USTICA I

Archaeologia Transatlantica
XIV

The Results of the Excavations of the Regione Siciliana
Soprintendenza ai Beni Culturali ed Ambientali Provincia di Palermo
in collaboration with Brown University
in 1990 and 1991

by

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with contributions by
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COLLEGE ERASME
LOUVAIN-LA-NEUVE, BELGIUM

1995
ERRATA

Page 87:

Page 88:
Last sentence should read: Furthermore, two pieces of obsidian from Ustica have already been reported to be from Lipari.7

Note 5 should include also: Crisci et al. 1994, cit. in note 2.

Note 7 should include also: Hallam et al. 1976, cit. in note 2.
APPENDIX I: OBSIDIAN PROVENANCE

R. H. Tykot

Obsidian is formed only in restricted volcanic circumstances, with just 6 sources in the Mediterranean area, all located on islands: Melos and Giali, in the Aegean; Monte Arci, in western Sardinia (with several distinguishable sub-sources); Palmarola, in the Bay of Naples; Lipari, in the Aeolian Islands; and Pantelleria, southwest of Sicily (with 3 sub-sources). Other sources exist in central and eastern Anatolia, and in central Europe.

Despite the limited number of geological sources, flake and blade tools of obsidian are well-known from neolithic contexts throughout the Central Mediterranean, and are commonly found at chalcolithic and bronze age sites as well. 1 Obsidian's glassy composition makes it superior to other rock types for cutting animal and plant materials.

Considerable effort has been expended to characterize each Mediterranean obsidian source, with the greatest success coming from trace element studies. 2 Fission-track dating has also been extensively used to source artifacts based on the different geological ages of the obsidian sources, 3 although the Sardinian and Pantellerian sub-sources cannot be distinguished by this method. Several other methods of analysis have proven useful in distinguishing at least some of the Mediterranean obsidian.


sources, but have not been widely applied to archaeological materials.  

In recent years, a number of chemical characterization studies of archaeological artifacts have been completed, so that the distribution patterns for each source are known in a general way. More research is necessary on chronological changes in obsidian distribution patterns, artifact typology and function, particularly at the site level. Only in this manner can we examine the underlying procurement and exchange mechanisms responsible for obsidian distribution, and the social and economic significance of obsidian being found at such great distances from its geological source.

In many cases, an experienced analyst may confidently assign an artifact to a single island source based strictly on its visual characteristics. Pantellerian obsidian is gray in transmitted light, but is nearly opaque; Liparian obsidian is gray to brown and quite transparent; Puntalaria obsidian is black and mostly opaque; Monte Arci obsidian is black, and ranges from virtually transparent to totally opaque. Although visual identification allows entire assemblages of artifacts to be studied, chemical analysis is a widely accepted, secure method of provenance determination, and should at minimum be used on a subset of an assemblage, to blindly test the success rate of the visual analyst.

The most likely source of obsidian artifacts found on Ustica would be Lipari, because of its geographic proximity and the already-known wide distribution of high-quality Lipari obsidian to sites all over the Italian peninsula, Sicily, Malta, and even North Africa. Furthermore, at least one piece of obsidian from Ustica has already been reported to be from Lipari, although no details have been published.

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6 For the most recent overview of Liparian obsidian distribution, see Bigazzi et al. 1992, cit. in note 3, p. 42; and Crummitt & Warren 1985, cit. in note 3, p. A1.2.

Table A1.1: Composition (in weight percent oxide) of twelve obsidian artifacts from Ustica, measured by wavelength dispersive spectrometry using an electron microprobe.

<table>
<thead>
<tr>
<th>Findspot</th>
<th>Lab. No.</th>
<th>Description</th>
<th>Attrib.</th>
<th>SiO₂</th>
<th>Al₂O₃</th>
<th>TiO₂</th>
<th>Fe₂O₃</th>
<th>MgO</th>
<th>CaO</th>
<th>Na₂O</th>
<th>K₂O</th>
<th>BaO</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ustica</td>
<td>1715</td>
<td>flake</td>
<td>Li</td>
<td>74.55</td>
<td>12.77</td>
<td>0.08</td>
<td>1.61</td>
<td>0.03</td>
<td>0.71</td>
<td>4.10</td>
<td>5.16</td>
<td>0.00</td>
<td>99.00</td>
</tr>
<tr>
<td>Ustica</td>
<td>1716</td>
<td>small flake</td>
<td>Li</td>
<td>74.59</td>
<td>12.70</td>
<td>0.07</td>
<td>1.63</td>
<td>0.02</td>
<td>0.71</td>
<td>4.11</td>
<td>5.16</td>
<td>0.01</td>
<td>99.00</td>
</tr>
<tr>
<td>Ustica</td>
<td>1717</td>
<td>small blade</td>
<td>Li</td>
<td>74.25</td>
<td>12.64</td>
<td>0.08</td>
<td>1.60</td>
<td>0.05</td>
<td>0.87</td>
<td>4.30</td>
<td>5.22</td>
<td>0.00</td>
<td>99.00</td>
</tr>
<tr>
<td>Ustica</td>
<td>1718</td>
<td>blade</td>
<td>Li</td>
<td>74.40</td>
<td>12.81</td>
<td>0.09</td>
<td>1.57</td>
<td>0.05</td>
<td>0.73</td>
<td>4.13</td>
<td>5.20</td>
<td>0.02</td>
<td>99.00</td>
</tr>
<tr>
<td>Ustica</td>
<td>1719</td>
<td>small chunk</td>
<td>Li</td>
<td>74.71</td>
<td>12.75</td>
<td>0.08</td>
<td>1.51</td>
<td>0.03</td>
<td>0.69</td>
<td>3.96</td>
<td>5.26</td>
<td>0.02</td>
<td>99.00</td>
</tr>
<tr>
<td>Ustica</td>
<td>1720</td>
<td>blade fragment</td>
<td>Li</td>
<td>74.37</td>
<td>12.75</td>
<td>0.09</td>
<td>1.80</td>
<td>0.04</td>
<td>0.81</td>
<td>4.01</td>
<td>5.13</td>
<td>0.01</td>
<td>99.00</td>
</tr>
<tr>
<td>Ustica</td>
<td>1721</td>
<td>core trim?</td>
<td>Li</td>
<td>74.69</td>
<td>12.74</td>
<td>0.08</td>
<td>1.57</td>
<td>0.03</td>
<td>0.70</td>
<td>4.04</td>
<td>5.16</td>
<td>0.00</td>
<td>99.00</td>
</tr>
<tr>
<td>Ustica</td>
<td>1722</td>
<td>small blade</td>
<td>Li</td>
<td>74.70</td>
<td>12.61</td>
<td>0.08</td>
<td>1.68</td>
<td>0.03</td>
<td>0.69</td>
<td>4.03</td>
<td>5.18</td>
<td>0.00</td>
<td>99.00</td>
</tr>
<tr>
<td>Ustica</td>
<td>1723</td>
<td>blade</td>
<td>Li</td>
<td>74.63</td>
<td>12.77</td>
<td>0.07</td>
<td>1.58</td>
<td>0.03</td>
<td>0.70</td>
<td>4.05</td>
<td>5.16</td>
<td>0.00</td>
<td>99.00</td>
</tr>
<tr>
<td>Ustica</td>
<td>1724</td>
<td>small chunk</td>
<td>Li</td>
<td>74.64</td>
<td>12.71</td>
<td>0.07</td>
<td>1.62</td>
<td>0.02</td>
<td>0.70</td>
<td>4.09</td>
<td>5.17</td>
<td>0.00</td>
<td>99.00</td>
</tr>
<tr>
<td>Ustica</td>
<td>1725</td>
<td>chunk</td>
<td>Li</td>
<td>74.78</td>
<td>12.62</td>
<td>0.08</td>
<td>1.65</td>
<td>0.02</td>
<td>0.69</td>
<td>4.04</td>
<td>5.12</td>
<td>0.01</td>
<td>99.00</td>
</tr>
<tr>
<td>Ustica</td>
<td>1726</td>
<td>arrowhead</td>
<td>Pa2</td>
<td>66.17</td>
<td>10.89</td>
<td>0.61</td>
<td>8.35</td>
<td>0.17</td>
<td>0.57</td>
<td>7.49</td>
<td>4.73</td>
<td>0.03</td>
<td>99.00</td>
</tr>
</tbody>
</table>

Obsidian from Pantelleria was also used in Sicily, at both neolithic (Grotta dell'Uzzo) and bronze age (Monte Cofano) sites, as well as in Malta and North Africa. Two arrowheads of Pantellerian obsidian have even been found in a Copper Age dolmen at San Sebastien in southern France. Only in North Africa, however, is Pantelleria ever the most common obsidian source represented in a site assemblage. Monte Arci obsidian is found at sites throughout Sardinia, Corsica, northern Italy and southern France, but not in southern Italy or Sicily. Obsidian from Palmarola appears to be restricted to central and northern Italy.

Twelve obsidian samples from Ustica, collected on the surface outside the archaeological site, were visually examined. Although without stratigraphic context, the pieces may be attributed to the period 1500-1200 BC. None of the pieces are more than 2.5 cm in length: a few are blades or blade fragments, one is a small arrowhead, and the rest appear to be debitage from the lithic reduction process.

The geological origin of these samples was determined on the basis of their color, transparency, and appearance in transmitted light. Eleven of the twelve are of typical Liparian type: one is certainly from Pantelleria. This visual assessment was then confirmed by chemical analysis of all twelve specimens.

Fragments 1 mm. in size were removed from the Ustica artifacts, mounted in 1-inch diameter epoxy disks, and polished flat using successively finer grinding compounds. The major/minor element composition of the samples was then determined by electron probe microanalysis with wavelength dispersive spectrometers, using the facilities of the Department of Earth & Planetary Sciences at Harvard University. Extensive analyses of geological source material have already demonstrated that all of the Mediterranean sources (and nearly all sub-sources) can be distinguished on the basis of their major/minor element composition.

The data in Table 1 represent the average of two analyses per sample, normalized to 99% (water content was not independently measured). Simple comparison of the elemental values for the archaeological samples with the geological data in Table 2 is sufficient to confirm that the first 11 artifacts are Liparian obsidian, and the twelfth art-

8 Francaviglia & Piperno 1987, cit. in note 5.
9 Cann & Renfrew 1964, cit. in note 2; Hallam et al. 1976, cit. in note 2.
11 Williams Thorpe et al. 1984, cit. in note 5.
12 Francaviglia 1984, cit. in note 2; Tykot 1995, cit. in note 2.
Table A1.2: Average composition of geological obsidian sources in the western Mediterranean, measured by wavelength dispersive spectrometry using an electron microprobe.

<table>
<thead>
<tr>
<th>Source</th>
<th>SiO₂</th>
<th>Al₂O₃</th>
<th>TiO₂</th>
<th>Fe₂O₃</th>
<th>MgO</th>
<th>CaO</th>
<th>Na₂O</th>
<th>BaO</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lipari</td>
<td>Ave.</td>
<td>74.51</td>
<td>12.75</td>
<td>0.08</td>
<td>1.63</td>
<td>0.03</td>
<td>0.72</td>
<td>4.03</td>
<td>99.00</td>
</tr>
<tr>
<td></td>
<td>Std. dev.</td>
<td>0.22</td>
<td>0.14</td>
<td>0.01</td>
<td>0.08</td>
<td>0.01</td>
<td>0.04</td>
<td>0.10</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>n = 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pantelleria 1 – Balate dei Turchi</td>
<td>Ave.</td>
<td>70.78</td>
<td>7.47</td>
<td>0.22</td>
<td>8.50</td>
<td>0.01</td>
<td>0.26</td>
<td>7.16</td>
<td>99.00</td>
</tr>
<tr>
<td></td>
<td>Std. dev.</td>
<td>0.10</td>
<td>0.03</td>
<td>0.01</td>
<td>0.05</td>
<td>0.00</td>
<td>0.00</td>
<td>0.11</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>n = 3</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pantelleria 2 – Gelkhamar</td>
<td>Ave.</td>
<td>66.23</td>
<td>10.17</td>
<td>0.61</td>
<td>8.90</td>
<td>0.15</td>
<td>0.53</td>
<td>7.56</td>
<td>99.00</td>
</tr>
<tr>
<td></td>
<td>n = 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

tifact is Pantellerian obsidian, specifically the Gelkhamar sub-source.

In conclusion, it was anticipated that obsidian artifacts found on Ustica would be mostly, if not entirely, of Liparian origin; the discovery that one of twelve artifacts derives from Pantelleria is not surprising. These findings augment our knowledge of prehistoric obsidian distribution in the central Mediterranean, and reaffirm the multi-dimensional nature of the sea-borne traffic in material goods characteristic of the Late Bronze Age.