VIII. TRACE ELEMENT ANALYSIS OF OBSIDIAN FROM THE SITE OF CHOLULA, MEXICO*

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The archaeological site of Cholula is located in the state of Puebla, central Mexico, about 65 miles southeast of Mexico City (Figure 1). During a brief visit to the site in 1970, we were able to obtain a sample of 89 obsidian artifacts. These specimens have been subjected to rapid-scan x-ray fluorescence analysis, a technique which we have previously used to determine the geologic sources of archaeological obsidian. Procedures followed in the analysis are the same as those outlined in Hester, Jack and Heizer (1971:93).

Our sample was collected from the surface of excavation backdirt on the west side of the Cholula pyramid and are undated. Presumably, the materials belong to the Classic period. We are fully conscious of the desirability of analyzing obsidian samples recovered from dated archaeological contexts since only information secured from this kind of material can provide us with hints of changing obsidian trade or procurement patterns over time at specific sites. However, we consider data such as presented here of value in giving us some indication of the geologic sources which furnished obsidian to prehistoric sites. We caution that inferences on "trade networks" and the like cannot safely be drawn from information such as given here for the site of Cholula.

As shown in Table 1 and Figure 2, x-ray fluorescence analysis has revealed the presence of six distinct obsidian groups or types in the Cholula sample. These have been earlier designated as types A-G (Hester, Jack and Heizer 1971: Table 8). At the present, we are able to correlate the following types with a specific obsidian source: type A (Cerro de las Navajas, Hidalgo); type D (Zaragoza, Puebla); type E (Cerro de Minas, Puebla); and, type G (Guadalupe Victoria, Puebla). The geologic sources of types B and F (both represented at Cholula) are not known. Type C obsidian, another of the types whose source is unknown, does not appear in our sample.

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Type D (Zaragoza) is the major type at Cholula, comprising almost 54% of the sample. This is of interest, since this type is the one used almost wholly by the peoples of Tres Zapotes, Veracruz (Hester, Jack and Heizer 1971). Similarly, type B (geologic source unknown) which is also prominent in the Cholula collection occurs as a major type at the site of LaVenta, Tabasco (see Hester, Heizer, and Jack 1971) and is present at the site of San Lorenzo (Cobean et al. 1971).

All of the obsidian sources represented in our Cholula sample are fairly close at hand, lying within a 75-mile radius of the site (Figure 1). The most distant sources are Cerro de las Navajas and Zaragoza, both about 75 miles away. Guadalupe Victoria and Cerro de Minas are 65-70 miles east of the site. Although there is considerable evidence of Teotihuacan influence at the site of Cholula, it is somewhat puzzling that we found no obsidian from the Otumba (Teotihuacan) source. This geologic source is closer to Cholula than any of the others represented in our sample. Given the poor contextual data associated with our sample, it would not be wise to speculate on the reasons for the absence of Otumba obsidian at Cholula. However, Michels (1971:266) notes that during the Colonial period, sites within the Teotihuacan Valley "...show noticeably greater use of gray [Otumba] obsidian...". Perhaps during the Classic period, these same sites more or less controlled the distribution of Otumba obsidian, and most of it was allocated for local consumption. This seems likely, for little obsidian of this type is represented at sites outside the Valley of Mexico. On the other hand, Cerro de las Navajas obsidian (the other major Valley of Mexico source) is quite widely distributed (Stross et al., in press).

With a small sample such as ours, we cannot deal with the important question of whether obsidian from the various sources was being brought to Cholula as raw material or if perhaps some of it was being traded to the site in the form of blades or finished artifacts. Of the artifacts in our sample, 76% are blades or blade fragments. Eight of the blades have trimming or use retouch on the lateral edges; of these, seven are of type D (Zaragoza) obsidian. This is the only artifact group which is largely restricted to a specific obsidian type. The remainder of the Cholula sample is composed of flakes and flake fragments (20%) and unifacial and bifacial tools (4%).
Table 1.

Obsidian Types at Cholula, Puebla

<table>
<thead>
<tr>
<th>Type and location</th>
<th>No. of samples</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (Cerro de las Navajas)</td>
<td>16</td>
<td>18.0%</td>
</tr>
<tr>
<td>B (unknown)</td>
<td>13</td>
<td>14.6</td>
</tr>
<tr>
<td>C (unknown)</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>D (Zaragoza)</td>
<td>48</td>
<td>53.9</td>
</tr>
<tr>
<td>E (Cerro de Minas)</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>F (unknown)</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>G (Guadalupe Victoria)</td>
<td>7</td>
<td>7.9</td>
</tr>
<tr>
<td>(89)</td>
<td>(100.0)</td>
<td></td>
</tr>
</tbody>
</table>
Figure 1. Location of the site of Cholula and geologic obsidian sources in central and southeastern Mexico.
Figure 2. Plotted results of rapid-scan analysis of obsidian artifacts from Cholula, Puebla, Mexico. Each point represents the relative Rubidium (Rb) K-alpha, Strontium (Sr) K-alpha, and Zirconium (Zr) K-alpha intensities for one artifact.
Bibliography

Cobean, R. H., M. D. Coe, E. A. Perry, Jr., K. K. Turekian, and D. P. Kharkar

Hester, T. R., R. F. Heizer, and R. N. Jack
1971 Technology and Geologic Sources of Obsidian from Cerro de las Mesas, Veracruz, Mexico, with Observations on Olmec Trade. Contributions, University of California Archaeological Research Facility 13:133-141.

Hester, T. R., R. N. Jack and R. F. Heizer

Michels, J. W.