Chemical Composition by Neutron Activation Analysis (INAA) of Neo-Assyrian Palace Ware from Iraq, Syria and Israel

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Abstract

Neo-Assyrian Palace Ware is an 8th-7th century B.C.E. fine-ware which originated in Northern Mesopotamia and spread throughout the greater Levant. The mechanism by which Palace Ware moved across the Neo-Assyrian imperial landscape (trade or local imitation/emulation) is of great archaeological interest. This dataset provides chemical compositional data, generated using instrumental neutron activation analysis (INAA), for Palace Ware vessels from Nimrud and Nineveh, in the Assyrian imperial core (Iraq), Dūr-Katlimmu, in one of the annexed provinces (Syria), and Tell Jemmeh, located outside the Neo-Assyrian provincial system (Israel).

Funding Statement

The generation of this dataset was made possible by grants from the UCL Graduate School, Smithsonian Institution Fellowship Program and the United States Department of State Bureau of Education and Cultural Affairs to support the doctoral research of Alice Hunt.

Context

Neo-Assyrian Palace Ware was first identified as a distinct cultural phenomenon in the 1850s but was not referred to as ‘Palace Ware’ until the 1950s when Rawson applied the term to a corpus of vessels excavated by Mallowan from the North-West Palace at Nimrud. Palace Ware has been associated with Neo-Assyrian imperial power, administration and prestige since the early 20th century because it is excavated primarily from royal and administrative contexts and appears to be a skeuomorph of metal forms also recovered from these contexts.

Palace Ware is distinguished within the greater Neo-Assyrian ceramic corpus by its extremely fine paste and delicate, thin walls. Palace Ware is a relatively short-lived phenomenon: first appearing in the late 9th century B.C.E. and discontinued in the late 7th century B.C.E., after the fall of Assyria to Babylon. Despite its short duration, Palace Ware is distributed across and beyond the boundaries of the Neo-Assyrian imperial landscape. The short duration of Palace Ware consumption combined with its association with Neo-Assyrian power and administration has enabled archaeologists, rightly or wrongly, to use Palace Ware as an ‘index artefact’ of Assyrian imperial contact and/or occupation.

Of interest to archaeologists and Assyriologists is the provenance of Palace Ware because of its important implications for our understanding of social, political and administrative organisation of the Neo-Assyrian empire and the relationship between the core and annexed provinces. This dataset provides chemical compositional data for Palace Ware vessels from Nimrud, Nineveh, Dūr-Katlimmu and Tell Jemmeh which indicates that Palace
Material analysed in this study is part of a larger corpus of Palace Ware vessels studied as part of the doctoral research of Alice Hunt. The sample population from the Neo-Assyrian imperial core includes material from two sites: Nimrud and Nineveh. Palace Ware samples from Nimrud are courtesy of the Trustees of the British Museum and come from Mallowan’s excavation of the North-West Palace and Nabu Temple. Samples from Nimrud are designated by lab numbers beginning with ‘N’. Palace Ware samples from Nineveh were provided by the UC Berkeley excavation of Kouyunjik and come from 8th-7th century B.C.E. strata adjacent to an unpublished ceramic workshop. Samples from Nineveh are designated by lab numbers beginning with ‘NV’.

The sample population from the annexed provinces comes from Dūr-Katlimmu. Palace Ware from Dūr-Katlimmu is courtesy of the Tall Schech Hamad Projekt and comes from the Red House. Samples from Dūr-Katlimmu are designated by lab numbers beginning with ‘SH’.

The sample population from outside the Neo-Assyrian provincial system comes from Tell Jemmeh. Palace Ware samples from Tell Jemmeh are courtesy of the Petrie Palestinian Collection at UCL Institute of Archaeology and van Beek’s excavation of the site housed in the Smithsonian Institution National Museum of Natural History. Samples from Tell Jemmeh from the Petrie collection are designated with lab numbers beginning with ‘J’ and those from the Smithsonian collection are designated with lab numbers beginning with ‘JS’.

**Spatial coverage of data**

NIMRUD (ancient Kalḫu), Mosul, Iraq: 36° 5’ 57” N / 43° 19’ 39” E

NINEVEH, Mosul, Iraq: 36° 21’ 34” N / 43° 09’ 10” E

DŪR-KATLIMMU, Lower Khabur, Syria: 35° 38’ 36” N / 40° 44’ 25” E

TELL JEMMEH, Negev, Israel: 31° 32’ 15” N / 34° 26’ 41” E

**Temporal coverage of data**

Start date: ca. 850 B.C.E.

End date: ca. 600 B.C.E

**Methods**

**Steps**

After a preliminary microscopic investigation to check the samples for foreign matter attached to the surface, the surface of the samples was scraped clean using the sharp edge of a pure silicon blade. For INAA, established procedures at the Atominstitut were followed: cleaned samples were crushed in an agate mortar and then dried at 80°C overnight. For each sample, approximately 100 mg were weighed into Suprasil quartz glass vials, sealed and then irradiated for approximately 40 h together with internationally certified standard reference materials in the central irradiation tube of the TRIGA Mk II research reactor of the Atominstitut at a neutron flux density of 1×10^{13} cm^{-2}s^{-1}. After irradiation, the vials’ surface was decontaminated and they were packed into PE vials fitting the sample changer of the γ-spectroscopy system at the Atominstitut, consisting of a 151 cm$^3$ HPGe-detector (1.8 keV resolution at the 1332 keV$^{60}$Co peak; 50.1% relative efficiency), connected to a PC-based multichannel analyser with a preloaded filter and a Loss-Free Counting system. All samples were
measured twice, once after a decay time of 5 days for 1800 s to obtain the activities of the short- and medium-lived radionuclides $^{76}$As, $^{42}$K, $^{140}$La, $^{24}$Na, $^{239}$Np (U), $^{153}$Sm and $^{187}$W and. The second measurement after an additional cooling time of 3 weeks at a measurement time of 10000 s was performed to detect the activities of the long-lived radionuclides $^{131}$Ba, $^{141}$Ce, $^{58}$Co (Ni), $^{60}$Co, $^{51}$Cr, $^{134}$Cs, $^{152}$Eu, $^{59}$Fe, $^{181}$Hf, $^{177}$Lu, $^{147}$Nd, $^{233}$Pa (Th), $^{86}$Rb, $^{124}$Sb, $^{46}$Sc, $^{85}$Sr, $^{182}$Ta, $^{160}$Tb, $^{169}$Yb, $^{65}$Zn and $^{95}$Zr.

**Sampling strategy**

Samples for INAA analysis were chosen based on their their conformity to typological and definitional criteria for Palace Ware detailed by Hunt and the absence of macroscopic surface corrosion and/or accretion.

**Quality Control**

For the quantitative analysis, 4 internationally certified standard reference materials were irradiated and measured together with the samples. Specifically, the CANMET reference soil SO1, NIST SRM 1633b Coal Fly Ash, BCR No. 142 light sandy soil and the MC rhyolithe GBW 07113 were used. Furthermore, each measurement run also included a sample of the Bonn standard as an in-house reference material.

**Constraints**

N/A

**Dataset description**

**Object Name**

Palace Ware INAA

**Data type**

primary data

**Format names and versions**

.csv, .pdf

**Creation dates**

The dataset was created between March 2007 and March 2011.

**Dataset creators**

Alice Hunt, Principal Investigator

Johannes H. Sterba, Radiation Physicist

**Language**
This dataset comprises chemical compositional data for Neo-Assyrian Palace Ware vessels and, therefore, is a valuable reference for archaeologists and archaeological scientists conducting provenance studies of ceramics from the Neo-Assyrian period and Northern Mesopotamia. Given the difficulty of sampling material from Nimrud and Nineveh this dataset provides a unique resource for provenance studies of Assyrian ceramics.

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