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 291) 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 $(\mathrm{g})$ 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.
3. 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.
4. In 1933 a fair collection of sherds was secured from the bedrock below this building.
5. 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).
6. 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.
7. 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.
8. Large detail photographs of the glyphs have been made at the Museum and are available to epigraphists.
9. 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.
