In 1952 two officers of the Desert Locust Survey, Dr. H. B. Gilliland and D. Burke, made several collections of chipped flint implements in southern Saudia Arabia while conducting locust control operations there. The total collection contains over three hundred specimens, and it is now housed in the National Museum of Kenya, Nairobi.

One other collection of chipped stone tools is known from the same area as the above. This collection was also made by officers of the Desert Locust Survey, and it can be found in the Aden Museum. G. L. Harding has figured several of the specimens in his book, *Archaeology in the Aden Protectorate*. The illustrated specimens are all bifacially-worked projectile points of two varieties—stemmed and basally-contracting. Similar flint implements are in the collection of the National Museum of Kenya.

Harding alludes to the similarities between the projectile points illustrated by him

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and the Neolithic ripple-flaked knives of Egypt. G. Caton-Thompson also finds striking parallels between a series of chipped flint implements, probably borers, from Mukalla, Southern Yemen, and specimens of the Faiyum B Neolithic assemblage.

The collections of Harding and Caton-Thompson are not directly comparable since they contain different classes of artifacts, namely, borers and projectile points; however, a common bond between them is the technique of manufacture, which is well-executed parallel pressure-flaking.

<table>
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<tr>
<th>SITE</th>
<th>K-10</th>
<th>13</th>
<th>14</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>20</th>
<th>20a</th>
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<td>2</td>
<td>3</td>
<td></td>
<td>5</td>
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<td>18</td>
<td></td>
<td></td>
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<tr>
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<td></td>
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<td>39</td>
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<td>4</td>
<td>2</td>
<td></td>
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<tr>
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<td>9</td>
<td>55</td>
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</table>

Clark illustrates a series of chipped stone implements from Mirsale Wells, Somalia, some of which are quite similar to the basally-contracting projectile points figured by Harding and to ovate and basally-contracting points illustrated in this article from the collection of the National Museum of Kenya. Clark attributes the implements figured in his work to the Doian Industry of “Neolithic” facies. Careful pressure-flaking characterizes these implements.

Other classes of implements reported by Clark to be typical of the Doian Industry are represented in the collection of the National Museum. Figs. o and p, on Pl. II of this article fall into Clark's class of "crude foliate points"; while Fig. n, Pl. II, and two

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5 J. D. Clark, *ibid.*, pp. 244–45.
other examples not shown would be at home in the class, "lanceolate and limace unifaced points," although the quality of workmanship of the specimens from Saudia Arabia is poorer.

Fig. 1 gives the collection locales of the stone tool assemblages described in this paper as well for the assemblages reported by Harding and Caton-Thompson. Unfortunately we have no idea of the physical surroundings of the collection locales reported here. We assume that the climate is arid and that there is little vegetation. We also know that the implements collected by the Desert Locust Survey officers were picked up from the ground surface.

The exact co-ordinates for the collection locales of assemblages reported in this paper are the following: K–13 (17° 12′ N, 45° 12′ E); K–14 (17° 05′ N, 47° 10′ E); K–16 (15° 23′ N, 47° 05′ E); K–17 (17° 10′ N, 45° 40′ E); K–18 (17° 25′ N, 46° 10′ E); K–20 (17° 50′ N, 45° 50′ E); and K–20a (17° 12′ N, 45° 50′ E).

Table I gives the number and kinds of implements of each assemblage. Unfortunately it cannot be determined whether the Desert Locust Survey officers\(^*$\) collected all the lithic material on the surface of each site. If they did not, the officers were certainly selective in their collecting. Assemblage K–20a, for example, contains only end scrapers and borers, and assemblage K–13 contains only end scrapers and projectile points. On the other hand, assemblage K–16 contains a wide variety of implements including unmodified flakes.

Further collecting on other sites in the same area would settle the question whether the Desert Locust Survey officers made complete collections from each site. If their collecting was thorough, then we could conclude that some of the assemblages shown in Table I are functional and that they represent specific activities of a single group of people.

Assemblage K–20a is noteworthy for the high incidence of borers to the exclusion of any other implement types except end scrapers. Figs. j–m, Pl. II are typical Type A (borers made on thin, flat flakes) borers from K–20a. The illustrated specimens are all unifacially-retouched blades. The shape of Fig. j is typical of the other fourteen specimens not included here. All the implements of the assemblage are fashioned from a tan or honey-colored chert.

The exact nature of the activity that was carried on at site K–20a is difficult to guess without a knowledge of the physical surroundings and resources. Perhaps the same activity that was carried on at K–20a was also pursued at the site near Mukalla described by Caton-Thompson.

Borers are also components of assemblages K–14, K–16, and K–18; the wider range of implement types of these assemblages, however, makes it seem likely that more than one type of activity was carried out at these sites.

The assemblages K–20 and K–17 have very few implements although each is composed of many classes of implements. If we keep in mind our uncertainty over the collection methods of the Desert Locust Survey officers, we might interpret sites K–20 and K–17 as temporary campsites of small groups of people and at these sites a range of activities were carried out.

At site K–13, on the other hand, the range of activities may have been very limited.

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\(^*$\) Dr. Gilliland, principal collector of the implements described in this paper, has since died.
TYPICAL EXAMPLES OF FLINT IMPLEMENT CLASSES SHOWN IN TABLE I
PLATE II

TYPICAL EXAMPLES OF FLINT IMPLEMENT CLASSES SHOWN IN TABLE I
if we judge by the sole presence of scrapers and projectile points. Site K–13 was possibly a hunting camp.

Sites K–14, K–16, and perhaps K–18 may represent either the campsites of large groups of people or places revisited several times by small groups. The second possibility gains weight by the presence of three classes of projectile points at sites K–14 and K–16. These projectile point classes probably define three groups of people separated temporally or socially (and possibly a fourth if we take into account the stylistic variation of the class of basally-contracting points).

Pls. I and II illustrate typical examples of the implement classes given in the table. Figs. a–g and i–m are all classed as stemmed points although it can be seen that there

is some stylistic variation in this class. Fig. h from site K–16 is a unique example of a basally-notched projectile point. It may have arisen from the stemmed point—some of which show an extreme development of the barbs.

Figs. n–p and q–s typify the subclasses of the class basally-contracting projectile points. Some specimens exhibit grinding or smoothing of the basal edge to facilitate hafting. With the exception of one point made of white quartz all the basally-contracting points in the collection of the National Museum of Kenya are fashioned from tan or honey-colored chert. The quality of the workmanship is excellent.

Fig. t is a unique triangular projectile point, which unfortunately has no data concerning its find location. It was associated with assemblage K–16 in the Museum collection. It is fashioned from an impure, gray chert, and there is no basal grinding.

Figs. u and v are typical examples of the class ovate points. This class seems to grade into the class of basally-contracting points. The flaking on ovate points is fine, and
invariably their edges have been finished according to the style of flaking as shown by Fig. a, Pl. III. The characteristic of this type of flaking is that the bulb of percussion of each edge flake is centered on the margin of the preceding flake struck from the opposite face. Such a technique of edge-finishing produces a very even edge that requires no retouch.

Stemmed and basally-contracting points, on the other hand, have edges finished by either the above technique or that shown in Fig. b, Pl. III. Occasionally both techniques have been used on the same specimen. In this method of edge-finishing flakes of both faces are struck from the same point on the edge. This method of flaking produces a wavy or serrated edge. Fig. d, Pl. I is a good example showing this type of edge-finishing. In order to obtain an even edge secondary retouch is necessary. Many stemmed and basally-contracting points exhibit secondary retouch at their base. Other projectile points of these classes have basal edges finished according to the technique shown in Fig. a, Pl. III, while the blade edges are serrated.

Figs. w and x, Pl. I are remarkably similar to specimens from west of the Nile that Caton-Thompson attributes to the Aterian. In 1946 the known distribution of Aterian points was bounded on the east by the Nile River. On the basis of Figs. w and x it is necessary to extend this range eastward to Saudia Arabia.

Fig. y is a knife or spearpoint fashioned from silicified oolitic limestone. It comes from site K–13, and it is a unique example.

Only ten per cent of the specimens in the Museum collection are made from materials other than tan or honey-colored chert. These materials in decreasing order of popularity are the following: dark gray chaledony(1); white quartz; mottled or veined light gray chert; pink chert; and silicified oolite. Nothing is known about the sources of lithic raw material in southern Saudia Arabia; so, it is quite possible that all the above implement materials are endemic. Some implements such as a and f, Pl. II retain a portion of the cortex of the original chert nodule. This shows quite well that the source of the raw material of some implements was a local quarry.

Figs. a–c, Pl. II belong to the class end scrapers. Fig. f, although typologically it is an end scraper, exhibits several spurs along its working edge, and for that reason it is classed as a graver. There are two varieties of end scrapers—those with a narrow working edge such as Fig. e and those with a broad working edge such as c. Functionally the two varieties may be identical.

Fig. i is possibly a sickle. It comes from site K–18, and it is the only example in the Museum collection. The implement is made on a flake, and it has been trimmed unifacially along the edges. There are no scratches or gloss characteristic of well-used sickles on the specimen.

Fig. n is a trihedral borer (Class B), which is worked on the dorsal faces only. It is one of three in the Museum collection. Borers of this type are quite different from those made from thin, flat flakes with low-angle retouch along the edges (Class A).

Figs. o and p are undoubtedly unfinished projectile points. These specimens and three others were collected at site K–13. They are not included in the listing of implements in Table I.

Conclusion

I will not presume to discuss the origin and distribution of the implement types reported in this paper, for my knowledge of the subject is limited, and Caton-Thompson has done this already in her many papers. Instead I would like to comment upon an aspect of the study of stone tools, which I feel has not been given enough attention heretofore. By this I mean the recognition of functional assemblages of chipped stone implements as a step to reconstructing the yearly round of activities of human groups. Once again I feel it is unfortunate that we do not know whether the Desert Locust Survey officers made complete collections from the sites. If we knew that they had done so, it would be possible to say the following about the makers of the implements:

1) That groups of people, probably few in number, visited repeatedly locales where possibly a number of different activities were carried out. (Based on sites K–14, 16, 17, 18, and 20.)

2) That there were special camps, probably hunting camps, and that a limited range of activities were carried out at these camps. (Based on site K–13.)

3) That there were areas where special raw materials were sought and that articles were manufactured there. The time of stay at these areas was short. (Based on site K–20a.)

An attempt to compare stone tool assemblages according to function, of course, is hampered by our ignorance of the exact uses to which the implements were put. It is possible that several types of implements were applied to the same end or one implement used for many ends. An assemblage of stone tools with a variety of types may represent a single activity or many.

An appeal to ethnographic data concerning the variety of uses to which a single implement may be put might be useful for certain implements. There are many types of chipped stone implements, however, for which ethnographic data is lacking or now impossible to obtain.

Archeological sites, where ideal conditions of preservation have enabled hafted tools and objects that show the mode of their manufacture to be found, are rare. Little information that will help us recognize functional stone tool assemblages can be expected from this quarter.

A solution to our difficulty rests in an intensive site survey with a yield of many sites. Our predictions of the function of stone tool assemblages can be verified by the observed frequency of the different assemblages. For example, we would expect campsites to be more numerous than sites where raw materials were sought and worked; thus, assemblages such as K–20a would occur rarely in comparison to assemblages such as K–14. It would also be useful to know in some detail the local resources and environments in order to predict an expected range of human activity.

Both the above factors, that is, an intensive archeological site survey and a knowledge of environment, are lacking for southern Saudi Arabia. Until they are provided any attempt to interpret the activities of ancient human groups within this region, as the attempt in this paper, must be regarded as tentative.

Acknowledgments.—I would like to thank D. M. Leakey and the National Museum, Centre for Prehistory and Palaentology, for assistance and permission in examining the
collection. I would also extend my appreciation to Mr. Robert Soper, Assistant Director of the British Institute of History and Archaeology, for his comments on the manuscript and to John Ochieng for the excellent drawing of the artefacts.

Since the writing of this article Dr. L. S. B. Leakey has drawn to my attention that notes on the collection do exist, presumably made by Dr. Gilliland, but as yet I have had no opportunity to examine them.