back screens, seven of masonry, one an uncarved stone slab. The latter was broken and fallen and may possibly have been a seat resting on the bench. Two of the masonry back screens have a ledge on each side, exactly like those of Throne 2.

The benches are found in palaces, in the two sweathouses that have been excavated, and in one temple. They are not given the prominent positions which the thrones occupy, for they appear in many old corners, several of the largest benches with back screens being in rooms not easily accessible. Few benches are opposite a doorway, none opposite a central doorway, and many against the end wall. In these cases they cross the full width of the room. Bench 9 is the only one which turns along the adjacent wall, giving it the shape of an $L$.

Table A.3.1 Thrones at Piedras Negras

|  | $\begin{aligned} & \mathrm{T} 1, \\ & \mathrm{~J}-6 \\ & \hline \end{aligned}$ | $\begin{aligned} & \mathrm{T} 2, \\ & \mathrm{~J}-11 \end{aligned}$ | $\begin{aligned} & \mathrm{T} 3, \\ & \mathrm{~J}-18 \end{aligned}$ | $\begin{aligned} & \mathrm{T} 4, \\ & \mathrm{R}-7 \end{aligned}$ | Total |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1. Legs |  |  |  |  |  |
| A. Slab |  |  |  |  |  |
| a. Tapering | x |  |  |  | 1 |
| b. Straight |  | x |  | x | 2 |
| B. Masonry (nearly square) |  |  | X |  | 1 |
| 2. Back Screen |  |  |  |  |  |
| A. Present | x | X | x |  | 3 |
| B. Unknown |  |  |  | X |  |
| 3. Screen Type |  |  |  |  |  |
| A. Slab | x |  |  |  | 1 |
| B. Masonry |  |  |  |  |  |
| a. Straight Side |  |  | x |  | 1 |
| b. Ledge on Side |  | X |  |  | 1 |
| 4. Location |  |  |  |  |  |
| A. In Palace | x | x | x | X | 4 |
| 5. Position in Building |  |  |  |  |  |
| A. In front Room | x |  | x | x | 3 |
| B. In End Room |  | X |  |  | 1 |
| 6. Position in Room |  |  |  |  |  |
| A. Opposite Central Doorway | x |  | x | x | 3 |
| B. Against End Wall |  | x |  |  | 1 |

Bench 10 stands beside an interior doorway which has been partly filled up, leaving a small window with plastered sill. Similar interior windows may have existed beside Bench 4 and Throne 2, but the walls in the doorways near which they stand were not preserved high enough to show whether or not there was a window.

## Thrones at Palenque

Thrones and benches occur in other parts of the Maya area, thrones being especially common at Palenque, where seven examples are still to be seen. These are all found in the palace group and are mostly of a tablelike variety, having a large thick seat slab supported by four legs, which are nearly square columns of stone, not tapering. There are no back screens.

One of these four-legged thrones stands just outside of House F, another in House E, and two in House H (Maudslay 1896-99:4, Plate 3). In the subterranean chambers are three more thrones, the one across one of the corridors having four legs. The smaller throne against the wall of the middle corridor has only two legs and a narrow masonry bench at the back to support the seat. In this case the seat is not a single stone slab but is made up of six narrow slabs reaching from the bench at the rear to a meter long stone slab extending from one leg to the
other. Finally, the throne in the inner corridor also has only two legs and a narrow bench at the rear. The seat is a single slab with much eroded glyphs along its edge at front and sides. There are also traces of carving on the leg fronts. This, the most inaccessible of all the thrones, is the only one decorated with sculpture.

An additional throne probably once existed in House E below the sculptured wall plaque. Del Río illustrates this as a large slab on four-straight-sided legs (Del Río 1822: Plate 12). The front edge of the seat is decorated with glyph (?) and human figures are shown on the front legs. A low back screen extends across the rear, just below the sculptured wall panel, but the panel itself forms the principal back screen for the throne.

## Benches in the Petén and Yucatan

Time is not available to trace the distribution of thrones and benches throughout the Maya area, but a few scattered references to occurrences of masonry benches without back screens will suffice to show that at least this form is widespread. In the Petén region of Guatemala benches appear to be extremely common. They are found in palaces at Tikal, sometimes as rectangular units against the back wall, sometimes also turning along the end walls and covering most of the room (Tozzer 1911:99, Plate


10). At Nakum is a large bench along the back wall with side benches at each end, a form typical in the whole region (Tozzer 1913, Fig. 77). At Holmul benches in the palaces are numerous (Merwin and Vaillant 1932, Figs. 2, $5,6,22$ ). At Uaxactún benches are common (Edwin M. Shook, personal communication) and in Temples E-I, EII, and E-III occur bench-like altars with high "wing walls" (Ricketson and Ricketson 1937: Figs. 9-12, 15-17, 19, 20; Plates 17a, 20b, c, 21c, and 22b, c). At what point a bench changes from a seat to an altar is often difficult to determine on its form alone.

Turning to Yucatan, we find benches without back screens common in the Puuc region (Harry ED. Pollock, personal communication). At Chichén Itzá also benches occur, several in the Temple of the Phalli and several in the Sweet House near the Mercado. In the Mercado is an unusually elaborate bench with battered sides and the front covered with sculptured figures.

## Sculptured Representations of Thrones

The occurrence of thrones and benches may be treated not only in actuality but also through representations of them in stone sculpture, stucco, and figurines. This method, moreover, has the advantage that they are seen in use as seats. Lintel 3 at Piedras Negras portrays a dignitary seated on a throne exactly like Throne 1, with tapering legs and sculptured back screen (Baker 1936). Stela 3 at the same site shows a figure on a throne, having glyphs along the front of the seat and on the slightly tapering legs (Maler 1901, Plate XIII). On Stela 6 and 12 also the principal figure sites on a throne or bench (Maler 1901, Plates XV and XXI).

That thrones were used at Yaxchilan may be inferred from the representation of one on a lintel. At Cankuen [Cancuen] on the upper Usumacinta a throne of a slightly different type appears on Stela 1 (Maler 1908, Plate 13). Seen from the front, it has three legs, with pairs of cross struts between them, indicating perhaps that the throne was made of wood. Two similar thrones with legs supported by struts are represented in the hieroglyphic stairway at Copan (Gordon 1902, Plates VI and XIV).

Figures seated on thrones are portrayed in stucco work on the piers of the palace at Palenque. House C provides three examples, both straight legs and tapering legs being represented (Maudslay 1896-99, Plate 38).

Finally, thrones may be depicted in clay figurines. An excellent example was purchased by a University Museum Expedition at Jonuta, which showed a figure seated on a throne having tapering legs and glyphs across the front of the seat.

## Uses of Thrones and Benches

All these representations of thrones show them as the seat for some dignitary, which effectively eliminates their possible use as altars, since altars would hardly be employed as seats. The benches, at least at Piedras Negras, may also be considered seats rather than altars because many of them have the back screen of thrones and all but one are in buildings other than temples. The one temple containing a bench also contains a small "column altar," the typical; temple altar at Piedras Negras.

The benches found in sweathouses undoubtedly were used in some part of the procedure of the steam bath, probably for resting afterwards. At Piedras Negras, of the 15 thrones and benches not is sweathouses, 14 are in palaces and only one in a temple, which indicates that their use was unconnected with temple ceremonies and suggests a secular rather than a religious function. Vaillant suggests the use of benches as beds (Merwin and Vaillant 1932:11). Some may have served this purpose but at Piedras Negras many are too small and those with back screens are more reasonably included with thrones as seats.

Satterthwaite believes the throne rooms were audience chambers and that the palaces containing thrones were public buildings like courthouses (Satterthwaite 1937:20). This is substantiated by practices at the time of the conquest described by Landa, although in his day "holding court" took place in the homes of the lesser leaders: "The chiefs govern the town, settling suits, ordering and adjusting the affairs of the communities, doing all through the hands of the leading men. These latter are much honored and obeyed, especially the wealthy, the chiefs visiting them and holding court ${ }^{2}$ at their houses for the settlement of affairs and business, this being done particularly at night" (Landa 1937:32).

The best confirmation for the use of thrones and benches in civil matters comes from sculptured representations of them showing more than the single feature on the throne, such as Lintel 3 at Piedras Negras. This scene represents no religious gathering but a chief on his throne discussing matters with this council, a distant predecessor of Landa's chief "holding court" with his leading men. Another example at Piedras Negras is Stela 12. The chief decides the fate of the captives huddled below. These sculptures lend weight to the belief that thrones and benches played a part in administrative and judicial matters. And this in turn leads to the belief that the palaces themselves were constructed primarily for these public purposes.

## Notes

1. The essays comprising Appendices 3 through 5 were originally submitted by Cresson between February 24 and April 14, while enrolled in Anthropology 9 as a graduate student at Harvard University in 1939. The two pottery essays (Appendices 4 and 5) by Cresson were
accompanied by pencil line drawings. The rendering of these was extremely crude and they have therefore been deleted from the present text [ed.].
2. Note by author reads: "In Bowditch's translation (Ms. at Peabody Museum) there is the following footnote at this point (p. 38, n. 3):The Spanish reads y tenian palacio, which Brasseur de Bourbourg translates on leur faisait la cour."

# Appendix 4 <br> Carved Orange and Carved Gray Wares at Piedras Negras 

Frank M. Cresson, Jr.

## What is "Fine Orange"?

In the classification and naming of pottery wares difficulties often arise in determining the range of variation which may be included under a single term, and the point at which divergence from the typical features of a certain ware is so great that a new ware must be recognized. For example, there is considerable confusion, at least in the writer's mind, as to exactly what is meant by the term "Fine Orange Ware." What shape and types of decoration does it include?, to what geographical areas does it extend?, and to what period of time does it apply?

Fine Orange is fully described by Vaillant (1927; Merwin and Vaillant 1932) and the most typical examples seem to be those from Yucatan and the Isla de Sacrificios, Vera Cruz, although it also appears in some localities in the southern part of the Maya area. Decoration is by painting, incising, stamping, or engraving in champleve. Fine Orange is found with Plumbate at Isla de Sacrificios and at Chichén Itzá, and these two wares are the characteristic pottery of the Mexican Domination Period, dated 1200 to 1458 (Vaillant 1935:120). "Fine Orange, then, appears to be not a general descriptive term for any orange pottery with fine-textured paste, but a definite ware with certain geographical centers and temporal limitations.

At Piedras Negras Butler describes an orange ware under the name "Orange 3," and states that "This ware corresponds to that sometimes described as 'Fine Orange'" (Butler 1935:10-11). It includes three types of decoration: sherds carved with human figures, bowls supported on three hollow spherical feet with incised lines on the bottom (grater bowls), and a few sherds with a champ-leve design cut through a white slip to the orange paste (Butler 1935, Plate 4.3, 4.8, this volume). Excavations since Butler's report was published have provided some additional specimens of carved bowls and grater bowls. The best examples of carving are shown on parts of two hemispherical bowls with flattened bottoms and a reclining human figure carved on the exterior. They were found in the South Group in debris around the base of one of the pyramids. "Orange 3 " is rare at Piedras

Negras and has been found only in "surface debris, although often well below the actual ground surface. It thus appears to be late, probably in use at the time of abandonment of the ruins. The latest dated monument is 10.0.0.0.0, according to Morley, so that "Orange 3" may be considered as about that date or somewhat later if occupancy continued after the erection of monuments.

At Uaxactún Smith also uses the term "Fine Orange Ware," applied to ovoid vessels with annular base having carved decoration. This ware occurs in the latter part of the Tepeu phase, which may be considered as ending with the dated monuments at 10.3.0.0.0. If Fine Orange Ware as used at Piedras Negras and Uaxactún means the same as that of Yucatan and Isla de Sacrificios or a close relationship to it, then this ware has been extended back in time two major pottery periods, from the Mexican Domination Period to the end of the Old Empire Stela Period, having skipped over the intervening Mexican Conquest Period, characterized by Carved Slate and Carved Gray wares (Vaillant 1935:100).

The relationship of the orange grater bowls and the orange champ-leve sherds at Piedras Negras are beyond the scope of the present discussion. What this paper attempts to show is that the third type under "Orange 3," which will be called simply "Carved Orange," does not correspond to the Fine Orange in Yucatan but is entirely distinct from it and finds its closest relationship with the Carved Gray of the Guatemala highlands. Carving at Piedras Negras has so far been found only in low, round-sided bowls. There is a complete absence of cylinder vases on annular bases and ovoid vessels on annular bases, shapes which are especially common with Fine Orange in Yucatan and Vera Cruz. The carving of the Piedras Negras examples, moreover, is a well-rounded bas-relief, more like the technique of Carved Gray or Carved Slate than that of Fine Orange, which is quite flat. This observation apparently applies also to the so-called "Fine Orange" ware at Uaxactún, which is described as "deeply carved." [Pottery from Piedras Negras] shows a "ceremonial assemblage" similar in style to the arrangement on Carved Gray vessels.

The probable connection of the Carved Orange at Piedras Negras with Carved Gray Ware is most strongly
indicated, however, by the fact that Gray Slate sherds have recently been found carved in exactly the same style as the orange bowls. They come from bowls of the same shape, have the same fine-textured paste, but are a clear gray from one side to the other. This difference in color is obviously due to a variation in the conditions of firing, as was shown through experimentation by Mr. Donald Horton at the University Museum. A piece of Carved Gray sherd was placed in a furnace, heated, and giver proper air conditions to allow oxidation. When taken out the sherd was a bright orange, the same color as the Carved Orange sherds. Oxidizing firing was evidently the usual practice of Piedras Negras potters, for just as carved pottery is far more often orange than gray, so also the Fine Slate ware bowls at Piedras Negras are generally yellow but sometimes gray.

## Reclining Figures

The Carved Gray sherds at Piedras Negras might be called a variety of the Carved Gray ware of the Guatemala highlands merely on the basis of color and general style of carving. But the Piedras Negras Carved Orange and Carved Gray is more firmly linked to the highland region through several occurrences of the reclining human figure. In the Uaxactún vase also one of the figures of the group appears in a semi-reclining position but not so extraordinarily like the Piedras Negras examples as are others from Yaxchilan and Kixpek.

The partially complete bowl from Yaxchilan, now at the Peabody Museum, is approximately the same size and shape as the Piedras Negras Carved Orange bowls and of similar paste. In the Yaxchilan specimen the outer half of the bowl wall is orange while the inner half is gray, indicating exterior oxidation only. On the exterior is carved a scene almost duplicating those on the two Piedras Negras bowls; a reclining figure looking away from his legs, scrolls and other designs on each side, and an ornamental glyph band a short distance below the rim. There is another reclining figure on the opposite side of the bowl, which was probably also the case at Piedras Negras, although both these examples are too incomplete to show it. Vaillant has considered the Yaxchilan bowl as an example of Fine Orange Ware (Vaillant 1927:118) and partly on this account places Yaxchilan contemporary with the Mexican Domination Period in his correlation tables (Vaillant 1935). With the material now available from Piedras Negras, it seems clear that the Yaxchilan bowl is not Yucatan Fine Orange but the same as Piedras Negras Carved Orange.

In the Burkitt Collection at the University Museum is another Carved Orange bowl of exactly the same type, excavated from the uppermost of several tombs
at Kixpek, near Chamá, Guatemala (Burkitt n.d.). This bowl has the same shape and paste as the Piedras Negras and Yaxchilan examples and an exactly similar design, with two reclining figures on opposite sides of the bowl and a decorative glyph band below the rim. It connects this style of carving with the region where Carved Gray Ware is most common; and as Carved Orange and carved Gray are so rare at Piedras Negras, the origin of these wares probably lies in the highland region.

Another example of reclining figures in a different style of carving comes from San Agustín Acasaguastlán, in the Motagua Valley (Lothrop 1936:146). Here the figures encircle the body of a jar, and there are no other decorations such as glyph band or scrolls. The bodies are far less well proportioned than in the previous examples and only one leg is visible. One figure holds a roundended spear thrower, possibly indicating contact with Mexican peoples.

Finally, mention should be made of certain carved sherds from Teotihuacán, Mexico (Linné 1934:98). None of these has a reclining figure but one depicts a person on one knee with the head turned backwards as in the cases already discussed. Linne mentions that the figure probably carries a spear thrower, but the sherd is broken too near the hand to be sure, or to state any definite resemblance on that account with the figure from San Agustín Acasaguastlán.

Tracing the characteristic features of Carved Gray and Carved Orange from Piedras Negras to the Guatemala highlands indicates that these two wares are closely related to the Carved Gray of the latter region. This conclusion raises the question of the major periods of Maya pottery and their bearing on the correlation problem. The occurrence of carved Gray at Piedras Negras, together with the presence of Fine Slate, unites the Mexican Contact Period to the closing years of dated monuments. But the Mexican Contact Period, characterized by Carved Gray, Carved Slate, and Fine Slate, lasts till the Mexican Domination Period, beginning in 1200 A.D. The Piedras Negras material may be considered as demanding a shortening of the Mexican Contact Period and thus favoring Vaillant's "11.3 Correlation." On the other hand, it may mean that Carved Gray dates back earlier than was formed supposed. Without more definite fixed points, it is difficult to state how long a certain pottery ware "ought" to last.

It would greatly aid a solution of the Maya dating problem, if the carved sherds at Teotihuacan could be assigned to their proper position in the series of Teotihuacan periods, to which Vaillant has now given approximate dates through a study of the historical sources (Vaillant 1938:561). Unfortunately, Linné’s "grave and building sequences are not readily comparable
to stratigraphical periods" (Vaillant 1938:543). Linné's material may date from "Teotihuacan II and III, if not later" (Vaillant 1938:542), which covers too long a time to allow a choice between two consecutive correlations.

It is to be hoped that other cross finds of this nature, which can be satisfactorily placed in some known chronology, will eventually settle the position of the Maya Long Count in the Christian calendar.

# Appendix 5 Pottery Types of Yucatan in the Usumacinta Area 

Frank M. Cresson, Jr.

## Yucatan Wares Having Chronological Significance

In his latest presentation of Maya history from a ceramic point of view, Vaillant distinguishes six main pottery periods for the Maya area as a whole (Vaillant 1935:120). The three earliest apply to the southern regions, the first before the earliest known dated stela and the next two covering the span of the Long Count dates recorded on the monuments. The three latest periods are represented especially in Yucatan; they are not connected with the Maya Long Count, the Maya Re-Occupation Period is characterized by incensarios and porous wares, which can be referred to the time following Mexican control of Chichén Itzá, or from 1458 to the Spanish conquest. The preceding period, the Mexican Domination Period, can be dated by historical sources as from 1200 to 1458. It is distinguished by the occurrence of Plumbate and Fine Orange wares (Vaillant 1927; Merwin and Vaillant 1932). Engraved Red is also represented with Fine Orange in the Mexican Dominination Period at Chichén Itzá.

The next earlier period in Yucatan is called the Mexican Contact period and is based mainly on Carved Slate Ware. However, the time limits of this ware are not clearly defined and it is stated that this period "rests on very weak foundations" (Vaillant 1935:133). It seems definitely earlier than 1200, since carved Slate does not appear in the Mexican Dominican Period at Chichén; but it apparently immediately precedes that date because Engraved Red, which does not survive into the Mexican Domination Period, has been found with Carved Slate at Labná, Ticul, and Jaina. Closely associated with Carved Slate, both typologically and geographically, is Fine Slate. The paste is fine-grained and the tempering particles minute. "The slip color range varies extraordinarily, extending even to pink and blue shades. The tone centers however, around a clear gray" (Vaillant 1927:83). Decoration, if present at all, is usually incised rather than carved. Fine Slate occurs at a number of sites in Yucatan and Campeche and at Yoxihá, Chiapas. One other variety in this period is Carved Gray, which is found in the south, especially in the Alta Verapaz region of Guatemala ${ }^{1}$.

Carved Gray is closely related to the carved Slate of Yucatan, both in shapes and in the scenes carved; and at the same time, from the arrangement and characteristics of the figures, it seems to be a direct development from the figure painting of the last period associated with the Long Count (Vaillant 1935:135). However, the examples of Carved Gray from the Alta Vera Paz and other southern regions are not from sites with dated monuments. Thus, the so-called Mexican Contact Period, characterized by Carved Slate, Fine Slate, and Carved Gray, is a period which ends with the Mexican occupation in Yucatan about 1200 , but which has its beginnings in the southern part of the Maya area, apparently under a strong stylistic influence from the closing period of dated monuments.

Under these circumstances, it would not be so very surprising to encounter examples of slate or gray wares at the sites with monuments. This, in fact, has occurred at Piedras Negras, where excavations have produced a type of pottery with closer resemblances to the Fine Slate Ware of Yucatan.

## Fine Slate Ware at Piedras Negras

A study of sherds from several overlapping architectural units on the Acropolis of the West Group at Piedras Negras has shown that the pottery may be divided into two main periods (Cresson 1938). The earlier, Period I, including shallow, tripod flanged bowls, and cylinder vases with slab feet, may correlate with the Tzakol Phase at Uaxactún (Vaillant's Petén Maya Period) or with an early part of the succeeding Tepeu Phase at Uaxactún. Period II includes a number of shapes connecting it with the Tepeu Phase and with Holmul V (Vaillant's Maya Great Period or Figure Painting Period). Associated with these Period II types, especially in one of the surface palaces, occurred a large number of sherds of a ware which, I believe, can be shown to be Fine Slate.

The paste is very fine with little or no tempering material. The sherds are thin and the paste hard. Its color is sometimes clear gray but more often pale yellow, in fact only about one-tenth of the sherds are gray. However, this
has been shown by experiment to be due to variations in the conditions of firing. Mr. Donald Horton of the University Museum, who is making a technological analysis of the Piedras Negras pottery, has placed gray sherds in a furnace and by proper heating and air conditions has changed them to the exact color of the yellow sherds. The slip also is variable in color, sometimes clear gray and sometimes light brown, due again to firing conditions. In view of the wide range of color for Fine Slate noted above, the variation in the Piedras Negras sherds does not exclude them from identification with this ware.

Only one type of bowl form has been recovered. One or two other rim forms and bottom forms are represented by a few sherds each but the great majority obviously come from bowls of the type illustrated. It is characterized by slightly flaring sides, a "basal angle" noticeable on the inside as well as the outside, and three small spherical rattle feet. The bottom is rounded above the lower edge of the feet but flat in the center. These bowls have no painted designs but all are decorated by incising. At the rim there may be a slightly projecting band, but far more often there are two or sometimes three incised lines a little below the rim. The main exterior surface is usually divided into a few wide panels by vertical lines and these spaces are filled with linear designs or animal forms. A pattern of a few curved lines may be the only design or there may be a fish or a monkey, naturalistically outlined by a few well-placed lines ${ }^{2}$. Finally, designs are occasionally executed in lines consisting of a series of short dashes, and on a few sherds the background is stippled.

Most of the sherds of this ware were found in one of the non-vaulted palaces (Str. JK-12 on Court 2), much broken and scattered, and lying directly on the floor plaster and on the surface of a solid masonry bench or throne. The number of feet present indicated that about 40 bowls were represented. They were evidently left when the building was abandoned; no evidence suggested a reoccupation. Moreover, a few sherds of the same ware and the same shape have been found below the latest floor of another palace, so that the ware was in use while building activity was still going on. The latest dated monument at Piedras Negras is 10.0.0.0.0, according to Morley. Unless building operations continued after stone carving, this type of pottery can be dated to 10.0.0.0.0, and possibly earlier.

At Yoxihá, Chiapas, south of Palenque, Blom found a number of pottery vessels in the upper vault of a tomb, including two bowls. They "are both of gray clay" (Blom and LaFarge 1926:229). Here we have a duplication of the bowls under consideration at Piedras Negras. The shape is the same with the projecting basal element, the rounded bottom, and small spherical feet. There is a band at the rim, an incised monkey or lemur incised on the background. Nothing could be more like the Piedras Negras specimens. These Yoxihá bowls are described by

Vaillant as examples of Fine Slate Ware (Vaillant 1927:86), and he compares the monkey to that incised on a Fine Slate rattle bowl from Sotutá, Yucatan. He considers them a local variation corresponding to the replacement of polychrome by incising in the Chamá region and in Yucatan (Vaillant 1927:371).

Turning to Yucatan, we find that one of the characteristic shapes of Fine Slate Ware is the "rattle bowl." The paste of the example in the Peabody Museum is fine-textured and clear gray, very like the gray specimens at Piedras Negras, and about the same thickness. In shape, the rattle bowls consist of very slightly flaring sides and rounded bottom, with a false bottom inside, the space between it and the real bottom containing pellets. There is no "basal angle" as in the Piedras Negras bowls and there are no feet, but in some cases at least the bottom is flat in the center and rounded only near the sides, as at Piedras Negras. In size and general proportion, moreover, the Yucatan and Piedras Negras vessels are about the same. It would be an easy transition from the Piedras Negras type to the rattle bowl, merely the dropping of the feet and the placing of a new bottom across the point of the "basal angle," since the hollow space for pellets is conveniently provided by the rounded form of the real bottom. A new but really very similar type of vessel is produced with the rattles simply transferred from the feet to the base of the bowl itself.

It is the incised designs, however, that most closely link the Piedras Negras vessels to the Fine Slate rattle bowls. One example shows a monkey not quite so accurately drawn as those at Piedras Negras but in exactly the same style. Furthermore, the figure is in a panel bounded by vertical lines, and the background is stippled. Three incised lines circle the bowl a short distance below the rim. In the other rattle bowls illustrated by Vaillant (1927, Figs. 324 and 329) there are no figures but there are three lines below the rim, like the two or three lines on the Piedras Negras vessels. Thus, the similarity in paste, the probable relationship in bowl forms, and the close resemblance in elements of incised design strongly indicate that the Piedras Negras ware should be classed with the Fine Slate of Yucatan. Besides the one from Itzincab or Sotutá, rattle bowls of Fine Slate are reported from Aké, Labná, and Jaina. A small rattle bowl, probably of Fine Slate, was purchased by one of the University Museum Expeditions at Jonuta, on the lower Usumacinta.

The occurrence of Fine Slate (and probably also Carved Gray ${ }^{3}$ ) at Piedras Negras by the date 10.0.0.0.0 has an important bearing on the main periods of Maya pottery. It means that the "Mexican Contact Period" or "Carved Slate Period" is linked to the Long Count dates and overlaps the closing years of the dated monuments. It is not proposed to delve into the ramifications of the Correlation Problem here; but it should be stated that the Piedras Negras material definitely favors a shortening of
the "Carved Slate Period," which would be accomplished by Vaillant's "11.3 Correlation." Whereas 10.0.0.0.0. would fall in 830 A.D. by the Thompson-MartínezGoodman Correlation, this date would be advanced to 1086 A.D. by the "11.3 Correlation." This would still allow over a hundred years for the decline of Carved Slate before the Mexican Domination Period begins at 1200.

## Engraved Red and Fine Orange in the Usumacinta Area

In Vaillant's "Chronology and stratigraphy in the Maya area," (1935), it is surprising to find Palenque and Yaxchilan placed so high in the Usumacinta column of the different correlation tables. In each case, they are put in the Mexican Domination Period, dated from 1200 to 1458. However, the architecture, sculpture, and even Long Count dates attest to the contemporaneity of Palenque and Yaxchilan with Piedras Negras and other typical "Old Empire" sites. Unless further pottery evidence has appeared since Vaillant's Chronological Significance of Maya Ceramics in 1927, it would seem that the only reason for placing these two sites at such a late date is the supposed occurrence there of certain vessels of Engraved Red and Fine Orange, the type wares for the Mexican Domination period in Yucatan. Nevertheless, a hasty perusal of the material suggests doubts as to the validity of the evidence. The matter needs further expansion but a few remarks may be made.

Both Engraved Red and Fine Orange are said to occur at both Palenque and Yaxchilan. It is stated that its occurrence at Palenque may be due to a late reoccupation and the observation is made that "this Engraved Red Ware vessel has a glyph band and other examples considered by us have not" (Vaillant 1927:372). With material now available from Uaxactún the glyph band gains importance. A carved bowl of exactly the same form, occurs at the end of the Tepeu Phase at Uaxactún. The Palenque bowl resembles the Uaxactún type more closely than the Yucatan examples, in bearing the glyph band and in the type of carving. We can therefore call this vessel contemporary with the buildings and still keep Palenque within the stela period. Incidentally, the ovoid form within annular base at Uaxactún provides another link between the sites with monuments and Yucatan.

An example of Fine Orange ascribed to Palenque is similar to a vessel attributed to Maxcanú in Yucatan, from Carter's collection of photographs (1932). The vessels illustrated by Vaillant and Carter are exactly the same size and the markings are so nearly identical that it is quite possible they are one and the same vessel. Moreover, at least half a dozen other cases occur where Carter and Vaillant five different proveniences in Yucatan
and Campeche to vessels that are obviously identical. Hence, the attribution of this Fine Orange bowl to Palenque is decidedly dubious.

From Yaxchilan is reported an Engraved Red cylinder vase on an annular base. It is certainly similar in form and decoration to various cylinder vases of Yucatan. However, when data are lacking on the exact location of finds, there is always the possibility of a reoccupation, and especially in the case of Yaxchilan, which in the past may have been a shrine for pilgrimages after its abandonment, even as it is today. Every year at a certain time the neighboring Lacandones still come to the ruins and spend a few days burning copal to the gods, leaving their crude incense bowls in the ancient temples.

The Fine Orange from Yaxchilan consists of a few sherds now at the Peabody Museum. They are carved or stamped in the same manner and with precisely the same complex designs as the so-called Fine Orange Ware at Piedras Negras. As stated above there is reason to believe that this ware is quite different from the Fine Orange of the Mexican Domination Period in Yucatan and related to the Carved Gray of the highlands. Thus, in each of the four cases there is some factor which makes the assignment of Palenque and Yaxchilan to the Mexican Domination Period open to doubt. This conclusion and the fact that no sherds from the excavations at Piedras Negras seem related to the wares and shapes of the Mexican Domination Period in Yucatan argues against Vaillant's proposed "10.10 Correlation." Such a correlation would place the Long Count date 10.0.0.0.0 at 1342 A.D. and in this case Plumbate and other late wares would certainly be expected at a site so closely situated to both Yucatan and Mexico as Piedras Negras. ${ }^{4}$

## Notes

1. Footnote by Cresson reads: "In surface deposits at Piedras Negras occur small amounts of a ware which has been called "Fine Orange" (Butler 1935:11). Recently, gray sherds with similar carved or stamped designs have been found, and it is my belief that the "Fine Orange" is actually a variation of the Carved Gray of the highland region. This subject will have to be reserved for a later paper."
2. Footnote by Cresson reads "This ware is described separately in Vaillant (1927), but is included under the term "Carved Slate" Ware in Vaillant (1935).
3. Footnote by Cresson reads: "I have no design samples here but the style is similar to that of the Yoxihá bowl."
4. Handwritten marginal note by Satterthwaite reads "Plumbate sherd was found there by Led[yard] Smith."

## Appendix 6 Piedras Negras Site Plan










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## INDEX

Abandonment, 322, 327
Academy of Natural Sciences, 44, 161, 385
Acosta, J. de, 205
Acropolis, 8, 16, 26, 27
Restoration drawing, 181-183; see also Sub-Acropolis structures
Agouti, 129
Aguacatán, 242
Aguirre, B., 235
Aké, 399
Alfred V. Kidder Medal, 387
Alta Verapaz, 115, 398
Altars, 167
Altar 1, 8
Altar 2, 8, 25, 26, 63, 73
Altar 3, 8, 23
Altar 4, 8, 23
Altar 5, 23, 150
Column Altars, 8, 202
Column Altar 1, 202
Column Altar 3, 193, 202
Column Altar 4, 195, 202
Drum altars 22, 25, 150, 332, 333, 335-338
Portable altars, $320,321,325,326$
Alvaro Obregon, 156
American Geographical Society, 385
American Museum of Natural History, 386
American Philosophical Society, 157, 386
Amram, D., 11, 158, 161, 385
Amsden, M., 173
Anta, 167
Apron face, 227
Apron molding, 167
Archaeological Institute of America, 11
Archaic period, 111, 131
Architecture, 155-170
Armadillo, 161
Arreola, J. M., 242, 245, 247
Arroyo Chinikiha, 160
Atitlán, lake, 112, 113
Awl, bone, 359
Aztec, 127, 247
Baker, M. L., 5, 8, 237
Baking Pot, 120
Balakbal, 386
Ballcourt, 205-240; see also Structures K-6 and R-11
Aprons, 209, 227
Bench, 206, 227
Double-T shape, 207
Extension, 207
Field, 207
I-shape, 207
Inner, 208
Lines, 208
Markers, 208, 221-224, 235-237

Niches, 209
Playing surface, 209
Ramp, 210
Stop-surfaces, 209
Structure, 206
Beads, Bone, 359
Clay, 128
Shell, 357
Becan, 386
Belize, 46, 94, 111, 124, 127, 387; see also Baking Pot, Cahal Pech, Caracol, Lubaantún, Mountain Cow, Tzimin Kax, Xunantunich
Benches, 334, 335, 390-394
Bench 9, 390
Bench 10, 391
Berendt, K. H., 4, 5, 267
Blom, F., 3, 7, 20, 29, 48, 157, 173, 205, 210, 399
Board of Economic Welfare, 385
Boca del Cerro, 160
Bolles, J. S., 57, 158
Bonampak, 5
Bone, 359
Bowditch, C. P., 394
Boyer, F., 386
Brasseur de Bourbourg, C. E., 394
Brinton, D. G., 4
British Museum, 11
Bryn Mawr, PA, 385
Burial vault, 354
Burials, 3, 27, 44, 47, 150, 236; see also Cremation
Burial 1, 354-356
Burial 2, 354, 356, 357
Burial 3, 354, 358, 359
Burial 4, 236, 237, 343, 360, 361
Secondary burials, 356
Burkitt, R., 4, 5, 48
Butler, M., 2, 3, 5, 7, 8, 11, 155, 158, 385, 395
Butler, S. D., 385
Byers, D., 244
Caches, 23, 44, 78, 202, 226, 338
Cache 1, 44
Cache 2, 44
Cache 3, 44
Cache 4, 44
Cache 5, 44
Cache vessels, 105
Cahal Pech, 5
Calakmul, 57
Calcite, 115
Campeche, 112, 124, 127, 156
Cancuen, 393
Capstones, 321, 326
Caracol, 4, 5, 7, 387
Carnegie Institution of Washington, 1, 8, 11, 15, 20, 29, 34, 57, 155, 157-159, 181, 386

Cartographic conventions see Mapping
Carved Orange pottery see Pottery: Orange 3
Casa Grande see Structure J-9
Cave, 58
Cedar, 161
Ceiling see Roofing
Celt, 150, 236
Censer, 58, 150, 151
Effigy 105
Lacandon 105
Ladle 105
Spiked 105
Ceramic Technology Project, 385
Cerro Zapote, 111
Chacamax river, 160
Chajcar, 124
Chalchuapa, 5
Chamá, 5, 92, 112, 113, 119, 124, 396, 399
Chamber, 354
Chambon, L., 1, 7
Chana, 386
Charnay, D., 10
Chert see Flint
Chicazapote, 161
Chichel, 48
Chichén Itzá, 5, 15, 46, 113, 158, 159, 173, 210, 242, 244-246, 256, 266, 386, 393, 395, 398
Chihuahua, 122
Chihuatal, 94
Children, 358, 359
Chipal, 48, 119
Chiriquí, 121
Chixoy river, 115, 160
Chronology, 78, 225, 237-239, 398
Chuitinamit, 120
Chukumuk, 115
Cist period see Postclassic period
Cists, 22, 150, 190, 333, 354-359
Cist 1, 334, 339-341
Cist 2, 334, 339-341
Cist 3, 334, 339-341
Cist 4, 25
Cist 6, 25
Cist 7, 25
Cist 8, 25
Stela cists, 153
Classic period, 112-115
Clavigero, F. S., 247
Cobá, 265
Codex Magliabecchiano, 247
Coe, W. R., 2, 5
Colton, H. S., 210
Column altar see Altars
Concrete, 48, 204, 227, 240, 279, 328, 342
Construction material, 62-63, 81-83, 162-163
Construction sequence, 36, 37, 78, 79, 83-84, 145-146, 212, 213, 215-221
Copán, 5, 11, 48, 92, 94, 96, 101, 112, 113, 115, 120, 124, 159, 205, 393
Costa Rica, 122
Courts, 319
Court 1, 26, 67
Court 2, 26, 27, 28, 399
Court 3, 26, 27, 28
Cremation, 333, 342

Cresson, F. M., 6, 8, 158, 184, 241, 267, 329, 385, 389
Crocodile, 161
Cuchumatán mountains, 244
Curtain holder, 259
Deer, 47, 161
Del Río, A., 73
Denison, J.H., 386
Dentition, 342, 356, 357
Dental modification, 359
Desempeño, 161
Designations, 175-178
Group, 175
Mound, 171
Section, 175
Structure, 171, 175
Diccionario Motul, 246
Diccionario pokomchi-castellano, 267
Dieseldorff, E. P., 7
Dish indentation, 91
Diving god, 131
Drainage, 256
Slab-lined, 89
Drum altars see Altars
Duck, 161
Dwellings, 318
Earplug, 128-130
Edificio de 8 Apostentos see Structure P-7
Egan-Wyer, T. 7, 11, 16, 158, 386
El Cayo, 17, 161
El Chile, 158, 161, 266
El Mirador, 5
El Paraiso, 266
El Porvenir, 160
El Quiché, 112, 121
El Retiro, 161
El Salvador see also Cerro Zapote, Chalchuapa, Santa Elena
Epigraphy, 386, 387
Escobedo, H., 2
False pyramids, 23, 140
Feldspar, 115
Field Museum of Natural History, 11, 386
Figurines, pottery, 44, 121-139, 151, 236, 383
Anthropomorphic, mold-made 122-127;
Anthropomorphic, modeled 127
Zoomorphic, mold-made 127, 128
Zoomorphic modeled 128
Personal ornaments 128
Filadelfia, 161
Fill, 169, 203, 227, 240, 323, 330, 332, 342, 371
Fire chamber, 251, 252, 257, 258
Fish, 161
Fitler, W.W., 157
Flint, 23, 25, 78, 226, 359
Blades, 342
Lenticular blades, 150
Eccentrics, 338
Floors, 42, 62, 81, 323, 372
Flue, 252
Frog, 161
Gamio, M., 7, 157, 242
García, F., 157

Glaxo Smith Kline, 386
Glyphs, introducing, 36
Godfrey, M. A., 386
Godfrey, W. S., 158, 385, 386
Gordon, G. B., 5, 205
Gordon, S. G., 44
Grasshoppers, 385
Greenstone, 236
Groups, 175
East Group, 17, 21-24, 107, 129
Northwest Group, 17, 28
South Group, 16-21, 107, 129, 395
Southeast Group, 16, 17, 28, 29, 108-111, 129
West Group, 8, 17, 24-28, 129, 153, 267, 398
Guatemala see also Aguacatán, Alta Verapaz, Atitlán, Cancuen, Chajcar, Chamá, Chichel, Chipal, Chuitinamit, Chukumuk, Cuchumatán, Desempeño, El Chile, El Mirador, El Paraiso, El Porvenir, El Quiché, El Retiro, Holmul, Kaminaljuyú, Kixpek, La Muralla, Lake Atitlán, Motagua River, Nakúm, Naranjo, Nébaj, Pueblo Viejo Aguacatán, Quen Santo, Quiriguá, Rabinal, Salama, Salcaja, San Agustín Acasaguastlán, San Francisco El Alto, San Pedro Carcha, Santa Lucia Cotzumalhuapa, Tactic, Tayasal, Tikal, Uaxactún, Utatlán, Xolchún, Xutilha, Zaculeu

Hallowell, H. J., 44
Hammerstone, 226
Haury, E.W., 210
Healey, G., 5
Hematite, 342
Hochob, 92
Holley, G., 2
Holmes, W. H., 181
Holmul, 92, 94, 96, 99, 112, 120, 393, 398
Honduras see also Copán, Ulúa River
Horton, D., 396, 398
House A see Sub-Acropolis Structure 3
House B see Sub-Acropolis Structure 4
Houston, S. D., 2
Howler monkey, 161
Hudson Valley Archaeological Survey, 385
Hummingbird, 161
Iguana, 161
Insect, 161
International School of Archaeology and Ethnology, 386
Isla de Sacrificios, 395
Itzincab, 399
Jacaltec, 266
Jade, 78, 128, 357, 359
Jadeite see Jade
Jaguar, 161
Jaina, 398, 399
Jatate river, 160
Jayne, H.H.F., 1, 7, 157
Jenks, J. S., 157
Johnson, E. R., 7, 11, 157
Jones, C., 6
Jonuta, 101, 113, 119, 122, 124, 393, 399
Joyce, T. A., 10, 46
Kaminaljuyú, 111, 124
Keeley, F. J., 44

Kekchí, 5
Kidder, A. V., 1, 210
Kilmartin, J. O., 173
Kixpek, 5, 101, 103, 112, 113, 119, 396
La Farge, O., 7, 244
La Muralla, 386
La Reforma, 160
Labná, 120, 398, 399
Labor, 163, 164
Labrets, 357
Lacandon, 58, 161, 333, 400
Lacantún river, 160
Laguna de Terminos, 160
Landa, D. de, 163, 246, 393
Lenticular blade see Flint
Lintels, 159, 261
Lintel 1, 8, 23, 153
Lintel 2, 8, 23, 47, 73, 149, 153
Lintel 3, 8, 23, 71, 73, 149, 153, 331, 393
Lintel 4, 8, 19, 122, 149, 153, 330
Lintel 5, 8, 25, 140, 149, 150
Lintel 6, 153
Lintel 7, 8, 24, 149
Lintel 8, 26, 149, 329-331
Lintel 9, 26, 330, 331
Lintel 10, 28, 359
Lintel 11, 19, 149, 153
Lintel 12, 8, 23, 25, 149, 153, 330
Lintel 14, 8, 19, 29, 47
Lintel 57, 8
Lithics, 46; see also Flint, Manos, Metates, Obsidian
Lizard, 161
Lothrop, S. K., 228, 242
Lubaantún, 34, 122, 129
Macabilero, 161
Macaw, 161
MacGowan, K., 210
Madeira, P. C., 5, 7, 156, 157
Mahogany, 161
Maler, T., 1, 3, 8, 10, 18, 25, 29, 73, 150, 153, 155, 160, 170, 388
Manos, 46, 226, 236, 327
Mapping, 11-15, 170-181
Cartographic conventions, 171
Marian Angell Godfrey Boyer Medal, 386
Marquina, I., 159
Mason, J. A., $1,5,8,11,16,155,157,158,228,242,386,388$
Masonry, 79, 203, 227, 240, 322, 323, 328, 332, 342, 362, 371, 372
Maudslay, A. P., 7
Maxcanú, 400
McGregor, J. C., 210
Mendoza, S., 158, 386
Mercer, H., 4
Merwin, R., 34
Metate, 46, 226
Mexico see Becán, Bonampak, Calakmul, Campeche, Chichén Itzá, Chihuahua, Cobá, El Cayo, Hochob, Jaina, Jonuta, Labná, Maxcanú, Milpa Alta, Palenque, Río Bec, Tabasco, Tancah, Tenosique, Teotihuacán, Texcoco, Tonalá, Tulúm, Uxmal, Valley of Mexico, Veracruz, Yalloch, Yaxchilan, Yucatan
Milpa Alta, 246, 256
Minerals, 44

Miscellaneous Stone Sculpture see Scuplture
Mold, figurine, 130
Moore, L., 7
Morley, S. G. 3, 7, 8, 10, 29, 138, 140, 146, 157, 159, 170, 190, 210, 242, 266
Morris, E. H., 266
Mortar, 48
Motagua river, 115, 396
Mountain Cow, 99
Mundo Nuevo, 161
Nakúm, 112, 120, 127, 393
Naranjo, 127
National Geographic Society, 385
Nébaj, 5
Negative painting, 90
Nelson, Z., 8
New World Archaeological Foundation, 386
Newport Tower, 385
Nicaragua see Rivas
Noguera, E., 157
Norris, E., 7
Nueva Orizaba, 160

O’Neill, J. P., 173
Oaxaca see Yucununahui
Obsidian, 23, 226, 338, 362
Old Empire see Classic period
Olmec, 127
Opossum, 47
Order of the Quetzal, 387
Oxpemul, 386
Palaces, 50-89, 169; see also Structures J-2, J-6, J-9, J-11, J-13, J-18, J-21, J-23
Palenque, 7, 56, 62, 73, 122, 155, 158, 160, 256, 391, 393, 400
Palizada, 160
Palma, E., 1, 7, 10
Palo Blanco, 266
Panama see Chiriquí
Panel stone, 169
Pared de los Reyes, 386
Parris, F. P., 7, 8, 11, 15, 16, 29, 158, 171, 190, 213, 267, 386
Parrot, 161
Pasión river, 160
Paso Caballo, 161
Peabody Museum of American Archaeology and Ethnology, Harvard University, 10, 23, 34, 73, 138, 396, 400
Peccary, 47
Pennsylvania Historical Commission, 385
Pennsylvania State University, 386
Penrose, B., 157
Pérez, A. F., 7
Pérez, O., 245
Personal ornaments, pottery, 128
Petate, 245
Petroglyphs, 18
Petrographic analysis, 115-121
Pezzati, A., 7
Philadelphia Museum of Art, 386
Philadelphia Orchestra, 386
Piers, 59, 60, 79, 169, 329, 332
Pilsbry, H. A., 44
Pinelo, V. M., 158, 386
Plaster, 48, 204, 227, 240, 323, 328, 342

Finishing plaster, 48
Platforms
Building platforms, 324, 375
Platform, basal, 167, 324
Platform courts, 169
Platform of the Twenty-Five Altars see Structure O-7
Supplementary platforms, 169, 320, 375
Plaza, 169, 343-362
Plazuela see Plaza
Plinth, 169
Plumbate pottery see Pottery: Plumbate,
Pokonchi, 249, 266
Pollock, H.E.D., 158, 265
Postclassic period, 341
Postel, W. A., 90
Pottery, 44, 90-139, 202, 203, 226, 385, 395-400
Pottery, Classification:
Black 1, 103
Black 2, 103
Black, Miscellaneous, 103
Brown 1, 103
Brown 2, 103
Brown, Miscellaneous, 103
Carved Gray, 395, 396, 398, 400
Carved Slate, 395, 398, 400
Dark on Light Orange, 96
Dark on Light Red, 96
Engraved Red, 398, 400
Fine Orange, 395, 398, 400
Fine Slate, 396, 398, 399
Gray Slate, 396
Mottled, 101-103
Orange 1, 98 ;
Orange 2, 98, 99
Orange 2a, 99-101
Orange 3, 101, 395, 396
Orange, 96
Plumbate, 124, 395, 398, 400
Polychrome A-1, 91, 92
Polychrome A-2, 92
Polychrome B, 92
Polychrome C, 92
Polychrome C-1, 92-94
Polychrome D, 94
Polychrome D-1, 94
Polychrome E, 94
Red 1, 103
Red, Miscellaneous, 103
Unslipped, 105
Usulutan, 111
Yellow, 101
Pottery, Forms; see also Censers
Bowls, 90
Dishes, 90
Disks, 226, 342, 359
Household or storage vessels, 105
Jars, 90
Masks, 151
Miniature vessels, 105
Plates, 90
Pottery cache vessels see Caches
Pottery counters, 46
Proskouriakoff, T., 2, 8, 158, 161, 171, 184, 210, 386, 389
Pueblo Viejo Aguacatán, 159
Pure rock fill, 48

Puuc, 393
Pyramid, 169; see also Structure
Quartz, 115
Quen Santo, 99
Quiché, 248
Quiriguá, 5, 11, 120, 159, 242, 266
Rabinal, 24
Raccoon, 130
Ramon, 161
Rands, R., 2
Raw materials, 48
Red paint, 27, 68, 369
Rehn, J.A.G., 44
Reygadas Vertiz, J., 159
Ricketson, O. G., 7, 8, 10, 159, 170, 173, 228
Río Bec, 386
Rivas, 121
Roberts, H. B., 138
Roofing, 259-261, 330, 368, 369
Beam-and-mortar roofing, 167
Ross, J. H., 7, 158, 387
Rubber, 161
Ruppert, K., 3, 29, 158, 210, 242, 386
Sacrificial Rock, 15, 17, 18
Sahagun, B. de, 246
Salama, 5
Salcaja, 111
San Agustín Acasaguastlán, 396
San Francisco El Alto, 48, 386
San José rapids, 160
San José Usumacinta, 161
San Juan Teotihuacan see Teotihuacan
San Martín de los Piramides, 245
San Pedro Carcha, 5
San Pedro Martir river, 160
Sanborn, C. A., 7
Santa Clara lake, 161
Santa Elena, 111
Santa Lucia Cotzumalhuapa, 159
Satterthwaite, L., 1-4, 6, 7, 158, 159, 387, 389
Satterthwaite, M. C., 387, 389
Sculpture, 330
Miscellaneous Stone Sculpture 1, 23, 150
Miscellaneous Stone Sculpture 4, 34
Miscellaneous Stone Sculpture 5, 34
Miscellaneous Stone Sculpture 9, 71, 73, 390
Miscellaneous Stone Sculpture 10, 8
Miscellaneous Stone Sculpture 16, 8
South Group Ball Court Sculptured Stone, 8
Section drawings, 181
Sharer, R. J., 5
Shark, 357
Shell, 44, 46, 78, 226, 342, 357
Shook, E. M., 5, 158, 266
Sills, 169
Slabs, 48
Smith, A. L., 158, 173, 205, 400
Smith, H. M., 161
Smithsonian Institution, 161
Snake, 161
Solar deity, 356
Sotutá, 399

South Group Ballcourt, 20; see also Structure R-11
Spider monkey, 161
Spinden, H. J., 10, 73
Spindle whorl, 44, 226, 353, 359
Spondylus shell, 128
Stair-side extension, 169
Stairways, 44, 83, 330, 335, 374
Stalacite, 327
Standard Fruit and Steamship Company, 158
Steam screen, 250, 251
Stela, 146-149, 189, 197, 385, 389
Stela 1, 8, 10, 25
Stela 2, 8, 19, 25
Stela 3, 8, 10, 25, 393
Stela 4, 8, 25
Stela 5, 8, 25
Stela 6, 8, 25, 393
Stela 7, 8, 25
Stela 8, 25, 150
Stela 9, 8, 25, 146, 150, 153
Stela 10, 8, 25, 146, 153
Stela 11, 8, 23, 25, 146, 150, 153
Stela 12, 8, 23, 393
Stela 13, 8, 23
Stela 14, 8, 10, 23
Stela 15, 8, 11, 23
Stela 16, 23
Stela 17, 23
Stela 18, 23
Stela 19, 23
Stela 20, 23
Stela 21, 23
Stela 22, 22
Stela 23, 22
Stela 24, 19
Stela 25, 8, 19, 189, 190
Stela 26, 8, 19, 190
Stela 28, 18
Stela 29, see Lintel 14
Stela 30, 19
Stela 31, 8
Stela 32, 8, 19
Stela 33, 8, 19
Stela 34, 8, 19
Stela 35, 8, 19
Stela 36, 8, 19, 73
Stela 37, 19
Stela 40, 8, 11, 25, 146
Stela 41, 21
Stela 42, 19
Stela 43, 25
Stela 44, 19
Stela 45, 47, 225
Stela cists see Cists
Sting-rays, 78, 357
Stoll, Otto, 248
Stone vessels, 353
Storage vessels see Pottery forms: Household or storage vessels
Stromsvik, Gustav, 46
Structures see also Sub-Acropolis structures, Platforms
Structure E-1, 28
Structure E-2, 28
Structure F-1, 28
Structure F-3, 7, 318-323
Structure F-4, 7, 323-328

Structure J-1, 7, 25
Structure J-3, 7, 25, 140-153
Structure J-3-2nd, 25
Structure J-4, 7, 25
Structure J-5, 7, 27
Structure J-6, 7, 27, 50-89
Structure J-6-2nd, 74-78
Structure J-7, 7, 27
Structure J-8, 7, 27
Structure J-9, 7, 27
Structure J-10, 7, 27
Structure J-11, 7, 27
Structure J-12, 7, 27, 390, 399
Structure J-13, 7, 28
Structure J-15, 28
Structure J-16, 28
Structure J-17, 7, 27, 28
Structure J-18, 7, 27, 378-380
Structure J-19, 7, 28
Structure J-2, 7, 25-27, 50-89
Structure J-20, 7, 26-28
Structure J-21, 7, 28
Structure J-22, 7, 26-28
Structure J-23, 8, 26-28
Structure J-24, 8, 26, 28, 380, 381
Structure J-25, 26, 28
Structure J-26, 26, 28
Structure J-27, 26
Structure J-29, 8, 28
Structure K-1, 22, 24
Structure K-2, 22
Structure K-3, 22, 24
Structure K-5, 8
Structure K-5-1st, 8
Structure K-5-2nd, 24
Structure K-5-3rd, 8, 24
Structure K-6, 8, 24, 30-49, 205, 228-240
Structure K-7, 24
Structure N-1, 267-280
Structure N-1, 8, 26, 267-280
Structure N-1-1st-A, 273-276
Structure N-1-1st-B, 271-273
Structure N-1-2nd, 269-271
Structure O-1, 20, 21
Structure O-2, 8, 21, 377, 378
Structure O-2-a, 21
Structure O-3, 8, 21, 383
Structure O-4, 8, 21
Structure O-5, 21
Structure O-6, 21
Structure O-7, 8, 21, 23, 46, 332-342
Structure O-7-1st, 335-338
Structure O-7-2nd, 334
Structure O-8, 22
Structure O-9, 22
Structure O-10, 22
Structure O-11, 22
Structure O-12, 8, 22, 23, 28
Structure O-13, 8, 18, 23, 150
Structure O-13-2nd, 23
Structure O-14, 23
Structure O-15, 8, 23
Structure O-16, 8, 23
Structure O-17, 26
Structure O-18, 8, 26, 328-332

Structure P-1, 22
Structure P-2, 22
Structure P-3, 28
Structure P-4, 28
Structure P-5, 22
Structure P-6, 8, 22, 24, 28, 373-376
Structure P-7, 7, 22, 24
Structure R-1, 8, 18
Structure R-2, 8, 18, 19
Structure R-3, 8, 18, 19, 20
Structure R-4, 8, 18, 19
Structure R-5, 8, 19, 20, 29
Structure R-6, 19
Structure R-7, 8, 20
Structure R-8, 20
Structure R-9, 8, 19, 184-204
Structure R-10, 8, 19
Structure R-11, 30-49, 210-228
Structure R-11-1st-A, 219
Structure R-11-1st-B, 218, 219
Structure R-11a-b, 8, 20
Structure R-12, 20
Structure R-13, 8, 20
Structure R-14, 20
Structure R-15, 8, 20
Structure R-16, 8, 21
Structure S-1, 28
Structure S-2, 8, 28
Structure S-4, 8, 28
Structure S-5, 8, 381-383
Structure S-17, 8
Structure S-18, 8
Structure S-19, 8
Structure U-1, 18
Structure U-2, 18
Structure U-3, 8, 18
Structure U-4, 18
Structure U-5, 18
Structure U-6, 18
Structure U-7, 18
Structure U-8, 18
Structure U-9, 18
Structure V see also Structure P-7
Structure V-1, 8, 28; plazuela, 343-362
Structure V-1-1st-A, 352-354
Structure V-1-1st-B, 352-354
Structure V-1-2nd-A, 350-352
Structure V-1-2nd-B, 350-352
Structure V-1-3rd-A, 348-350
Structure V-1-3rd-B, 348-350
Structure V-2, 8, 29
Structure V-3, 8, 29
Structure I see Structure J-4
Structure II see Structure J-3
Structure III see Structure O-13
Structure IV see Structure O-12, Structure R-5
Structure IX see Structure R-4
Structure VI see Structures R-9 and R-10
Structure VII see Structure R-1
Structure VIII see Structure R-3
Structure X see Structure R-5
Structure X-5, 24
Stuart, D., 7
Stucco, 23, 48, 151, 169, 369, 383
Sub-Acropolis Structures, 363-372

Sub-Acropolis Structure 1, 365, 366
Sub-Acropolis Structure 3, 366-369
Sub-Acropolis Structure 4, 369
Sweathouses, 241-317, 385; see also Structures J-17, N-1, O-4, P-7, R-13, S-2, S-4, S-19
Benches, 252
Ceiling, 255
Drainage and entrance arrangements, 249, 250, 256
Enclosing structure, 252
Exterior niche, 252
Heat and steam producing arrangements, 250-252, 256-259
Heat and steam retaining arrangements, 252, 259-261
Identification traits, 261-263
Roofing, 252
Tabasco, 124
Tabular stone, 169
Tactic, 249
Tancah, 265
Tayasal, 5
Teeth see Dentition
Temazcalli see Sweathouses
Temples, 170, 184-204
Temple of Eight Chambers see Structure P-7
Templo de la Estela 28 see Structure R-1
Templo de la Estela 29 see Structure R-3
Templo de la Estela 30 see Structure R-4
Templo de las 10 Estelas see Structure O-13
Templo de las 3 Estelas see Structure J-3
Templo de las 8 Estelas see Structure J-4
Templo de las Estelas 22 y 23 see Structure O-12
Templo de las Estelas 24-27 see Structures R-9 and R-10
Templo de las Estelas 32-37 see Structure R-5
Tenosique, 10, 156, 157
Teotihuacán, 121, 245, 396, 397
Texcoco, 127
Tezcatlipoca, 247
Thrones, 8, 27, 68-73, 170, 331, 390-394
Throne 1, 390, 393
Throne 2, 390
Throne 3, 390
Ticks, 161
Ticul, 398
Tikal, 5, 73, 161, 386, 391
Toad, 161
Todd, M. C., 7
Toltec, 128
Tonalá, 159
Toro, A., 159
Toucan, 161
Tozzer, A. M., 73, 266
Tulúm, 265
Turtle, 47
Tzeltal, 266
Tzimin Kax, 112
Uaacbal, 386
Uaxactán, 11, 92, 99, 112, 131, 159, 161, 205, 256, 393, 395, 396, 398

Ulúa river, 101, 120, 127
Unclassified Buildings and Substructures; see also Structures F-3, F-4, J-19, J-24, O-2, O-3, O-7, O-18, P-6, S-5, Structure V-1 plazuela, and Sub-Acropolis Structures 1, 3, and 4
Unit, 170
United Fruit Company, 158
Universidad del Valle de Guatemala, 7
University of Pennsylvania, 387
Archives, 5-7
Burkitt Collection, 396
Fairchild Aerial Survey, 5, 157
Museum, 4-6, 23, 27, 90, 155, 356, 385, 386, 388, 389, 398
Tikal Project, 3, 4, 387
Usumacinta river, $10,101,112-115,122,127,129,131$, $159,160,266,388,393,398-400$
Utatlán, 159
Uxmal, 158
Uxul, 386
Vaillant, G. C., 386, 398, 400
Valley of Mexico, 127, 128
Vassar College, 385
Vaults, 59-62, 79, 323; see also Burial vaults
Veneer, 170
Ventura Mendez, M., 245
Vera Cruz, 101
Villacorta B., C. A., 157
Villacorta C., J. A., 157
Villanueva G., F., 7, 157

Walls, 42, 59, 60, 79, 203, 227, 240, 323, 328, 332, 372, 372
Basal walls, 167
Partition walls, 328
Retaining walls, 342
Sherd wall, 256, 257
West Group Ball Court see Structure K-6
Whistle, bird-effigy, 78
Wild pig, 161
William Simpson and Sons, 385, 386
Window, 170
Works Progress Administration, 385
Xochicalli, 247
Xolchún, 48, 159
Xunantunich, 5
Xutilhá, 5
Yalloch, 94, 112
Yaxchilan, 20, 34, 57, 73, 101, 124, 127, 155, 158-161, 266, 321, 327, 386, 393, 396, 400
Yoalticitl, 247
Yoxihá, 398, 400
Yucatan, 265, 266, 398
Yucununahui, 205
Zaculeu, 159
Zapote, 161

