impressions. Quite clearly, what is being represented here is an ear of maize within a partly opened husk.

To turn to the Olmec area, the very same motif is of common occurrence, particularly in the engravings which appear on finely polished jade celts (unfortunately often of unknown provenience). The usual position is on the head of a were-jaguar (Fig. 2 *d-f*), where the intention to show a sprouting plant or ear of maize is quite evident. A more abstract representation is shown on the celt of Figure 2 *b*.

In Olmec iconography, the U-element is obviously to be considered as identical with the well-known cleft rather disconcertingly present in the head of the were-jaguar, whether in infantile or adult form (or more abstractly rendered in the mosaic pavements of La Venta). One of Covarrubias' many contributions to Mesoamerican research was his demonstration (1957: 60–3, Fig. 22) that the familiar Rain God of the Classic and Post-classic civilizations (Tlaloc to the Nahua; Cocijo among the Zapotec; and Chac to the Maya) was the direct descendent of the Olmec were-jaguar, which thus was a rain god itself. Taking this as a lead, one might suggest that the cranial cleft of these snarling monstrosities may have been the mark of the sprouting maize, so intimately connected with the coming of the rains. Thus, the were-jaguar may have been lord of the maize as well.

It should also be noted that the U-element can stand by itself in the Olmec canon as a very prevalent iconographic motif, perhaps as a "short-hand" form of the cranial cleft (Fig. 2 *c*).

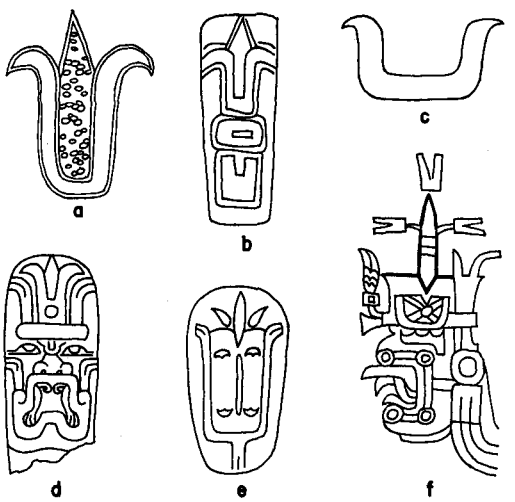

FIG. 2 [COE]. Comparison of the design on the Kotosh bottle with Olmec motifs. *a*, grooved design on the Kotosh bottle; *b*, engraved Olmec celt of diopside-jadeite of unknown provenience (redrawn from Lothrop, Foshag, and Mahler 1957, Pl. 10, bottom); *c*, U-element on helmet of Olmec colossal head, Monument I at La Venta; *d*, engraved celt, Olmec, unknown provenience (redrawn from Covarrubias 1957, Fig. 34, left); *e*, engraved Olmec celt from La Venta (after Drucker 1952, Fig. 47 *b*); *f*, engraving from Olmec celt of unknown provenience (redrawn from Covarrubias 1957, Fig. 33, right).

If the claim that the design on this Peruvian vessel is of Olmec origin be admitted as valid, there is a conflict with our previous statement that the Olmec and Chavín civilizations were coeval, for the Kotosh bottle is pre-Chavín. This conflict may be more apparent than real, for the five charcoal samples which date the earliest building phase of Complex A at the great Olmec site of La Venta *average* 814 B.C., thus suggesting but not proving that the Olmec span opens at around 800 B.C.; actually, the oldest radiocarbon date at La Venta is 1154 B.C. ± 300 (M–535) (Drucker, Heizer, and Squier 1959). There is therefore the possibility that Olmec culture may begin as early as the 12th century before Christ, or even earlier. If so, then the chances are very good that all New World civilizations, including Chavín, have a single point of origin on the Gulf Coast plain of southern Mexico.

Acknowledgments. I wish to thank Toshihiko Sono and Naotsune Watanabe, both of the University of Tokyo, for their kindness in furnishing information on the Kotosh excavations and for providing the photograph reproduced in Figure 1. The report on the field work carried out at the site by the University of Tokyo will be published in 1962.

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New Haven, Conn.
November, 1961

PROBLEMS OF URBAN ARCHAEOLOGY*

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ABSTRACT

A brief review of the rise of interest in historic site preservation and of the use of archaeological techniques in this field, is followed by a discussion of the recent phenomenon of urban renewal as it applies to an increasing necessity for archaeological work in urban areas. Experience gained in the archaeological program at Independence National Historical Park, Philadelphia, provides the basis for a discussion of some of the specific problems encountered in urban sites: excavation costs

* Presented at the 26th Annual Meeting of the Society for American Archaeology, Columbus, Ohio, May 6, 1961.

problems of public relations, the necessity for special equipment and specialized artisans, and the archeologists' training.

NEARLY EVERYONE today is acquainted with the growing interest being shown by the American people in the physical remains of our history. Beginning in 1850, when the first publically-owned historic house museum was acquired, public interest in historic shrines and monuments has grown steadily and even, it sometimes seems, alarmingly. The centennial celebrations of 1876 brought new activity, as did a surge of interest by Civil War veterans in the scenes of their heroic endeavors. The federally-sponsored relief projects during the 1930's were a boon to local historical efforts, as well as to archaeology, and helped nurture interest in the nation's past (Lee 1951: 11–17). Since the Second World War, the trend has snowballed, until today historic shrines number in the thousands. During the last year more than one and one-half million persons visited Independence Hall in Philadelphia alone (National Park Service 1960); altogether, about 60 million people visited the historic shrines scattered over the face of our land (Alexander 1961: 60).

Since the 1930's, the recognition and application of archaeological techniques for the preservation, stabilization, and restoration of historic sites has also been growing. In 1942, Frank M. Setzler wrote that historic sites archaeology was one of the four most important contributions made to American archaeological sciences in the preceding decade. He did not even attempt to estimate the importance of archaeological contributions to historical research (Setzler 1942: 255, 259, quoted in Stauffer and Porter 1942: 46–7). Harrington, writing in 1955, noted that it would be quite impossible, within the scope of an article in the *American Anthropologist*, to furnish specific annotated references to major contributions in the historic sites field because of the great deal of digging which had been done since the end of World War II (Harrington 1955: 1130). So we can see that the growth of interest in historic sites, their preservation and presentation, has been followed by, with some lag to be sure, an increased awareness and use of archaeological techniques in the development and interpretation of the sites. I will not go into the place of archaeology in the study of historic sites, since that subject has already been belabored many times.

The twin streams of historic sites preservation and historic sites archaeology have lately been affected by the rising tide of a third movement — one which gives promise of affecting the future of both the initial forces.

That movement is urban renewal or city planning. Beginning with the housing act of 1949, federal financial aid became available to local planners for the rehabilitation and rebuilding of sections of cities blighted by age or sub-standard industry or slums. Grants by the federal government amounted to about $400,000,000 in 1955 (Follin 1955: 13). As of January 31 of this year, the amount has been increased to more than $1,000,000,000. Today there are 489 projects in 318 localities under contract. There are 395 other projects in the planning stage. Altogether 479 cities and towns are cutting up federal funds amounting to $1,200,000,000 in grants and $1,700,000,000 in loans — that is almost $3,000,000,000 (Housing and Home Finance Agency 1961). The projects range from a $5000 grant for slum clearance in Cairo, Illinois, to a $240,000,000 grant for 27 projects in New York City (Housing and Home Finance Agency 1960).

Although I have not heard that any of this money is being spent for archaeological research or salvage, it is not inconceivable that someone may someday realize that valuable historic data are being destroyed and try to do something about it. In Philadelphia, the City Historical Commission seems to have a fairly strong voice in the urban redevelopment program. While they have no archaeologist on their staff, they have felt moved several times to call on my office for advice. This trend may well grow.

While my work is not directly involved with urban redevelopment as such, for over four years now I have been archaeologist at Independence National Historical Park. The Park lies right in the heart of Philadelphia, our fourth largest city. We have excavated at more than a score of sites located beneath city streets and sidewalks and under both historic and modern buildings. I am not sure, but I believe my colleague and I must be the only archaeologists around who go to their dig by subway.

The archaeology at Independence National Historical Park is a part of the over-all research program, which includes historical and architectural research, designed to provide basic data for Park development and interpretive planning. The archaeology is concerned primarily with the recovery of physical remains and other evidence not available in documentary sources. Some of the work is actually more salvage than anything else.

To be more specific: the sites excavated have included Independence Square — the city block containing Independence Hall. While most of this area is turf covered, parts of it are now under wide flagstone walks constructed around the turn of the present century. The Square is filled with utility lines, some dating to the first quarter of the 19th century. We have excavated in the grounds of both the First and Second Bank Buildings of the United States. At the First Bank we worked under modern sidewalks and at the Second Bank beneath a driveway. In the grounds of Carpenters' Hall, famous as the meeting place of the first Continental Congress, the archaeology took us under the foundations of a modern building and under sidewalk and alley-way. We have excavated in the cellars of several houses built in the 18th century, and in a couple built in the early years of the 19th century. Our most recent, and perhaps most important, excavation has been at the site of Benjamin Franklin's home. Until May, 1960, this area was covered by a paved street lined with 19th and 20th century shops and warehouses. The standing buildings were demolished and the area cleared before we began our excavation the following July.

Archaeology in the concrete jungle presents problems not found in other, more blessed, locations. I would like to review briefly several of these problems and offer some personal thoughts on them. These matters may be considered under four general headings: (1) costs; (2) equipment; (3) public relations; (4) training; or the lack thereof.

Under costs, I consider only expenses of excavation, not those of site acquisition or rental. In general, archaeology in urban areas is more expensive than in rural areas. Labor is more expensive; special equipment is expensive; it takes longer to remove a paved street than it does a layer of sod; there is usually much overburden to be removed; the nature of the earth is different, often being composed largely of brick rubble which is very slow digging; and frequently arrangements must be made for removal of backdirt from the site since space is often limited.

In Philadephia, we must pay $2.20 per hour for common labor. This represents a sizeable outlay — a six man crew for an 8 week project thus costs over $4,000. It might not be entirely out of line to note that laborers there make more than archaeologists do in some areas.

In general, the excavation of a given area in an urban situation takes longer than the excavation of an equal area in open country. Paving is difficult to remove and takes time — it matters little whether you use sledge hammers or jackhammers. The same thing applies to concrete cellar floors and modern foundations. When utility lines are encountered, the archaeologist has to determine what they are, whether they are dead and can be removed, or whether they are alive. If they are in use, permission must be obtained to cut them or they must be avoided — either way takes time. Since time is money, these aspects add to the cost of research.

If backdirt has to be hauled from the site, a truck is necessary. A dump truck without driver in Philadelphia rents for $10.50 per day plus about 50¢ per mile. One is also usually required to pay for the privilege of dumping the fill.

I should add to the credit side of the ledger the fact that as yet I have never had to house or feed a crew in the city.

Special equipment and special artisans are repeatedly needed in urban sites. Jackhammers are an obvious necessity for removing paving or modern concrete construction. In Philadelphia, a truck-mounted compressor and a set of jackhammers without operators, cost $70.00 per day plus delivery charges. Dump trucks, as I have mentioned, are often a necessity. A front-end loader may be required for loading backfill; one with operator costs $100.00 per day plus delivery.

We have often found it necessary to have an acetylene torch for cutting steel pipes and reinforcing rods. Flash cameras or floodlights must be used in house cellars.

Masons of various types are sometimes essential for repairing street or sidewalk paving when excavations are finished. I have had occasion to call on plumbers, electricians, gas company employees, and city water department men to repair or turn off utilities of one sort or another.

The complexity of archaeological public relations varies directly with the living population of the site. Whereas in rural areas one may deal with a single farmer or rancher, many other persons enter the picture in a city. Landowners and tenants, city police, street commissioners, departments of water and sewage, electric, gas, and telephone companies, equipment contractors, and even labor unions may enter the picture. If you are working in the open, visitors add to your problems by interrupting you and your workmen and by the ever-present danger of their being injured at the site.

It has been my experience that one of the most ticklish public relations jobs is trying to talk a contractor into holding up a back-hoe, bulldozer, or crane while measurements or other records are made of an exposed feature during salvage type operations. Most contractors work within rigid time limits and often with expensive rented equipment. It is exceedingly difficult to get one of these gentlemen to slow down his operation to accommodate a rather useless, to him, archaeologist.

The lack of properly trained archaeologists for historical sites work has been a perennial cry within our ranks. The usual complaint is that as anthropologists most of us are not at home in the intricacies of historiography. That may be, but it is a sure bet that no matter what our academic background, very very few of us are prepared for all the things found underground in a modern city. Let me illustrate this point.

A few months ago in a portion of the Franklin house site somewhat removed from the house itself, we uncovered a very curious brick and stone feature for which we had no ready explanation. I had never seen anything like it. As a matter of fact, the thing was causing some stir because we knew Franklin and a bathing house warmed by sub-floor hot air ducts, and some of us were already mentally making a fireplace or hot air trap of some sort out of the newly found structure. Fortunately, I showed the structure to one of our Park carpenters whose tip caused me to call a friend in the Philadelphia Department of Water. Through his good graces the site was visited by a representative of the Department of Sewage Maintenance, a man with 30 years experience in the field. Our mysterious structure turned out to be an abandoned sewer inlet which had once received water from a long-lost gutter and emptied it into a now-missing sewer. It dated from about 1880. The moral of this story is that even an archaeologist doesn't have all the answers, and he had better be prepared to look around for somebody who does. In a city, help is usually available if he knows where to find it.

In summary, the archaeologist who is to work in a modern city will face the usual battery of archaeological problems and demands on his technical competence. He will face additional problems which are peculiar to the urban situation. There will be added expense, brought about by the greater length of time required to excavate a given area and by the necessity of using

specialized equipment. As a rule of thumb, I would suggest he add 20% to his budget figure. Special equipment includes tools — cutting torches and jackhammers, for instance — and earth-loading and moving equipment. Masons, plumbers, and the like are often indispensible. He will need to be especially careful of relations with other professionals, tradesmen, and city officials. His handling of the public will demand tact. And finally, because it is unlikely that any archaeologist will possess the necessary background and all the skills to handle every situation that arises, he will need to cultivate a wide army of professional and subprofessional experts on whom he can depend for help and advice.

Urban archaeology is not particularly difficult, nor is it necessarily unpleasant. It has its problems, but it also has its rewards. As our cities become more and more involved in urban renewal, and as the public recognition of the loss of historical values becomes more vocal, more of us will be called on to dig in citified sites. We may even find interested and civic minded groups pressing archaeological funds upon us. If that time ever comes we must, like all good scouts, Be Prepared!

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Philadelphia, Pa.
July, 1960

THE ANTIQUITY OF POTTERY IN THE NORTHEAST

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ABSTRACT

Radiocarbon dates indicate the beginning of fiber-tempered pottery in Georgia and Florida around 2000 B.C. In discussing the relative antiquity of ceramics in the Southeast and Northeast, Bullen rejects a radiocarbon date of 2448 B.C. for Vinette 1 pottery from the Hunter site, New York, because of dubious association of pottery and burial complex. The association is shown to be secure, but a new gas-method radiocarbon date of 841 B.C. for the same sample, removes the difficulty, and establishes an approximate age of 1000 B.C. for the earliest known Northeastern ceramics.

IN A RECENT ARTICLE in this journal, Bullen (1961: 104–6) has presented a group of radiocarbon dates for Georgia and Florida sites in support of his postulation that the fiber-tempered pottery horizon began, probably as the result of an independent invention in the Georgia — Florida area, about 2000 B.C., and constituted the first known appearance of pottery in the New World, north of Mexico. Discussing the earliest heretofore published date for pottery in the Northeast, Bullen questions the validity of the association on which it was based, rather than the date itself, but a new date for the same sample reveals an alternative source for the difficulty, and supports Bullen's evidence for the priority of Southeastern pottery.

The date in question, 2448 B.C. (not 2445 as Bullen states) ± 260 years (C–794) was obtained by the solid carbon method on clean charcoal derived from a crematory pyre, intermixed with burned human bones and highly distinctive items of grave goods, from Feature 1, in a burial pit 30 inches deep, at the Hunter site on Red Lake, New York (Ritchie 1955: 27–9, 66–7). This was one of five burial sites of the early Point Peninsula culture, exhibiting a mortuary ceremonialism of Early Woodland provenience. Pottery was not found in any grave on these sites, suggesting its customary omission in this culture from grave furniture.

Nevertheless, in each site, potsherds of Vinette 1 ware, the earliest known pottery in the Northeast, were present on the surface near the burials, sometimes with characteristic stone artifacts of the culture. Still more convincing evidence that this pottery formed an intrinsic part of the culture accrues from the presence, *as grave goods*, on nearly every site of this complex, of one or more cigar-shaped, tubular pottery pipes of Vinette 1-like paste. It is difficult to believe that the people who made the pottery pipes did not also make the pottery vessels of similar paste found on the same sites.

New, and unequivocal evidence for Vinette 1 pottery in the early Point Penisula complex is coming from a single period-habitation site of this culture, Riverhaven No. 2, now under investigation on the Niagara River in western New York.

Since doubt has been growing concerning the antiquity of Vinette 1 pottery, as inferred from the Hunter site date, I requested Libby to return for reanalysis any unused portion of the sample from Feature 1 at Red Lake. He promptly and courteously complied, sending the ample charcoal remnant in a sealed and catalogued plaster bag, which was then generously accepted by the Yale Geochronometric Laboratory, thanks to Irving Rouse