

3) A sticky or sweaty surface on the glass (usually a highly alkaline solution).

4) Internal cracking.

Symptoms which appear on the substrate (less common):

1) A “bleached image” of the beads on a wool or silk substrate directly below the deteriorating glass beads (a reaction between the highly alkaline glass surface and protein-based material).

2) A substantial darkening of the skin or leather directly in contact with the deteriorating glass beads (a reaction between the highly alkaline glass surface and proteinaceous substrate).

Deterioration of Glass

Several beads were analyzed by atomic absorption spectrophotometry and scanning electron microscopy, and various signs of deterioration were observed. In general the quality of glass was poor—the composition was found to be characteristic of unstable glass. (Glasses which contain an excess of alkali or a deficiency of stabilizer are prone to attack by atmospheric moisture. A glass containing more than 20% alkali and less than 4% lime or other stabilizer, is considered unstable and is prone to attack by water [Brill 1975:121].) Bubbles, inclusions, and glass decomposition of one form or another were detected. Scratches and cracks were also observed which can act to accelerate glass decomposition. Hydration occurs along the cracks which cause the walls to swell and propagate the crack.

In any area accessible to moisture there are two major processes which take place simultaneously at the glass-solution boundary. The first process involves the extraction of ions from the glass and this dominates at a pH of less than 9. The second process involves the dissolution of the siloxane bonds at the glass-solution interface and this process dominates at a pH of greater than 9. In general the removal of silica lags behind the extraction of the alkali ions from the surface, resulting in the formation of a leached layer (Clark 1979:1). This alkali-depleted layer was observed on both the inside and the outside surfaces of several beads and some beads had suffered pitting and glass decomposition where an alkaline solution had accumulated.

The variation in the quality of the glass used to make trade beads was illustrated by one bead which had a composition which changed from region to region. This glass was not mixed and melted properly, and in this case a glassy state may not have been achieved uniformly throughout the

bead. Most of the unstable beads analyzed had either high alkali, low lime, or some other imbalance in composition. Some of the glasses were part lead glasses, some were soda-lime glasses, and some were hybrids which contained part potash, part soda, and part lead.

Preventive Conservation

Once beads have deteriorated to the stage that they are cracking and breaking apart, there is little that can be done. However, if the early stages or subtle symptoms of glass disease are detected, a number of preventive conservation methods should be followed:

1) Avoid cleaning unstable glass beads with water. Water accelerates glass deterioration.

2) Provide a rigid support such as a piece of Corex (fluted polypropylene) or acid-free matboard if the object is not self-supporting. This reduces the amount of lateral stress, thus minimizing scratching and breakage.

3) Control the relative humidity by providing RH between 30-40%. This will slow down the deterioration process considerably.

References Cited

Brill, Robert H.

1975 Crizzling—A Problem in Glass Conservation. *Conservation in Archaeology and the Applied Arts*, Stockholm Congress, International Institute for Conservation, pp. 121-134.

Clark, David E., C.G. Pantano and L.L. Hench

1979 *Corrosion of Glass*. Books for Industry and the Glass Industry, New York.

57. A HISTORIC NOTE ON BEAD USE AMONG THE SEMINOLE INDIANS, by Clay MacCauley (1997, 31:14-15)

The following item is extracted from Clay MacCauley's report on “The Seminole Indians of Florida” which appeared on pp. 469-531 of the *Fifth Annual Report of the Bureau of Ethnology 1883-1884* which was published in Washington, D.C., in 1887:

My attention was called to the remarkable use of beads among these Indian women, young and old. It seems to be the ambition of the Seminole squaws to gather about their necks as many strings of beads

as can be hung there and as they can carry. They are particular as to the quality of the beads they wear. They are satisfied with nothing meaner than a cut glass bead, about a quarter of an inch or more in length, generally of some shade of blue, and costing (so I was told by a trader at Miami) \$1.75 a pound. Sometimes, but not often, one sees beads of an inferior quality worn.

These beads must be burdensome to their wearer. In the Big Cypress Swamp settlement one day, to gratify my curiosity as to how many strings of beads these women can wear. I tried to count those worn by "Young Tiger Tail's" wife, number one, Mo-ki, who had come through the Everglades to visit her relatives. She was the proud wearer of certainly not fewer than two hundred strings of good sized beads. She had six quarts (probably a peck of the beads) gathered about her neck, hanging down her back, down upon her breasts, filling the space under her chin, and covering her neck up to her ears. It was an effort for her to move her head. She, however, was only a little, if any, better off in her possessions than most of the others. Others were about equally burdened. Even girl babies are favored by their proud mammas with a varying quantity of the coveted neck wear. The cumbersome beads are said to be worn by night as well as by day (pp. 487-488).

58. SCOTTISH IRON AGE GLASS BEADS, by Euan W. MacKie (1996, 29:4-7)

Introduction

The latter part of the Iron Age of western Europe—starting about 450 B.C. and lasting until the Roman conquest—is known as the La Tene period. Important features of the period are elaborately decorated metalwork and rich burials under mounds containing dismantled wheeled vehicles. It is usually assumed that this archaeological culture correlates with the historically documented expansion of the tribes north of the Alps known to the Romans as *Celtae* and to the Greeks as *Keltoi*. Independent evidence that Celtic-speaking people were in central and western Europe in ancient times comes from place names found in this area or referred to there in Classical sources, particularly those ending in "dunum," "briga," and "magus." Decorated glass beads and armlets made by native craftsmen became increasingly numerous in later La Tene times, particularly in Gaul (France). After the Roman conquest from about 120 B.C. onwards, the La Tene culture was transformed and gradually disappeared.

A long-standing problem for archaeologists has been: to what extent did this presumably Celtic Iron Age La Tene culture move into the British Isles, the place where "Celtic" traditions survived the longest (in Wales, highland Scotland, and Ireland)? We know that in Iron Age England P-Celtic languages (ancestral to modern Welsh) were widely spoken; place-name and other evidence shows that these Ancient British dialects were also spoken in Scotland and probably in northern Ireland. From about A.D. 500, these languages were supplanted in Scotland by the Q-Celtic language brought by immigrants from Ireland. However, although it is clear that the Iron Age populations of England and southern Scotland were Celtic in the linguistic sense, only a small part of the Continental La Tene culture appears in the British Isles; vehicle burials, for example, are found in only one limited area in Yorkshire.

So one of the questions archaeologists have to try to answer is: how can we tell from mute archaeological evidence—and in the absence of native written records—whether the Iron Age population was mainly indigenous or whether it was substantially influenced by La Tene Celtic immigrants from the continent? The presence of what appear to be exotic artifacts from abroad—including the decorated glass beads—has always been an important factor in these discussions. At present, archaeological theory is reluctant to postulate migrations without overwhelming evidence so most of these "exotic" objects tend now to be interpreted as traded items, or even as independent inventions.

Iron Age Scotland

Similar problems occur in the interpretation of some of the Scottish Iron Age cultures, particularly those which appear about the 1st century B.C. in the maritime far northern and western highland and island zone known as the Atlantic Province. These are distinguished by a new and sophisticated form of circular dry-stone building, with tower-like proportions, known as the *broch*, by large quantities of well-made decorated pottery (in contrast to the contemporary cultures of the mainland) and by many exotic-looking objects which appear in the north for the first time and some of which strongly resemble similar artifacts in southern England and even in Brittany (northwest France). So archaeologists are confronted with the same question: were these dynamic new broch-building cultures purely an indigenous development on the extreme northwest fringe of Europe (brochs are not found anywhere else, for example) or were they brought into being, at least in part, by sea-borne migrants who sailed up the west coast of Britain, perhaps escaping from the Roman conquest? Two kinds of glass beads shed light on this problem.