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PETROLOGICAL EXAMINATION OF POTTERY FROM THE BROCH OF GURNESS, AIRTHERNESS, ORKNEY

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INTRODUCTION

Forty-five samples of pottery from the Broch of Gurness were submitted for petrological examination. These included two sherds of Roman amphora. The remainder of the sherds were initially viewed with the aid of a binocular microscope (x 20), and a sample from each was then studied in thin section under the petrological microscope. The object of the analysis was to obtain a detailed fabric description of each sherd submitted based on the type of non-plastic inclusions present in the clay and, if possible, to suggest likely source areas for the pottery. This work forms part of a long-term project on the petrology of Orkney pottery (see Williams, 1981).

ROMAN AMPHORA

Camulodunum 185A (Hawkes and Hull,1947).

1860(GA32.371), 1883(GA36.450C).

Both sherds are from the amphora type Camulodunum 185A , which originates from Baetica/southern Spain and probably contained marine products. The form is characteristic of the first and early second centuries A.D. To the best of the writer's knowledge, the Gurness vessel is the most northerly occurrence of this particular form.

PETROLOGY AND FABRIC

Fabric 1

1870 (GA77.269A), 1871 (GA77.269C), 1872 (GA77.269E).

In thin section all three samples are seen to contain fairly frequent inclusions of argillaceous material scattered throughout a very clean clay matrix. The angularity of much of this material suggests grog (crushed up pottery) rather than naturally occurring clay pellets. These sherds have a distinctive 'soapy' feel in the hand-specimen.

Fabric 2

1787 (GA31.214).

Thin sectioning reveals a scatter of quartz grains, 0.20mm and below in size, flecks of mica and some iron ore.

Fabric 3

1848 (GA77.298T).

Thin sectioning shows frequent grains of quartz and several pieces of calcareous sandstone.

Fabric 4

1739 (GA34.108A), 1740 (GA77.271A8), 1741 (GA30.123), 1815 (GA77.307I), 1832 (GA77.101B & C), 1834 (GA37.538H), 1858 (GA77.309I), 1862 (GA77.306A), 1875 (GA32.315), 1879 (GA77.317).

Thin sectioning reveals a fairly micaceous fabric containing a groundmass of quartz grains, average size 0.20mm and below, with the odd larger grain, iron ore and pieces of sandstone. The sandstone is composed principally of subangular quartz grains, together with

a little plagioclase felspar and mica, predominantly muscovite. Sample 1815 also contains a number of elongate voids, which might suggest that some form of organic material has been added to the clay.

Fabric 5

1783 (GA34.125A), 1788 (GA31.251), 1794 (GA77.310M), 1796 (GA38.684B).

Thin sectioning shows numerous quartz grains ranging in size up to 0.90mm, with an average of 0.15-.30mm across, flecks of mica and pieces of sandstone (composition as in Group 4). The latter tend to be slightly coarser in texture than are those of Group 4.

Fabric 6

1830 (GA35.217), 1850 (GA77.562E), 1853 (GA77.309F), 1856 (GA77.165A), 1863 (GA77.309B), 1865 (GA77.316), 1866 (GA35.234E).

The principal inclusions of this group are again numerous quartz grains and pieces of sandstone (composition as in Group 4). Texturally, the sherds as a whole appear to be intermediate in fabric between Groups 4 and 5. Sample 1865 also contains a little limestone.

Fabric 7

913 (GA77.93B), 1045 (GA77.293H), 1063 (GA77.303FG), 1170 (GA77.304C), 1257 (GA32.327C), 1729 (GA77.292Y), 1731 (GA31.287), 1829 (GA77.302A), 1833 (GA38.675D), 1845 (GA77.313B), 1867 (GA36.447C), 1874 (GA31.194).

These samples are very distinctive in thin section. All of them contain pieces of camptonite (numerous phenocrysts of reddish-brown hornblende and some pale green prismatic grains of augite, set in a groundmass of hornblende, augite and lath-shaped felspar). In

the majority of sherds the camptonite inclusions are frequent, and generally accompanied by numerous quartz grains and the odd piece of sandstone. Samples 1170, 1729, 1731, 1845 and 1874 tend to be finer-textured than the other sherds.

Fabric 8

1868 (GA77.254E).

In thin section the principal inclusions in this sherd are seen to be discrete grains of light green hornblende, felspar (both plagioclase and potash), quartz, mica, a little pyroxene and pieces of a hornblende-felspar-quartz rich rock.

Fabric 9

1820 (GA77.305J).

Thin sectioning reveals frequent discrete grains of pyroxene, plagioclase felspar, quartz, mica and pieces of a pyroxene-plagioclase felspar rich rock.

Fabric 10

1825 ((GA77.306C), 1831 (GA35.196A).

In thin section both sherds are shown as containing large inclusions of lava, set in a fairly clean clay matrix of fired clay. The parallel orientation of microlite inclusions in the lava can clearly be seen. The lava inclusions in sample 1831 are more viscous than is the case in 1825. Both sherds also contain some quartz grains and a little sandstone, while camptonite is additionally present in 1825.

DISCUSSION

Thin section analysis of the pottery selected for examination from the Broch of Gurness, shows that the sherds fall into fairly well defined fabric groupings based on the principal inclusion types present in the paste. Gurness is situated on Middle Old Red Sandstone formations, closeby to Boulder Clay and blown sand deposits. Two camptonite dykes are located about a mile to the south of the Broch, along the present coast line (Geological Survey 1" Map no. 119). The major temper constituents of the first seven fabric groupings - grog/clay pellets, quartz, sandstone and camptonite - could thus all be obtained at a reasonable distance from the find-site. This is not to say, of course, that some of the pottery could not have equally well been made at some distance from Gurness, as similar geological formations can be found over much of the Orkneys. There is at present, however, no reason to suspect anything other than a fairly local origin for Fabrics 1-7.

A non-local origin appears more likely with Fabrics 8-10. If a source in the local Boulder Clays can be ruled out for the igneous/metamorphic material in these sherds, and apart from 1825, the lack of variety of inclusion types present in the paste tends to discount this, these vessels should be treated as potential imports to Gurness. Igneous and metamorphic outcrops in the Orkneys are fairly restricted (Mykura, 1976). The area around Stromness and northern Graemsay contains formations of granite and schist, the latter containing varieties rich in hornblende and pyroxene (Wilson, 1935, 47-49). This region shoud therefore be considered for Fabrics 7 and 8, particularly as a pyroxene-rich sherd has been identified from the Broch of Bu in the south east part of Stromness. It has not been possible to distinguish the source of the lava in Fabric 10,

but possibilities are the Hoy Lavas, which have a limited distribution in north and south Hoy, and the Basic Lavas situated in the southern part of the Mainland and at Hacos Ness in Shapinsay. Two Iron Age sherds from Quanterness have also been found to contain inclusions of lava (Williams, 1979).

However, a source, or sources, further afield for Fabrics 8-10 should perhaps also be considered. The Shetland Islands with their wide range of igneous and metamorphic rocks spring to mind. Steatite tempered pottery from Shetland, for example, is found at a number of Orkney sites (Hamilton, 1956, 31), including Bu Broch. A green hornblende-rich fabric has also been noted in pre-Norse pottery from north Uist in the Outer Hebrides, though geographically this might seem less likely as a source for Fabric 8.

One particularly interesting feature of the Gurness pottery is the high percentage of sherds which contain dyke rock inclusions. Included in Fabric 7 are five samples, 913, 1045, 1063, 1170 and 1257, from Fabric A of the Pottery Catalogue, which is said to represent 'the vast majority of the sherds recovered from Gurness'. Since such dyke rock material would in all probability have to be searched out by the potters of Gurness, it would appear that this form of temper was deliberately added for a particular purpose. This 'technological recipe', if it can be regarded as such, appears to have been fairly widespread during the Orkney Neolithic, occurring at a variety of sites such as Skara Brae, Rinyo, Stones of Stenness and Quanterness (Williams, 1981). The occurrence of dyke temper at the Roundhouse at Quanterness, the Broch of Bu and now in some numbers at Gurness, suggests that this practice may also have been common during the Orkney Iron Age.

A single source for much of this dyke-rock pottery seems to be unlikely, as the accompanying non-dyke inclusions in the paste

are variable. Instead, it seems more probable that the majority of this pottery was made at or near each particular find-site. In which case, what we are noting may be a tradition of making pottery in a rather special way by the addition of crushed dyke rock, that was widespread over the Orkneys. Perhaps dyke rock was chosen because of its fairly low thermal expansion (mainly felspar/hornblende - see Skinner, 1966), an important factor if pottery was used for cooking purposes and subjected to rapid expansion and contraction. If the above suggestion of a 'technological recipe' is correct, it does imply a large measure of contact between Orkney communities during the Neolithic and Iron Age periods.

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