animals that were missing from the assemblage and suggested that such distribution might be due to dogs.

> . . . on trying the experiment, he ascertained that the bones which are absent from the Kjökkenmöddings are precisely those which dogs eat, and those which are present are the parts which are hard and solid and do not contain much nourishment (Lubbock 1904: 196).

I might suggest that had professor Steenstrup carried his experiment a step further, he would have found that the dogs would have almost totally destroyed the bones from many of the smaller animals represented in low proportion in the middens.

Obviously more experimental work and more observation should be devoted to the question of the extent to which dogs may eat up the archaeological record. However, the type of distortion that could enter into the interpretation of bone debris due to destruction of bones by dogs should be considered in attempting to reconstruct the economy of any archaeological culture.

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CUES I: DESIGN AND CONSTRUCTION OF AN EXPERIMENTAL ARCHAEOLOGICAL STRUCTURE

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Abstract

A long-range experiment aimed at shedding light on what happens within archaeological sites during their natural history phase was begun in the spring, 1968, with the planning and building of a pie-shaped structure that houses several kinds of materials. By the winter, 1968, gross changes in the structure were already in evidence.

BETWEEN the abandonment of a human habitation site and its excavation, natural agents decompose and rearrange materials. Excavations at different times after abandonment yield different facts, and different facts, in turn, lead toward different inferences. Thus there arises a need to know what happens within archaeological sites. One way to begin to find out is to build experimental structures and study change through monitoring and periodical sectioning. In May, 1968, CUES I, the first of a projected family of such structures, was built in Tompkins County, New York.

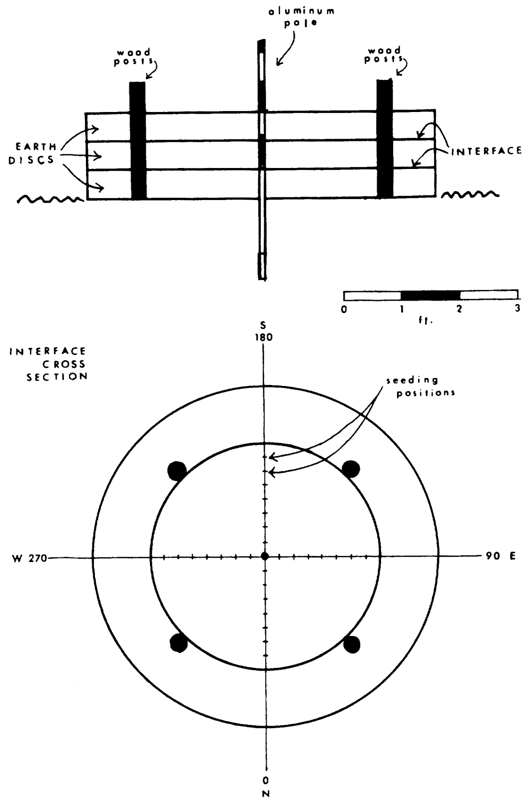

Fig. 1 [Ascher]. Top is general view of CUES I as it would appear if sliced vertically through the center. Bottom is the seeding plan. Items are placed beginning 3 in. (7.6 cm.) from the aluminum pole and extend, at 3-in. intervals (7.6 cm.), to 24 in. (60 cm.). There are 64 positions, 32 at each interface. (By error, the 90E and W270 are reversed in the figure.)

The design for CUES was guided by several considerations. Since the structure is to be examined in parts at different times, allowance was made for the removal, examination, and replacement of one portion without undue disturbance to other portions. Conceived initially for natural outdoor environments, the scale of a CUES is such that it can be easily constructed indoors if parallel laboratory experimentation is added to the program. The seeding of the structure had to be planned to permit the observation of small positional changes. These and similar considerations focus on keeping the structure as general, as simple, and as adaptable as possible. In particular, a CUES can be constructed in almost any environmental setting. Considerations of a practical nature also enter. CUES is designed so that actual building can be accomplished by 10 people in one day at a cost (exclusive of labor and land) of less than $25.

Concurrent with the development of a general design for CUES, studies were undertaken for the construction of CUES I. Weathering of the structure and its contents evidently will be brought about by the combined action

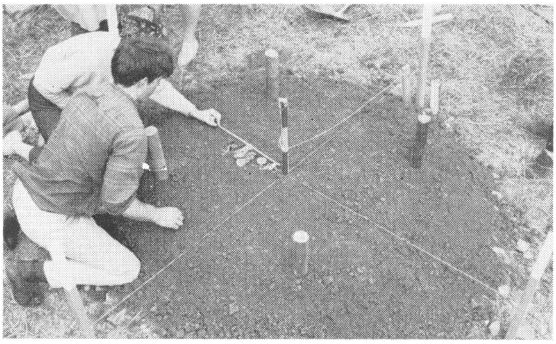

FIG. 2 [ASCHER]. Placement of items at the clay-humus interface along the 270° (west) line. North is toward the upper right-hand corner of the photograph. Note the use of the nylon string in aiding placement. The ruler is extended approximately 24 in. (60 cm.). Students are members of the class "Science in Archaeology" at Cornell University in the spring term, 1968.

of local natural factors such as wind and rain. These and other potentially disturbing influences (for example, the burrowing of animals) were investigated, and the results were brought together. What will happen to the structure must also depend on its shape and the materials with which it is built. The principal materials for the construction of CUES I are local soils arranged in an order corresponding to the soil history of the site. In other words, the structure both houses the experiment and is part of the experiment. CUES is symmetric. In this, and in other respects, it does not look like a replica of an archaeological site. There is no reason why it should. The shape of CUES, and other things about it, result from the balance struck between the requirements for experimental study and the possible conditions within an archaeological site.

Viewed from the outside, CUES I can be figuratively described as three discs, four posts, and a pole (Fig. 1, top). The discs are set in layer-cake fashion: the lower disc is composed of pebbles up to 5 in. (12.7 cm.) in diameter mixed with slightly weathered clay; the middle disc is made of heavily weathered clay; the top disc is humus. Each disc is 6 in. thick (15.2 cm.) and has a radius of 3 ft. (.91 m.) as measured from the outside of the pole to the outer edge of the disc. The aluminum pole, located at the center of the structure, is 4 ft. (1.2 m.) long and has an outside diameter of 1 in. (2.5 cm.). One and one-half feet of the pole (.46 m.) are below ground, 1.5 ft. (.46 m.) reach through the three discs, and the remaining 1 ft. (.3 m.) is exposed above the top disc. The part of the pole that extends through and above the discs is marked in alternate 6-in. (15.2 cm.) red and yellow bands, small holes are drilled in the pole at 0° (north), 90° (east), 180° (south), and 270° (west) at each color change, and nylon strings, each 5 ft. (1.5 m.) in length, are threaded through the holes and tied inside the pole. This threaded, painted pole facilitated prompt and accurate construction (Fig. 2). Wooden posts, freshly cut from different trees, were placed 2 ft. from the pole at 45° (pine), 135° (elm), 225° (maple), and 315° (ash). Each post is a little longer than 2 ft. (.61 m.) and has a diameter close to 3 in. (7.6 cm.). The posts provide support for the structure and serve as experimental materials.

Inside the structure, at the two disc interfaces, items are placed at 3-in. (7.6 cm.) intervals along each cardinal direction (Fig. 1, bottom). The first item is placed 3 in. (7.6 cm.) from the pole, and the last, in the same direction, is located 24 in. (60 cm.) from the pole. In this manner, 64 items are planted, 32 at each interface. CUES is planned for maximum leeway in the choice and treatment of seeded items. In CUES I, the major categories of materials include bone, pottery, textile, and leather. Subcategories for bone include, for example, freshly cut, charred, and cooked samples, and the especially handmade textiles include specimens woven from animal and vegetable fibers (Fig. 2). In several instances, relatively rapid chemical change is hypothesized; in other cases small changes of this type will be difficult to detect even in the long run. However, concern is with change along the entire spectrum, from the submicroscopic level to that of a gross nature. For this reason, the pottery, for example, was seeded so as to best indicate displacement of whole items, whereas other samples, for example, fresh-cut bone and its matrix, were chemically analyzed prior to the sealing of CUES I. An archive has been established to retain records of the testing program and the procedures used in hand-manufacturing all materials. Control samples were kept for all items.

The program for monitoring and sectioning CUES I is varied and flexible. A meteorological station located less than ½ mi. from the structure daily records wind, solar energy, and other relevant influences. At least three times a year the structure is inspected for conspicuous change. The first inspection (September 1968) revealed that CUES I had sprouted fresh vegetation and had compacted 3 in. (7.6 cm.) as measured along the aluminum pole. Conspicuous changes noted during a second visit (December 1968) include some flattening due to soil creep and the beginning of decomposition of the exposed portions of the wooden posts. According to *Webster's New World Dictionary*, a cue is "a hint; intimation; suggestion." It is in this sense that the experiment described here is of archaeological value.

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