



---

Article: A technological study of the painted surfaces of Zapotec urns from Xoxocotlán

Author(s): Samantha Alderson

Source: *Objects Specialty Group Postprints, Volume Nine, 2002*

Pages: 146-160

Compilers: Virginia Greene and Patricia Griffin

© 2002 by The American Institute for Conservation of Historic & Artistic Works, 1156 15<sup>th</sup> Street NW, Suite 320, Washington, DC 20005. (202) 452-9545

[www.conservation-us.org](http://www.conservation-us.org)

Under a licensing agreement, individual authors retain copyright to their work and extend publications rights to the American Institute for Conservation.

Objects Specialty Group Postprints is published annually by the Objects Specialty Group (OSG) of the American Institute for Conservation of Historic & Artistic Works (AIC). A membership benefit of the Objects Specialty Group, *Objects Specialty Group Postprints* is mainly comprised of papers presented at OSG sessions at AIC Annual Meetings and is intended to inform and educate conservation-related disciplines.

Papers presented in *Objects Specialty Group Postprints, Volume Nine, 2002* have been edited for clarity and content but have not undergone a formal process of peer review. This publication is primarily intended for the members of the Objects Specialty Group of the American Institute for Conservation of Historic & Artistic Works. Responsibility for the methods and materials described herein rests solely with the authors, whose articles should not be considered official statements of the OSG or the AIC. The OSG is an approved division of the AIC but does not necessarily represent the AIC policy or opinions.

## **A TECHNOLOGICAL STUDY OF THE PAINTED SURFACES OF ZAPOTEC URNS FROM XOXOCOTLÁN**

Samantha Alderson

### **1. Introduction and Background**

Figural ceramic urns are among the most recognizable and important artifacts of Zapotec culture, a civilization that flourished in Oaxaca, Mexico from approximately 900 BC until AD 900. Hundreds of Zapotec urns are in museum collections around the world and they have been published widely. However, beyond authentication studies, little technological information about these important artifacts has appeared in the literature. In 1994 I had the opportunity to begin a technological study of Zapotec urns in the collection of the American Museum of Natural History, with funding from the Kress Foundation. The study has included investigation of construction techniques and ceramic analysis but has focused primarily on examination of the painted surfaces of the urns, and it is this aspect of the research that will be presented below.

Past studies of Zapotec urns have focused on iconography. Scholars have traditionally described and categorized the urns as deities - representations of members of a Zapotec pantheon of Gods (Caso and Bernal 1952; Boos 1966). It has more recently been suggested that they were connected to the practice of ancestor veneration, which was an integral part of the Zapotec religion (Marcus 1983; Marcus and Flannery 1996). They are generally found in association with tombs, but there remain many unanswered questions regarding the function of the urns within the burials. They appear to be constructed as vessels, but are almost always found empty. It has been suggested that they may have held an organic substance, possibly a liquid, which has decomposed or evaporated over time, but to my knowledge, no residual analysis has been done on freshly excavated urns to test this theory. It has also been suggested that the vessels were intended to hold "spirit" or other non-corporal force (Boos 1966; Marcus and Flannery 1996).

Each urn is a cylindrical vessel open at the top and fronted by an anthropomorphic or zoomorphic figure frequently obscuring the vessel behind it. The figure is most often seated cross-legged with hands on knees and wears an elaborate headdress. There are numerous variations in position and attire. They can vary greatly in size. Many are less than a foot high, while others are life-sized, or larger (Figs. 1-3).

These low-fire ceramics can be quite complex constructions, assembled before firing from numerous components. Some were made using only hand modeling and carving techniques, while others include press-molded elements. Past studies have usually reproduced the urns using black and white photographs or drawings and surface decoration has often not been addressed. Based on personal examination of Zapotec urns in museums in Mexico and the United States and extensive review of the literature, it appears that almost all urns have traces of post-fire paint. A few examples have full polychromy, but most do not appear to have been elaborately painted. The

## *Alderson*

absence of complex paint schemes is probably partially responsible for the historic lack of interest in the surface decoration of the urns. This has no doubt been compounded by the fact that the paint on Zapotec urns is usually very powdery and friable, and thus often badly preserved.

The collection at the American Museum of Natural History contains approximately 80 urns and more than 100 urn fragments. This is to the best of my knowledge the largest collection of Zapotec Urns outside Mexico. Several of the urns and fragments in the Museum's collection have remarkably intact painted surfaces making them particularly good candidates for pigment study. These well preserved pieces belong to a part of the collection that was excavated by Marshall Saville, the museum's first curator of Central and South American archeology, in the late 1800's and early 1900's.

The Saville collection presented a unique opportunity to conduct a technological study of a significant number of urns that were known to be authentic. The unquestionable provenance of these urns was crucial since only a small number of the thousands of known urns have a documented archaeological context and apparently there are a great number of forgeries, many with very early collection dates. Several published thermoluminescence studies have exposed numerous fakes in collections around the world, and it is now often assumed that urns are suspect unless proven otherwise by documentation or analysis (Mongne 1987; Shaplin 1978).

Most of the Saville material was excavated in 1898, at the site of Los Mogotes de Xoxocotlán (Saville 1989 and 1904). The site is located in a valley less than 5 km from the Zapotec capital of Monte Albán, which at its height in the 6<sup>th</sup> and 7<sup>th</sup> centuries AD had a population of approximately 24,000 (Marcus and Flannery 1996). It has been suggested Xoxocotlán may have served as an agricultural center or marketplace for this capital city (Kowaleski 1983). There are 12 urns and 30 urn fragments from Xoxocotlán in the museum's collection, and all appear to date from the classic period of the Zapotec culture, roughly from AD 200 – 700.

## **2. Surface Examination**

The surfaces of the Xoxocotlán urns were carefully examined using a binocular microscope prior to removing pigment samples for analysis. This often revealed the presence of designs or pigments that were not apparent to the naked eye and had not been previously noted when the urns were published by Saville or cataloged into the Museum's collection.

The three large urns Saville found in Mound 9 have the best-preserved paint of all the urns found at Xoxocotlán (Figs. 4, 5). These are part of a set of five urns that were placed in a row above the doorway to Tomb 3. (The other two urns, like much of the material from Xoxocotlán remained in Mexico in accordance with an agreement made prior to the excavations.) The fronts of the urns are covered with a layer of red pigment, much of it preserved under a compact layer of burial soil. At first it appeared that red paint once covered the entire fronts of these urns. However, upon further examination it became clear that there are no significant traces of red, or any other color,

on the central medallions in the headdresses. These medallions appear to have been unpainted, while the rest of the urn fronts and much of the tomb front were also painted red. This design would have greatly altered the visual impact of the urns, accenting the glyphs, which would have stood out very strongly in the overall tableau of the façade.

Unfortunately, not all the urn surfaces are as well preserved as those from the façade of Tomb 3. In Mound 7, Saville uncovered a second set of five large urns, two of which are in the museum's collection (Figs. 6, 7). These urns were not built into the façade but placed in a row on the ground in front of Tomb 1. At first it appeared there was very little pigment on these urns but careful examination revealed small traces of red overall, often heavy in interstices or other protected areas. There is enough pigment remaining to say that most of the surface was probably once painted red but too little to determine a pattern in its application.

A smaller more elaborately painted urn was also found in Mound 7, lying on a section of ceramic tubing leading down to the tomb (Fig. 8). The urn has a finely modeled face and is ornately dressed wearing a complex headdress. Although the traces of paint are faint in many areas, it was possible to sort out some of the original decoration. The plaited headdress and teeth were painted white. There are traces of yellow pigment on the face from the nose down, while the upper half of the face and the lips are painted red - a type of bicolor face decoration that is found elsewhere in Zapotec pictorial art. The hair, ears, arms and parts of the ear ornaments are also clearly painted red. The painted surface on the lower half of the figure is severely damaged. There are clearly remains of both white and red paint, which overlap in some areas, perhaps indicating that at least parts of this urn were repainted at some time.

Evidence of repainting is also found on the small urn that Saville found in a niche above the entrance to a Tomb 2 in Mound 8 (Figs. 9, 10). In this case the painted surface is fairly well preserved, probably because like the urns from Tomb 3, it was placed in the façade of the tomb and the surface was protected to some degree during burial. Most of the front of this urn is covered with red paint. On much of the surface the red pigment is applied directly to the ceramic body, however in others areas it is clearly on top of a layer of white paint or stucco. In addition, a third layer of paint was visible under magnification in some areas, including the grooves between the toes. A cross-section of the paint from this location showed three layers of paint: red on the surface, a white underlayer, and below the white layer, a second red layer applied directly on the ceramic.

Although the order and distribution of these layers is unclear, it certainly appears that the urn was repainted on at least one occasion. This is important evidence that it may have been used in a previous burial or perhaps in a different context before it was placed in the façade of the tomb. In addition, red pigment found on the old break edges at the loincloth and headdress of this urn offers further evidence of reuse. It appears that the vessel was painted and placed in the tomb façade after these parts were lost.

### 3. Pigment Analysis

Once the surface examinations of these and the other urns from Xoxocotlán were complete, pigment on all the urns and urn fragments were sampled for identification. More than 100 pigment samples have been taken from urns and related material from the tombs at Xoxocotlán. The pigments were identified using microchemical tests, a polarizing light microscope, and a scanning electron microscope with energy dispersive spectroscopy.

A literature review conducted prior to sampling revealed published analysis of pigments from other areas of Mesoamerica, mostly of Maya murals (De Hanau et al. 1966; Gettens 1955; Hansen et al. 1995; Magaloni et al. 1995; Merwin 1931; Shepard 1946), and analyses of murals at Teotihuacan (Littman 1973; Torres 1972). However, there are very few analyses of Zapotec painted artifacts (Castillo 1968; Olvera 1994). For this reason it was decided to sample pigments not only from urns but also from other painted artifacts excavated at Xoxocotlán. These included human and animal bones, mural fragments and painted stucco sculpture. The broader sampling provided a more complete picture of the Zapotec palette and supplied comparative material for the analysis of the pigment samples from the urns.

The results of the pigment analysis are shown in Table 1. Red is clearly the most widely used color in the burials at Xoxocotlán. Red is also the predominant color throughout ancient Mesoamerica. Red paint is found on the earliest painted pottery in Oaxaca, and continues to appear in abundance on architecture, murals, sculpture and other objects. In burials it is found smeared on walls, thrown over objects, dusted on floors, and applied to human remains (Boone 1985; Marcus and Flannery 1996; Miller 1995).

Colors	Pigments	Total Objects	Urn	Urn Fragments	Stucco	Murals	Bones
White	Calcium Carbonate	7	3	1	1	2	0
Black	Carbon	2	0	0	0	2	0
Yellow	Goethite (Iron Oxide)	1	1	0	0	0	0
Blue	Maya Blue	1	0	0	0	1	0
Red	Hematite (Iron Oxide)	17	10	5	1	1	0
Red	Cinnabar (Mercuric Sulfide)	12	1	2	0	1	8

Table 1. Results of pigment analyses for samples taken from artifacts excavated at Xoxocotlán.

Two reds were found at Xoxocotlán: hematite (red iron oxide) and cinnabar (mercuric sulfide). Both have been previously reported on Zapotec material (Castillo 1968; Olvera 1994) and on artifacts throughout Mesoamerica. Hematite is an earthy and muted red while cinnabar is a

brighter, more intense hue. Iron oxides are very common minerals throughout the world, while cinnabar is less widely distributed. Interestingly, there appears to be a pattern in how the two red pigments are utilized at Xoxocotlán. Generally, cinnabar appears to have been used more infrequently. The red pigment on almost all the urns from Xoxocotlán was identified as hematite. Most of these objects are large and the fronts are almost completely covered with a wash of paint. This would have required a considerable amount of pigment. Cinnabar appears on a few urn fragments but only one complete urn - the smaller portrait urn found in Mound 7. This urn is not only smaller thus requiring less pigment than the larger urns, but is also remarkable for the complexity of its polychromy and the quality of the modeling. This indicates that it might have been a particularly high status object, which may account for the selection of the less common and brighter red.

Mural fragments found in Tomb 3, Mound 9, present another example of the use of the two different reds. The walls of the tomb were repainted at some time and the fragments have two distinct pictorial layers. The earlier design is partially visible in areas where the fragments are damaged. Large areas of red, blue, and white paint are visible. In this layer, where presumably large amounts of red pigment would have been required to fill in the flat areas of color, the red was identified as hematite. While in the upper design layer the red is cinnabar. Here red is used in small amounts, applied only as a wash of color on faces of the procession of figures that are drawn in black outline in the mural.

The manner in which the cinnabar is applied to the faces in this mural appears more symbolic than representational. Interestingly, cinnabar is applied in a similar manner to the facial area of a skull from the same tomb and is used exclusively on human and animal bones found in the tombs at Xoxocotlán (Table 1). Thus cinnabar is not only used more sparingly than hematite but the manner in which it is used implies this pigment may have held a distinct meaning for the Zapotec.

The other pigments found on the artifacts from Xoxocotlán are consistent with previously published analyses of paint from Zapotec and other Mesoamerican artifacts. The white samples were all calcium carbonate, black was identified as carbon, yellow as iron oxide, and the blue sample as Maya Blue. Identification of Maya Blue on the mural fragments from the tomb at Xoxocotlán is notable, since identification of this pigment for a well provenienced Zapotec artifact is not found in the literature.

Maya Blue is an unusual Mesoamerican pigment that has been widely debated and studied (José-Yacamán et al. 1995 and 1996; Kleber et al. 1967; Littman 1980 and 1982; Reyes-Valerio 1993; Shepard and Gottlieb 1962; Shepard and Pollack 1971). It is now understood to be an ancient synthesized pigment, manufactured by heating a mixture of the white clay mineral palygorskite and indigo.

The blue sample taken from the Xoxocotlán mural fragments exhibits the characteristic optical and physical properties typical of Maya Blue. When examined with a polarized light microscope it appears amorphous and pleochroic with low birefringence. When tested microchemically, it

*Alderson*

proved to be completely resistant to concentrated acids and alkalis. A sample examined with the scanning electron microscope showed the tiny rod structure typical of palygorskite (Fig. 11), and an EDS spectrum showed a composition typical of a clay mineral without the presence of elements that one would expect to find in other ancient blue mineral pigments, such as copper for azurite or sulfur and sodium for natural ultramarine (lazurite) (Fig. 12).

Maya Blue has been identified predominately on objects from the Yucatan, but many samples have been found in several other areas of Mesoamerica with occurrences spanning several eras. There is still no evidence on exactly how or where it was manufactured. It is not known if it was made by several different groups or traded over the large geographical range in which it has been found. Once more is known about the ancient manufacture and distribution of Maya Blue its presence on Zapotec material may offer evidence of trade relationships or other contact with regions outside of Oaxaca.

#### **4. Conclusion**

Even the mostly monochrome and often fragmentary painted surfaces of Zapotec urns have much to tell. Careful examination shows that the traces of pigment on the urns are often more extensive than it would first appear. All the urns and urn fragments from Xoxocotlán have pigment on their surfaces. Many urns like the ones from Tomb 2, Mound 7, at first largely appear unpainted but actually reveal extensive traces of pigment upon microscopic examination. The designs on the urns can also be more complex than one would assume. Paint was used to create detail, such as the face painting found on the portrait urn found in Mound 7, or to emphasis certain elements of the urns such as the glyphs on the urns from Mound 9. Study of the urn surfaces can offer evidence of repainting and reuse as was revealed on at least two urns found at Xoxocotlán.

Pigment analysis gives us a better understanding of the painted surfaces of the urns and the overall Zapotec palette. The identification of Maya Blue on Zapotec artifacts and the apparent selective use of red pigments at Xoxocotlán are two examples of what can be learned in this type of study.

Thus far, I have examined only a small number of urns and related material all of which are from one site in Oaxaca and so it is difficult to draw any solid conclusions. However, I believe this work clearly demonstrates that careful examinations and technological analyses hold great potential for deepening our understanding of these important artifacts of the Zapotec culture for which so many basic questions remain unanswered.

#### **Acknowledgments**

I would like to thank the Kress Foundation for funding the initial stage of this project. I would also like to thank Judith Levinson, Charles Spencer, Andrew Balkansky, and Joyce Marcus who have all offered advice and guidance during my work.

Alderson

## References

- Boone, E., ed. 1985. *Painted Architecture and Polychrome Monumental Sculpture in Mesoamerica: A Symposium at Dumbarton Oaks, October 1981*. Washington, D.C.: Dumbarton Oaks Research Library and Collection.
- Boos, F. H. 1966. *The Ceramic Sculptures of Ancient Oaxaca*. New York: A.S. Barnes and Co. and London: Thomas Yoseloff Ltd.
- Caso, A., and I. Bernal. 1952. *Urnas de Oaxaca*. Mexico: Instituto Nacional de Anthropología e Historia.
- Castillo T. N. 1968. *Algunas Técnicas Decorativas de la Cerámica Arqueológica de México, Serie Investigaciones 16*. Mexico: Instituto Nacional de Antropología e Historia (INAH).
- De Henau, P., R. Kléber, L. Masschelein-Kleiner, J. Thissen, and F. Trricot-Marckx. 1966. Les peintures murales Mayas de Bonampak: analyse des matériaux. *Bulletin Institut Royal du Patrimoine Artistique* 9: 114-124.
- Gettens, R.J. 1955. Identification of Pigments on Fragments of Mural Paintings from Bonampak, Chiapas, Mexico. In: Ruppert, K. et al, *Bonampak, Chiapas, Mexico, Publ. 519*. Washington, D.C.: The Carnegie Institution.
- Gettens, R.J. 1962. Maya Blue: an unsolved problem in ancient pigments. *American Antiquity* 27: 557-564.
- Gettens, R.J., R.L. Feller and W.T. Feller. 1993. Vermilion and Cinnabar. In *Artists' Pigments: A Handbook of their History and Characteristic, Vol. II*, ed. A. Roy. Washington, D.C.: National Gallery of Art. 159-182.
- Hansen, E.F., R.D. Hansen and M. Derrick. 1995. Los Análisis de los Estucos y Pinturas Arquitectónicas de Nakbe: Resultados Preliminares de los estudios de los Métodos y Materiales de Producción . In *VIII Simposio de Investigaciones Arqueológicas en Guatemala*, ed. J.P. Laporte and H.L. Escobedo. Guatemala: Ministerio de Cultural Y Deportes, Instituto de Antropología e Historia de Guatemala, Asociación Tikal. 543-560.
- José-Yacamán, M. and M. Carmen Serra Puche. 1995. High Resolution Electron Microscopy of Maya Blue Paint. In *Materials Issues in Art and Archaeology IV*, eds. P.B. Vandiver, et al. Pittsburgh, Pennsylvania: Materials Research Society. 3 - 11.
- José-Yacamán, M., L. Rendón, J. Arenas, and M. Carmen Serra Puche. 1996. Maya Blue Paint: An Ancient Nanostructured Material. *Science* 273: 223-225.

*Alderson*

Kleber, R., L. Masschelein, and J. Thissen. 1967. Étude et Identification du 'Bleu Maya'. *Studies in Conservation* 12 (2): 41-56.

Kowaleski, S. 1983. Valley-Floor Settlement Patterns during Monte Albán IIIa. In *The Cloud People: Divergent Evolution of the Zapotec and Mixtec Civilizations*, eds. K.V. Flannery and J. Marcus. Ann Arbor, Michigan: Museum of Anthropology, University of Michigan, Academic Press. 149-150.

Littman, E.R. 1973. The Physical Aspects of some Teotihuacan Murals. In *The Mural Paintings of Teotihuacan*, Arthur G. Miller, Dumbarton Oaks.

Littman, E. R. 1980. Maya Blue - A New Perspective. *American Antiquity* 45 (1): 87-100.

Littman, E. R. 1982. Maya Blue - further perspectives and the possible use of indigo as the colorant. *American Antiquity* 47 (2): 404-408.

Magaloni, D., R. Newman, L. Baños, V. Castaño, R. Pancella, and Y. Fruh. 1995. An Analysis of Mayan Painting Techniques at Bonampak, Chiapas, Mexico. In *Materials Issues in Art and Archaeology IV*, eds. P.B. Vandiver, et al. Pittsburgh, Pennsylvania: Materials Research Society. 381 - 388.

Marcus, J. 1983. Rethinking the Zapotec Urns. In *The Cloud People: Divergent Evolution of the Zapotec and Mixtec Civilizations*, eds. K.V. Flannery and J. Marcus. Ann Arbor, Michigan: Museum of Anthropology, University of Michigan, Academic Press. 144-147.

Marcus, J., and K.V. Flannery. 1996. *Zapotec Civilization*. New York: Thames and Hudson.

Merwin, H.E. 1931. Chemical Analysis of Pigments. In *The Temple of the Warriors at Chichen Itzá, Yucatan*, E.H. Morris, et al. Washington, D.C.: The Carnegie Institution of Washington. 355-356

Miller, A. 1995. *The Painted Tombs of Oaxaca, Mexico*. Cambridge: Cambridge University Press.

Mongne, P. 1987. Les Urnes Funéraires Zapotèques: Collectionnisme et Contrefaçon. *Journal de la Société des Américanistes*. 7-50.

Olvera, Mireya. 1994. Análisis químico de pigmentos utilizados en elementos arquitectónicos de Monte Albán. In *Monte Albán Estudios Recientes 1992-1994*, ed. M. Winter. 117-118.

Panczner, W. D. 1987. *Minerals of Mexico*. New York: Van Nostand Reinhold Company.

*Alderson*

Reyes-Valerio, C. 1993. *De Bonampak al Templo Mayor: El Azul Maya en Mesoamérica*. Mexico: Siglo Veintiuno Editores.

Saville, M. H. 1899. Exploration of Zapotecan Tombs in Southern Mexico. *American Anthropologist*, New Series I: 350 - 362.

Saville, M. H. 1904. Funeral Urns from Oaxaca. *The American Museum Journal* IV (3): 50-60.

Shaplin, P. 1978. "Thermoluminescence and style in the authentication of ceramic sculpture from Oaxaca. *Archaeometry* 20-21: 47-64.

Shepard, A. O. 1946. Technological notes on the pottery, pigments and stuccoes from the excavations at Kaminaljuyu, Guatemala. In *Excavations at Kaminaljuyu, Guatemala*. Kidder, A.V. et al. Washington, D.C.: The Carnegie Institution of Washington. 261-277.

Shepard, A. O. and H.B. Gottlieb. 1962. *Maya Blue: alternative hypothesis. Notes from a Ceramic Laboratory 1.* , Washington, D.C.: The Carnegie Institution of Washington.

Shepard, A. O. and H. Pollock. 1971. *Maya Blue: an updated record. Notes from a Ceramic Laboratory 4.* Washington, D.C.: The Carnegie Institution of Washington.

Torres, L. M. 1972. Materiales y tecnicas de la pintura mural de Teotihuacan. In *Sociedad Mexicana de Antropologia. 11 Mesa Redonda, 1966*. Mexico: Museo Nacional de Antropologia. 17-42.

Torres, L. M. 1988. Maya Blue: how the Mayas could have made the pigment. In *Materials Issues in Art and Archaeology I*. Pittsburgh, Pennsylvania: Materials Research. 123-128.

Van Olphen, H. 1966. Maya Blue: A Clay-Organic Pigment? *Science* 154: 645-646.

#### **Author's Address**

Anthropology Department, American Museum of Natural History, Central Park West at 79<sup>th</sup> Street, New York, New York, 10024



Figure 1. A variety of Zapotec Urns in the collection of the American Museum of Natural History. Left to Right: 30/93 (H: 13"), 30/6340 (H: 6 3/4"), 30.0/1 (H: 14 1/2"), 30/6796 (8 1/4"), 30.0/2 (12 3/4").



Figure 2. Two urns from Xoxocotlan showing range of size in the museum's collection. Left: 30/6332 (H: 22") Right: 30/6340 (H: 6 3/4")



Figure 3. Side and back of Zapotec Ums from Xoxocotlan, collection of AMNH.  
Top: 30/6336 (H: 17 1/4"), Bottom: 30/6333 (H: 20 1/2")



Figure 4. Zapotec Urns found in Tomb 3, Mound 9 (Xoxocotlan). Ceramic and Pigment. Left to Right: AMNH 30/6334 (H: 18 3/4 “), 30/6335 (H: 18.1/2” ), 30/6336 (H: 17 1/4” ).



Figure 5. Front of Tomb 3 (Xoxocotlan) showing urns in situ. Photograph taken by Marshall Saville 1898. Archives of the Anthropology Department AMNH.



Figure 6. Urns from Mound 7, Tomb 1, Xoxocotlan.  
Left: 30/6332 (H: 22") Right: 30/6333 (H: 20 1/2")



Figure 7. Urns in situ in front of Tomb 1 (note urn on far right was removed before the photo was taken). Photograph taken by M. Saville 1898. Archives of the Anthropology Department, AMNH.



Figure 8. Urn from Mound 7 (Xoxocotlan)  
AMNH 30/6331 (H: 15 1/2")



Figure 9. Urn from front of Tomb 2, Mound 8  
(Xoxocotlan) AMNH 30/7101 (H: 10")



Figure 10. Front of Tomb 2, Mound 8 showing urn in situ.  
Photograph taken by Saville 1898. Anthropology Department Archives, AMNH.

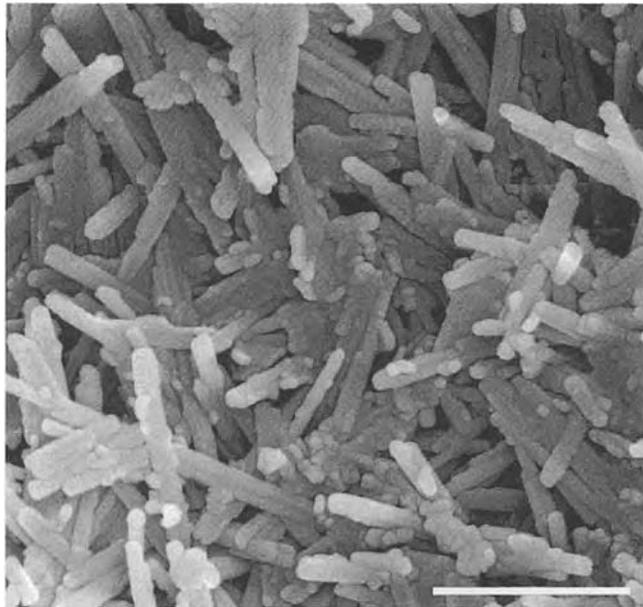


Figure 11. Scanning Electron Microscope image of Maya Blue sample from Xoxocotlan. scale = 1 micron

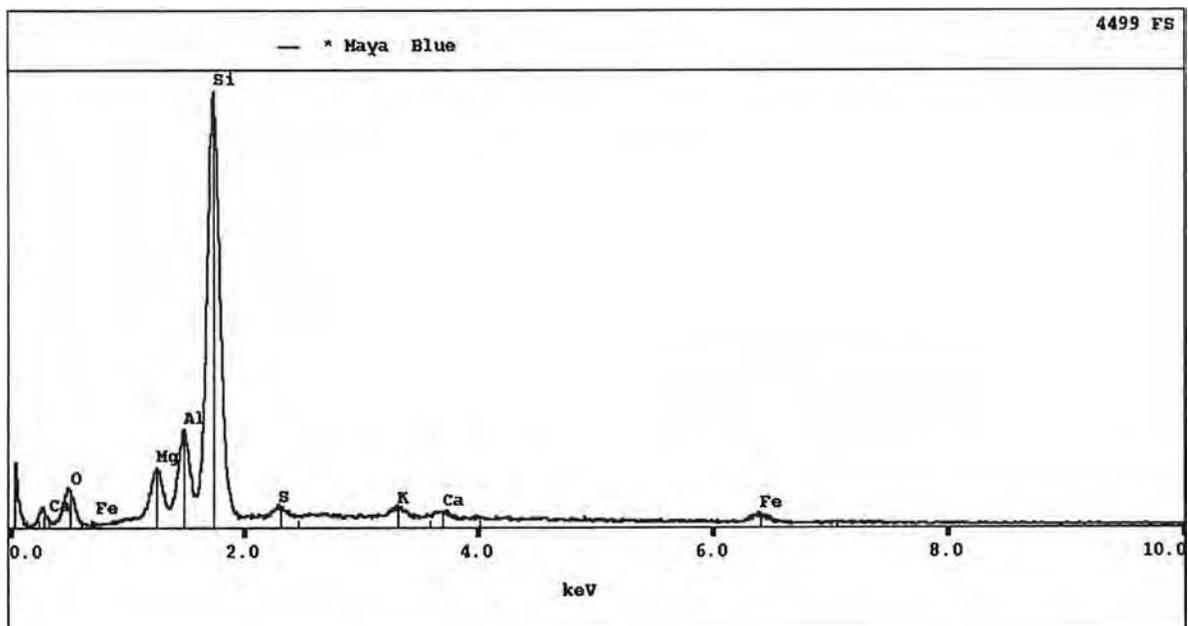


Figure 12. Energy Dispersive Spectroscopy (EDS) analysis of Maya Blue sample from Xoxocotlan.