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## APPENDIX F

# Notes on Jadeite Color

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### *Jadeite Color*

The colors of Mesoamerican jadeites vary from white and grey through a range of blue-greys and greens to brown and black. The mechanisms for pigmenting jadeite are complex and not adequately defined. Theoretically, pure jadeite should be white, without a tinge of color. It appears colorless and quite transparent in thin section. "Natural colors" in jadeite are those produced at the time of crystallization of the mineral. These are the result of the substitution of an element in the crystal structure.

Agents which give jadeite natural color are mainly compounds of iron, manganese, and chromium. Chromium is important as the source of the brilliant emerald or imperial green of the rarest Mesoamerican jadeite, a color found in small quantities at Chalcatzingo. However, jadeite also exhibits a very extensive range of solid solution relationships within the pyroxene group. Two, three, or more materials may substitute on the crystal lattice, making the mechanism of pigmentation difficult to identify.

In the lighter-colored translucent varieties of jadeite, there are diffraction colors caused by the scattering of light as it passes through the material. Colors may also be due to agencies affecting jadeite after formation, such as weathering, absorption of coloring agents, and fire.

### *Notation of Jadeite Color*

Color names for the Mesoamerican jades have in the past been taken from Robert Ridgeway's *Color Standards and Color Nomenclature* (1912). Following a suggestion made by Maria Luisa Johnson (1975), the Munsell system of color notation is proposed as a more current and usable color reference system. The Munsell system (Munsell Soil Color Charts 1971) identifies color in terms of three attributes: hue, value, and chroma. The complete Munsell notation for chroma

matic color is expressed symbolically:  $H\ V/C$ .

The hue ( $H$ ) notation of a color (e.g., red, green, blue, etc.) indicates its relation to an equally spaced scale of 100 hues. In fact, the colors of the Mesoamerican jadeites fall within the range of seven Munsell hue charts: 10 Green-Yellow, 2.5 Green, 5 Green, 7.5 Green, 2.5 Blue-Green, 5 Blue-Green, and 7.5 Blue-Green.

There are variations for value and chroma on the hue charts. The value ( $V$ ) notation indicates the degree of lightness or darkness of a color in relation to a neutral grey scale extending from absolute black to absolute white. Value ranges from 0/ for absolute black to 10/ for absolute white. Thus, the darker jades have low value numbers, and the brightest, clearest colors have numbers in the 5/ to 6/ range.

The chroma ( $C$ ) notation indicates the degree of departure of a given hue from a neutral grey of the same value. The chroma scales extend from /0 for a neutral grey to /10, /12, /14, or farther, depending on the strength or saturation of a color.

### *Color Terms for the Chalcatzingo Jades*

Imperial green jadeite is synonymous with "emerald" green and denotes the clearest, most intense green of the Mesoamerican jades. It has a Munsell notation of 2.5G 5/10. The term *imperial* originally referred to Chinese court etiquette, which reserved the finest jade for the use of royalty and decreed the quality of jade that could be worn according to the wearer's rank. From what we know of the ethnographic literature in sixteenth-century Mexico, it appears that the same practice was followed there as well.

Apple green jadeite, a stone used by the Maya and not so far appearing in Olmec and Formative inventories, has the same hue as imperial green jadeite

but less color saturation or intensity (chroma) and lighter color (value). Its notation in the Munsell system would be in the range of 2.5G 6/7 and 2.5G 6/8, with variation according to composition.

The blue jades fall on the Munsell Blue-Green hue charts, but their distinction also lies in their chroma. They are very grey for their hue, having chroma values of /1 and /2. Some of the blue jades excavated at Chalcatzingo are distinctive for the pearly luster of their polished surfaces.

Chalcatzingo mottled jadeite, which has feldspar inclusions, exhibits a wide range of color and quality variation. The jadeite matrix varies from whitish grey to grey-green (5G 6/2), and the inclusions of feldspar are brighter and/or darker green-yellow, falling on the Munsell hue chart at 10GY.

Two distinct minerals were identified for the fragments of "paper-thin" ear-spools. The first was a dark spruce green fuchsite (5G 3/2) which appeared translucent spinach green when held to a light source (10GY hue chart). The second was a bluish grey serpentine (10G 6/2).

Jadeite called "bright green" is intermediate in color between imperial green and apple green, having less color strength and lighter color than imperial green.