A NEUTRON ACTIVATION ANALYSIS STUDY OF BRONZE AGE-MAMLUK PERIOD POTTERY FROM TELL NIMRIN, JORDAN

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1. Introduction

Twenty-five pottery sherds (Table 1), representing a range of types covering the long span from Early Bronze (EB) IV (ca. 2300-1900 B.C.) through the Mamluk period (A.D. 1250-1516), were selected for Neutron Activation Analysis (NAA) by Drs. Rudolph H. Dornemann and David W. McCreery. The periods of intensive occupation at the site are especially well-represented in the corpus, including the Middle Bronze (MB) Age (ca. 1900-1550 B.C.), Iron Age (ca. 950-600 B.C.), and Persian period (539-332 B.C.) Nine cooking pots from seven different periods were chosen, because this pottery type was often locally produced; cooking pots, being closely tied to a well-established cuisine, are among the most conservative elements in a pottery repertoire. A minimum of six storage jars/amphoras from four periods were of interest in possibly shedding light on wider trade connections. A group of five red-burnished bowls and jars, characteristic of the earlier and later phases of Iron II (ca. 900-600 B.C.), were also tested, together with two White Slip sherds of late Middle Bronze II date (ca. 1600-1550 B.C.) belonging to the Chocolate-on-White class.

2. Analytical and Statistical Approach

The physico-chemical method of NAA has been extensively employed in pottery provenience studies, because of its sensitivity and precision in measuring as many as 35 elements, including rare earths which often characterize a clay source, and because it requires very small samples (50-200 mg) that are non-destructively analyzed. The 25 samples from Tell Nimrin were assigned NAA numbers in the PMG-series (the initials are those of the author), and analyzed at the University of Missouri Research Reactor (MURR), under the direction of D. Michael D. Glascock and with support from the National Science Foundation (grant no. DBS-9102016).

The analytical procedures have been fully described elsewhere (Abascal, et al. 1974; Bishop, et al. 1982; Glascock 1992). Briefly, samples were prepared either by drilling with a tungsten-carbide drill or by scraping the surface with a sapphire or silicon carbide tool until the interior fabric was exposed and crushing to a fine powder using an agate mortar and pestle. Samples were homogenized, oven-dried, and subjected to short and long irradiations. The resultant gamma ray data were then processed, incorporating decay corrections, spectrum analyses and standards, yielding concentrations of elements for each specimen. Following Brookhaven convention, concentrations are reported as oxides of the elements in the order shown in Tables 2-5. MURR elemental data were converted to the oxides and intercalibrated with a large Old World database of analyses carried out at Brookhaven National Laboratory by multiplying by the relevant factors using a FoxPro database program on an IBM-PC in the Museum Applied Science Center for Archaeology (MASCA) at the University of Pennsylvania.