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This quoit-shaped bead (Fig. 8.8) was found in the fill of a shallow pit (F1034), associated with cremated human
bone. Its maximum external diameter is 23.9 mm, hole diameter 12.3 mm and thickness 5.5 mm. The bead is roughly circular, but has three large and one small weathered flake scars around its circumference, giving it an irregular appearance. Two of these scars are close to each other and appear to define a lug-like feature, echoing the lugs seen on quoit pendants (e.g. at Oxsettle Bottom and Clayton Hill, Sussex: Beck and Stone 1936, pl LXIV, fig. 2.5–6). However, the unevenness of the indentations suggests that this shape is accidental, and not a deliberate lug skeuomorph (as had been the case with a quoit bead from Findhorn, Moray: Sheridan and McDonald 2001). In addition, there is minor modern chipping around the outer and hole edges, and one large shallow flake scar where part of the surface has recently spalled off. The hole is roughly circular, perpendicular and not quite central, and there is slight lipping on one side. The edge of the bead is relatively sharp, and, unlike some other quoit and star beads, there is no marked vertical asymmetry. In other words, one surface is not markedly flatter than the other.

The bead’s present colour and texture are significantly altered from its original appearance. When new, its surface would have been bright green-blue (from the copper-based colourant in the glaze, see below) and possibly glossy. Now, however, it is mainly matt and the predominant surface colour is a muddy buff, with darker patches of purplish-red and occasional pale green-blue patches. The surface is uneven with what appear to be roundish vesicles (resulting from gas production during manufacture). Areas where the subsurface has been exposed in the recent past are pale green-blue. In some of the exposed areas purplish-red material is observed overlying blue-green and/or white material. On one side there is a cluster of small, thin, white inclusions embedded in the surface. These also occur elsewhere, as a few tiny specks.

The bead was examined using binocular microscopy, and its composition analysed non-destructively using air-path X-ray fluorescence spectroscopy, at the British Museum. The bead was also examined in Edinburgh, at the National Museums Scotland, using a controlled-pressure scanning electron microscope (CP-SEM) to investigate the surface composition and features in greater detail. The British Museum Department of Scientific Research has a research interest in faience of this period, having analysed a fragment of an unusual, and apparently imported, quoit-shaped bead from a domestic context at Varley Halls, Sussex (Bowman and Stapleton 1997; Rohl and Needham 1998, 111–2). The National Museums Scotland research forms part of a broader collaborative project, undertaken with the British Museum, National Museums and Galleries of Wales and the Research Laboratory for Archaeology & the History of Art, University of Oxford, connected with a forthcoming corpus of Bronze Age faience in Britain and Ireland (Sheridan and Warren forthcoming).

**Analysis and Results**

Air-path examination of the bead’s surface by X-ray fluorescence spectroscopy (XRF) was undertaken using the analytical conditions of 35 kV, 0.6 mA and 500 s livetime. The results of air-path examination on uncleaned surfaces of objects containing light elements are qualitative rather than quantitative. Nevertheless, XRF is valuable in the examination of ceramic materials, such as faience, in indicating for example, the presence of elements that were used as colourants.

A number of differently coloured areas on the surface of the bead were analysed. All showed significant levels of copper and of tin suggesting the use of copper as the colourant, with the copper probably added in the form of bronze scrap or waste. The ratio of copper to tin is highly variable; copper is more soluble than tin and the variability may reflect differential leaching of the copper. This leaching partly explains the loss of the bead’s original green-blue colour (but see also below).

The lead levels at each of the points of analysis are roughly at the limit of detection, i.e. in the order of 0.1%.

Imaging of the bead’s surface using CP-SEM was carried out using a four quadrant solid state back-scattered detector (Fig. 8.9). The conditions used for imaging were chamber pressures of 30 Pa and 40 Pa, electron gun voltages of 20kV and 25kV, and working distances between 22mm and 18mm. Qualitative energy-dispersive microanalysis was carried out at 25kV, with 30 Pa chamber pressure.
and at a working distance of 35mm. Microscopy using CP-SEM allows non-conducting objects to be examined without application of a conductive coating. However, there is some reduction in the quality of the images and analytical information that can be obtained compared with conventional scanning electron microscopy.

A number of particles on the surface were analysed, including the aforementioned thin white inclusions. The largest was found to be rich in calcium and phosphorus, which is consistent with bone. Its textual characteristics (Fig. 8.8) also suggested it was a bone fragment.

Discussion

The Cefn Cwmwd bead and other faience beads from Britain and Ireland examined to date (Aspinall et al. 1972; Magee 1993; Stone and Thomas 1956; Warren and Shortland pers. comm.) differ from the Varley Halls bead in their lead content. The high amount of lead present in the latter means that it must have been deliberately added, to both the paste and the glaze; and lead isotope analysis has indicated a probable source area in the Vosges. This is consistent with the copper ore source area for certain metalwork of the Acton Park period, c. 15th century BC (Rohl and Needham 1998, 112.).

Faience can be made in a number of ways (Vandiver 1983); however, as was found with the Varley Halls example, it is not possible to predict all combinations of technique that might have been used. The core can be sand or crushed quartz made into a paste to which a source of alkali, such as a sodium salt or material like plant ash containing potassium, may have been added. Calcium is commonly detected in faience and could have been a deliberate addition in the form of shell, or have been incorporated incidentally if sand was used as the silica source. It is not essential that alkali be present in the core, but its addition does aid binding through the formation of glass linking the silica grains, and with faience formed into an object such as a segmented bead with a perforation that is not glazed, then alkali in the core would certainly be beneficial. To form the glaze, alkali and a colourant, usually copper-based, would have been required in addition to silica in some form. For a specific object, access to the core material is needed to discover whether alkali was added, and, to determine the method of manufacture, a polished cross-section of the faience is needed to show the glaze, the core and any so-called interaction layer between the two (Tite and Bimson 1986). Neither was feasible with the Cefn Cwmwd bead.

Looking at British faience in general, there have been few instances of finds where it is clear that fully quantitative analyses of the core material were undertaken separately from analyses of the glaze. Stone and Thomas (1956) for example made no differentiation, and their analyses are thus an ‘average’ of the two components. Similarly, many neutron activation analyses were done on whole beads. A number of other workers have analysed only the remaining surface glaze (e.g. Aspinall et al. 1972; Magee 1993). Varley Halls was unusual in that a cross section of the bead could be examined in the SEM (Bowman and Stapleton, 1997), but as we have seen this bead is atypical. One fragment of a segmented bead from Lake, Wiltshire in the British Museum’s collection (1895, 7–23, 54n) has also been examined in this way (to be published in Sheridan and Warren forthcoming). The core was found to contain very little alkali and the glaze material appears to have been added, most probably as a thick slurry prior to firing. Several other beads have been examined in this way by Anthony McDonald (Sheridan and McDonald 2001) and by Andrew Shortland in Oxford.

The identification of one of the white fragments embedded in the surface of the Cefn Cwmwd bead as bone indicates that the bead had been through the pyre, and thus would have been worn on the body during the funeral. This has been found to be the case in several other instances, for example at Findhorn in Moray (Sheridan and McDonald 2001).

Exposure to such conditions may have made the bead more susceptible to weathering and contributed to its current, predominantly buff, appearance. As most British faience is blue-green, the blood-red colouration observed at the surface of this bead requires some explanation. It is possible that reducing conditions within the pyre changed the oxidation state of the copper colourant, turning it from blue-green to red. However, without being able to examine a cross section through the bead it is not possible to determine the relationship between the core and glaze materials. Examination of such a cross section would establish whether there is alkali and/or colourant in the body and allow a more precise assessment of the changes which have taken place between the original and the current state of the bead. As this was not possible, much remains speculation.

It is clear that the weathered flake scars relate to ancient damage. However, whether this is due to the way the bead had been threaded and worn is unclear. Some non-faience quoit beads exhibit features that might possibly relate to thread wear, or wear from adjacent beads: a jet or jet-like quoit from Ox teddle Bottom, Sussex, has four distinct ?thread-wear notches on the edge of the hole (best illustrated in Horsfield 1824, pl 3.2), while two ‘shale’ quoits from Upton Lovell, Wiltshire have indentations on their outer surfaces, at least one of which is suggestive of possible bead damage (Beck and Stone 1936, pl LXIII, fig. 1.1). Such features might possibly have occurred if the bead had been worn flat against the body, and strung tightly. With the Cefn Cwmwd bead the flaking could have occurred during the cremation process.

Within Wales, faience beads are relatively rare. Only seven examples from five locations have been found, and the Cefn Cwmwd bead is the only example of a Welsh quoit-shaped bead. An old find, which is now lost, of “a small ring of blue glass” at nearby Henblas, Llangristiolus (Prichard 1866) has been tentatively claimed as another possible example (Lynch 1991, 203), but it is clear from the original description that this was not directly associated
with an urn containing cremated remains, but simply a nearby find. As such, the possibility that this was a later blue glass bead cannot be ruled out; Frances Lynch (pers. comm.) has revised her earlier opinion and feels it may even be medieval.

Most of the other Welsh faience finds are from near the north coast – from Ystrad Fawr, Llangwm (Ellis Davies 1929); Tandderwen (Brassil et al. 1991) and Brynford (Ellis Davies 1949; Savory 1980), all in Clwyd. The exception is a star-shaped bead from the Breiddin, Powys (Musson 1991, 159–60). The Ystrad Fawr and Brynford examples (two segmented beads, and one segmented bead plus a spacer bead respectively) were from cremations within Food Vessel Urns (the latter an Encrusted Urn). The Tandderwen segmented bead fragment was from a multiple cremation deposit within a possible coffin; there may also have been a primary inhumation. The Breiddin star-shaped bead was a stray find, within the body of a hillfort rampart dating to c. 1100–800 BC.

Quoit-shaped beads and quoit pendants of faience, though not numerous, are widespread in Britain and Ireland, being found in the east of Ireland (Magee 1993); Scotland; and various localities in the southern half of England (see Beck and Stone 1936, pl LXIV, fig. 2 for examples). They are not common in Wessex, where the majority of segmented faience beads have been found; but, as noted above, they do occur in Wessex (and elsewhere) in other materials, jet and similar substances, as well as amber. Along with several other shapes of faience beads, the quoit is extremely rare outside Britain and Ireland, and may thus represent an indigenous shape preference, with all the symbolic significance that this shape may well have had. Dates for any kind of faience in Britain and Ireland are not numerous, but the currently available evidence indicates a currency from possibly as early as the 20th century BC (based on radiocarbon dates at 2σ) until the 15th century BC, with most finds suspected to date to between 1850–1550 BC (at 1σ; Sheridan and Warren forthcoming). Thus, if the Cefn Cwmwd pit F1034 is broadly contemporary with the dated pit F1014, its date of 1890–1520 cal BC is consistent with the overall date range for British and Irish faience.

**Fig. 8.9 Cefn Du: shale armlet and shale ring**