EXCAVATIONS AT FOX HOLE CAVE, HIGH WHEELDON, 1961-1970

By D. BRAMWELL

INTRODUCTION

FOX HOLE cave is situated at Nat. Grid Ref. SK 100663, which is about one mile south of Earl Sterndale village, Derbyshire. The cave opens on to High Wheeldon Hill at an elevation of about 1250 feet, on the north-facing side of a rib of limestone. The inconspicuous entrance commands wide views. To the west are the grit and shale hills of the upper Dove valley, to the north west the Hindlow tumulus, to the north Brier Low and Dow Low tumuli and four miles in a south-easterly direction, but not in view, lies Arbor Low stone circle. Until the year 1928 the cave was unsuspected, the only indication being a fox earth among a small group of rocks. A dog going to ground here and having to be rescued, leading to discovery of an extensive cave system, made a sensational story in the local press at the time, with various local antiquaries contributing their impressions. Some digging was undertaken and a variety of animal remains and pottery secured, probably chiefly from the Entrance Chamber (fig. 1), and it was left to Dr. J. W. Jackson to assess and report briefly on the finds in an article in this journal.[1] The finds are now in the Buxton museum and include a fine brown bear skull and bones, thick pieces of Neolithic pottery, some black chert microliths and a bronze wire armlet of Roman age. No description of the area excavated is known and there is no section available of the important deposits at the entrance. At a later date the door on the cave was broken open and potholers began some investigations in the Bear Chamber. Not being acquainted with the earlier work at the cave, they were surprised at turning up some very large bones of bear. Dr. Jackson then suggested that the Peakland Archaeological Society should make a detailed study of the deposits in the cave, chiefly to supplement the earlier work and to try and resolve some outstanding questions, such as the age of the microliths and the reason for two forms of bear. The society initially worked in the Bear Chamber, but under some difficulty, so this plan was abandoned in favour of taking up the excavation at the beginning of the Main Passage, where it leads out of the Entrance Chamber. A new door was fixed and a simple cable haulage system installed by which the various sediments could be brought to the sorting table at the entrance. This system has

now been replaced by a monorail type of haulage which now carries the buckets over 80 feet of passage.

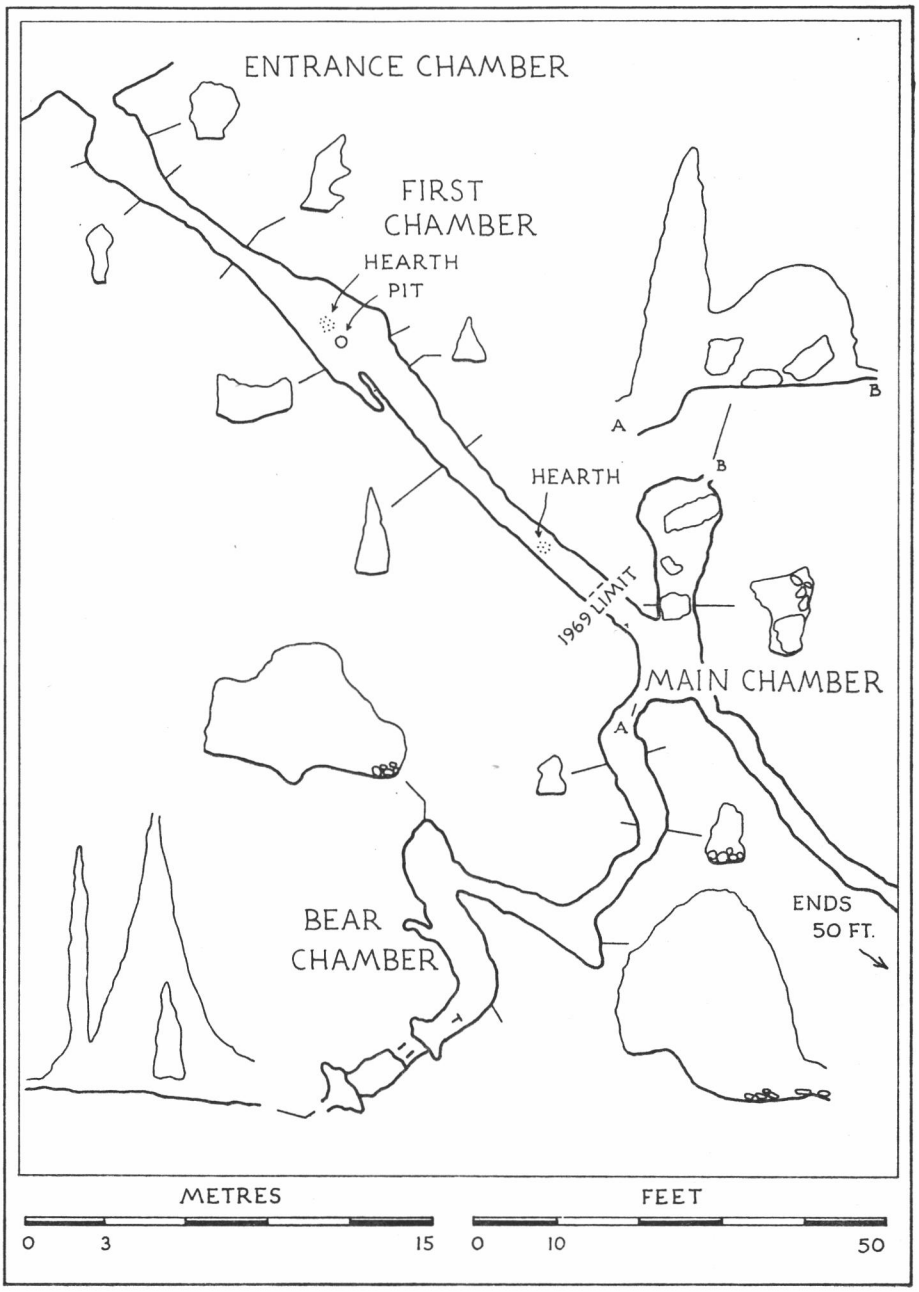

FIG. 1. Fox Hole Cave : Plan and Sections.

THE CAVE ENTRANCE

In his account of the cave Dr. Jackson calls attention to the use made of the entrance for Neolithic burials, so a closer examination was made to see if any features of interest still remained. The first obvious discovery was of a large slab of limestone resting on its long edge on the east side of the threshold. This was clearly an artificial feature and very slight excavation revealed a row of three packing stones at its base. The stone measures 41 in. by 16 in. by 5 in. as far as is visible, but the depth of 16 in. represents the amount standing above ground, while the 41 in. is the long edge on which the stone rests. There is no sign of a comparable stone on the west side of the entrance, but it is assumed that entrance was gained by removing boulders on this side, in order to rescue the trapped dog. At a point where the platform at the entrance widens to about 9 ft., a shallow exploratory trench was dug, revealing the sequence: a few inches of turf, then some obvious old spoil and finally a kind of cobble pavement upon which was a scatter of pottery, mainly of Romano-British type, flecks of charcoal and bones and teeth of badger, fox, horse, hedgehog and hare. Since excavations inside the cave reveal a continuation of the cobbles, it is apparent that the entrance of the cave, at least, had been treated as a long barrow with a stone cist blocking the way in. This structure must have been demolished by later people, in later Bronze Age or Roman times, who made some use of the cave. In clearing-up operations inside the Entrance Chamber a human mandible was found in the topsoil, evidently of the Roman period. It is clear that this occupation was a brief one.

THE MAIN PASSAGE

It is assumed that the cobble floor continued across the Entrance Chamber and joined the floor revealed by our excavations in the Main Passage. Here, however, the floor became the living place of Beaker Age people over most of its length, but it was found to be everywhere submerged under a layer of recent, fine chocolate-coloured mud, of jelly-like consistency. The mud, Layer A, was rich in humic acid and was difficult to sort. A similar feature was found in Dowel Cave by this society, and the presence there of Early Iron Age materials proved it to be an accumulation dating from the deterioration of climate which occurred about 500 B.C., when the cool, wet sub-Atlantic phase began. The Dowel mud was dated archaeologically, but the Fox Hole mud yielded some good pollen to Dr. Shimwell's research, with results as set out in Appendix II. Animal bones from Layer A were mainly of badger and fox, and the prey taken into the cave by these two predators: hare, rabbit, poultry and scraps of domestic animal bones, probably foraged from farm rubbish heaps; there were also bones of otter and raven.

Investigations in the Main Passage proceeded slowly owing to the scarcity of archaeological material and the confused state of the deposits,

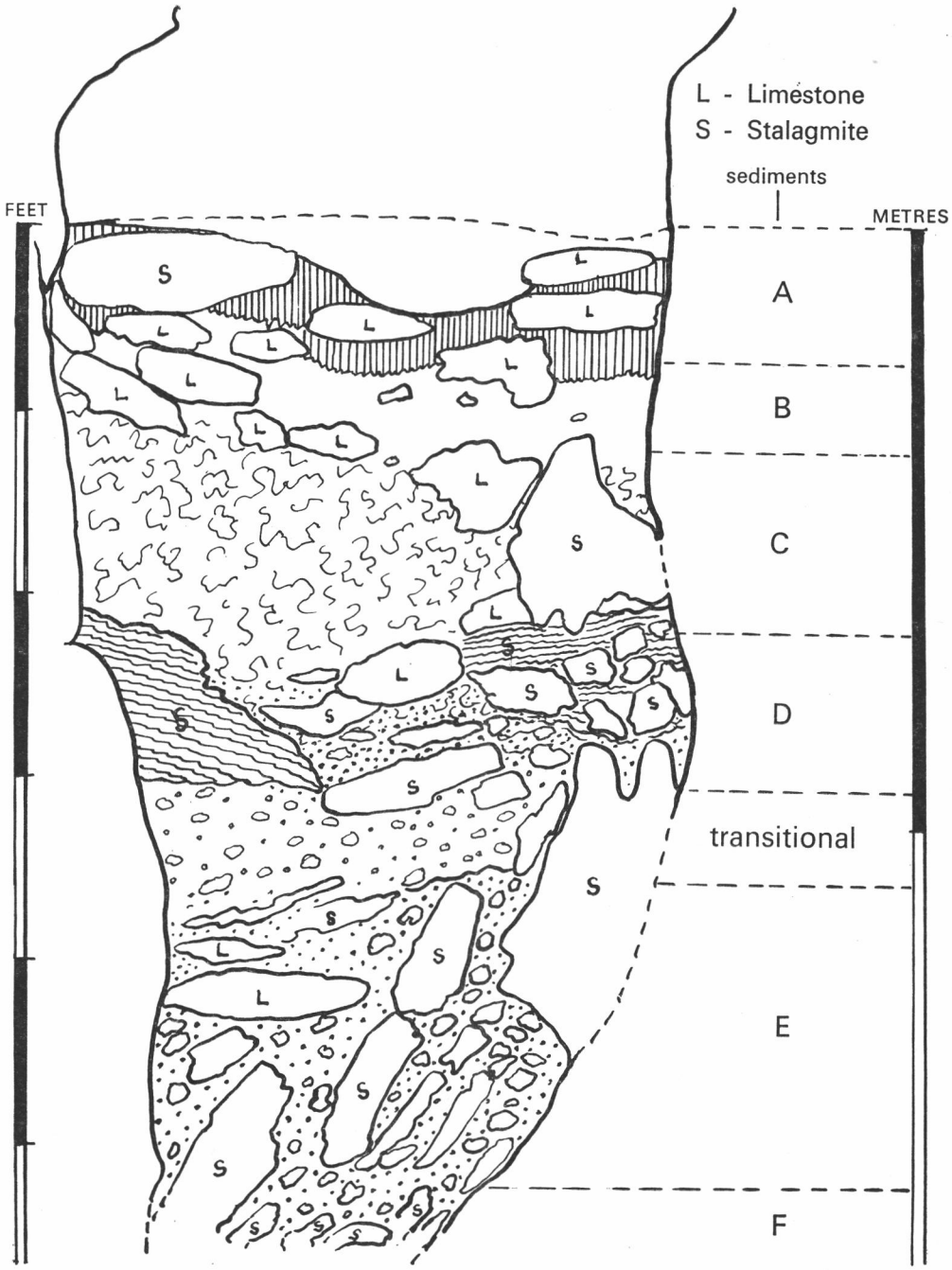

FIG. 2. Fox Hole Cave : Typical Section of Main Passage.

which also looked very featureless in the light from Biladdin pressure lamps. The narrowness of the passage was also a handicap as only one person could excavate at a time. Experience has shown that cave entrances always provide the best-marked sequences of sediments, which rapidly become somewhat featureless as one passes into the cave. At Fox Hole the earlier excavations had accounted for these rather vital entrance deposits and the plentiful clues which they must have contained. Rate of progress has averaged only about 6 ft. of passage per season's work, which may appear very slow, but it must be remembered that much of the work entails hand sorting of very sticky clay. In due course the following sequence was arrived at:

A. Dark brown silt with Roman débris, about 1 ft. thick.
B. Floor of limestone cobbles with Beaker and late Neolithic pottery, about 6 in. thick.
C1. Mottled, sticky, yellow clay with Peterborough ware but no Beaker, from 6 to 12 in. thick.
C2. Similar clay but less sticky. Human occupation not evident. Animal remains of forest type. Up to 8 in. thick.
D. Still drier and more sandy. Mesolithic or late upper Palaeolithic occupation. Up to 8 in. thick.
E. Gritty cave earth with both rounded and angular pieces of limestone, much decayed stalagmite, and bones of late Pleistocene mammals, dominated by a large form of brown bear. Up to 30 in. thick.
F. Slabs of limestone and blocks of stalagmite lying over a fissured floor.

The whole series averages 5 ft. 6 in. in depth. (See typical section, fig. 2.)

On the plan can be seen a widening of the Main Passage into what is conveniently called the First Chamber, where there is a hump or rise in the deposits, caused by excessive roof falls. The hump seems to have had the effect of checking the movement and distribution of the deposit E, so it can be assumed that this sediment was distributed through the cave in a semi-liquid state, from some point beyond the end of the Main Passage. The sludging reached the First Chamber and was then arrested by the barrier of fallen rock. Another piece of evidence for considerable movement is the broken-up state of the bear and other contained animal remains. In some cases even the strong canine teeth have been sheared across while few skeletal parts lie in conjunction, as they would be had they died at the spot where found. There is also a good deal of fractured stalagmite formation in E, which may indicate that an old floor had collapsed from a higher level. This could have been due to washout of underlying sediments or to a current of freezing air passing through the passages with consequent ice fracturing of the wall and floor stalagmite formations. The current of air would also presuppose that there was

formerly an outlet, perhaps to the Bear Chamber, an open swallet down which the animals fell to their death, as has been the case in numerous caves in the Peak District (Windy Knoll, Dove Holes Quarry, Hoe Grange Quarry, etc.).

ARCHAEOLOGY

Romano-British

This has already been dealt with as most of the evidence came from the Entrance Chamber, excavated by others. The bronze armlet is of interest as an armlet of more elaborate design and heavier workmanship was found outside the Thirst House cave, in Deepdale, near Buxton. The two types are on view in Buxton museum and can be compared.[2] Small amounts of pottery, a few scraps of iron and the human mandible seem to indicate use of the cave on a very temporary basis, probably because of the very narrow threshold.

Middle or Late Bronze Age

There is a possibility that one or two pottery sherds may be of this age, but there is evidence of cereal pollen of this period from a small storage pit in the First Chamber (Appendix II).

Neolithic — Beaker

This composite culture has proved to be the most important in the history of the cave, as in the early investigations too, but further evidence has come to light which shows that the Beaker folk were clearly later occupants and had a richer culture than the cave-dwelling Neolithic folk. The Beaker level was well marked by its rubble floor, which yielded a few small round scrapers, sherds of beakers and occasional pieces assigned to Peterborough ware and Rinyo-Clacton (see Appendix I). These latter came from the First Chamber, where a feature of interest was the presence of several hearths, one of which was bounded by a short stone curb, about 2 ft. in length. The area of calcined limestone forming this hearth was overlain by an inch or two of burnt clay with lenses of ash and charcoal, this in turn being covered by 3 in. of very compact clay. Some 12 in. beyond the hearth was a small pit, sunk into the cobbled floor. This was assumed to be of Beaker age also until a pollen study was carried out on the organic sediment in the bottom (Appendix II). The pit was 15 in. in diameter at the surface but tapered a little to the base 10 in. below. The area to the east of the hearth and pit was found to be covered by a compact layer of clay, interstratified with thin, dark organic layers which have also been sampled for pollen, proving that they are of later age than the Beaker rubble. Other parts of the floor in this First Chamber have produced further hearths and burnt clay, also a barbed and tanged arrowhead in poor flint (fig. 3 no. 2). Animal remains have been

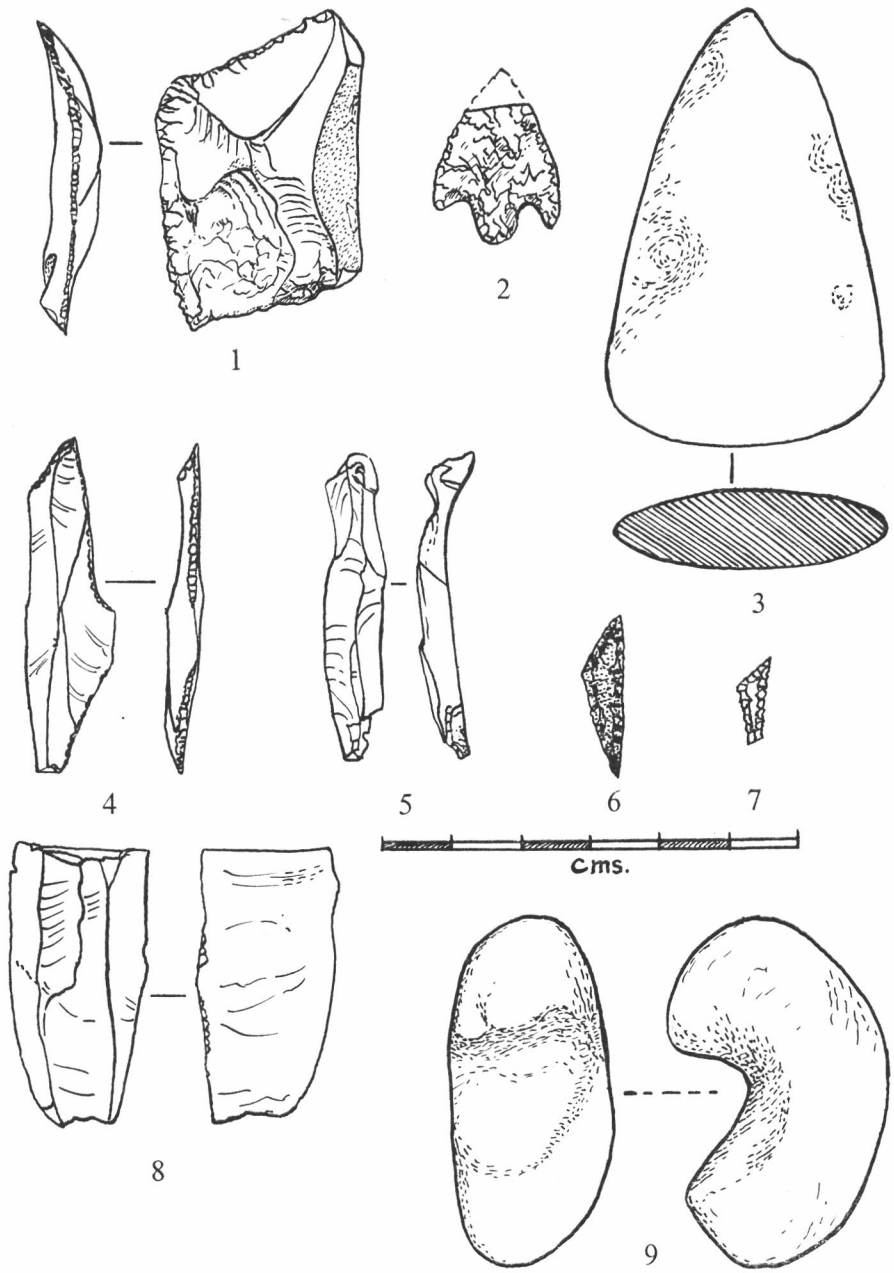

FIG. 3. Fox Hole Cave : Stone Artifacts.

numerous but very broken and difficult to name apart from the micro-fauna of rodents, amphibia, etc.

Beyond this interesting living chamber the Beaker floor led further into the cave with sherds of Beaker pottery becoming more frequent as a new hearth area was approached. The new hearth was located on a rock ledge at a point where the cave floor was rising towards the Main Chamber. This area of increased Beaker activity was in a particularly narrow and difficult section, and occupation at this point is difficult to explain. Along with charcoal the better part of a crushed corded beaker was found which Mr. Manby has, with some difficulty, described from the 50 fragments so far found. Near the hearth were several interesting bone artifacts, but the only flint implement was a rhomboidal, flattish piece which had been retouched along two edges to form a knife, but it had lost a large flake through being partly calcined (fig. 3 no. 1). One of the worked bone pieces, fig. 4 no. 2, is a rib of a deer or pig worked to a spatula shape but it differs from the usual Beaker age spatulae in being drawn out to a point at one end. The instrument shows clear marks of having been finished off on a gritstone rubber. Its use is difficult to imagine as it seems too fragile for a borer, but it might possibly have had a use in weaving. A large boar tusk, fig. 4 no. 3, has also been utilised by having a V-shaped notch cut into the outer edge at a point where the tusk would have entered the jaw. Boar tusks had evidently some ritual significance for the Beaker folk in view of the numerous finds from barrows of the period. A further bone, regarded by us as a worked specimen, was the vertebral body of a brown bear which had a hollow worked into its top side, the neural arch being cut away. Pure speculation suggests that this was a primitive lamp, with the hollow used as an oil reservoir. Cave dwelling would demand illumination other than from fires, but the usual type of early lamp recognised is the soapstone dish or the hollowed piece of chalk as used by the Neolithic miners of flint.

Of some significance in the Beaker occupation level is the frequency of remains of brown bears and the broken condition of their bones. It is fairly clear that these early agriculturalists were regularly hunting the animals to rid them from their herding areas. It is also likely that the cave was in demand by the bears as the only really suitable one in a wide area, in which to bring up their families, and for hibernation. The evidence from the local barrows on this point is negative, for Bateman has no record of bear remains from the numerous burial mounds opened to him. Harborough cave produced a pierced canine tooth of a bear, but the evidence seems to indicate a pre-Neolithic level.[3] There are also some references to pierced bear teeth from Welsh caves, but the age is regarded as Neolithic.[4]

The removal of the cobble floor at Fox Hole disclosed a sticky clay, C1. The clay had a mottled appearance, due to its foreign bodies in the form of human bones (usually broken), charcoal specks, animal bones, Peterborough potsherds, ironstone nodules, quartzite pebbles,

gritstone and shale. The Neolithic ware seemed to belong chiefly to one big bowl, but there were several others represented by other fragments. The human bones seemed much disturbed and fractured and were

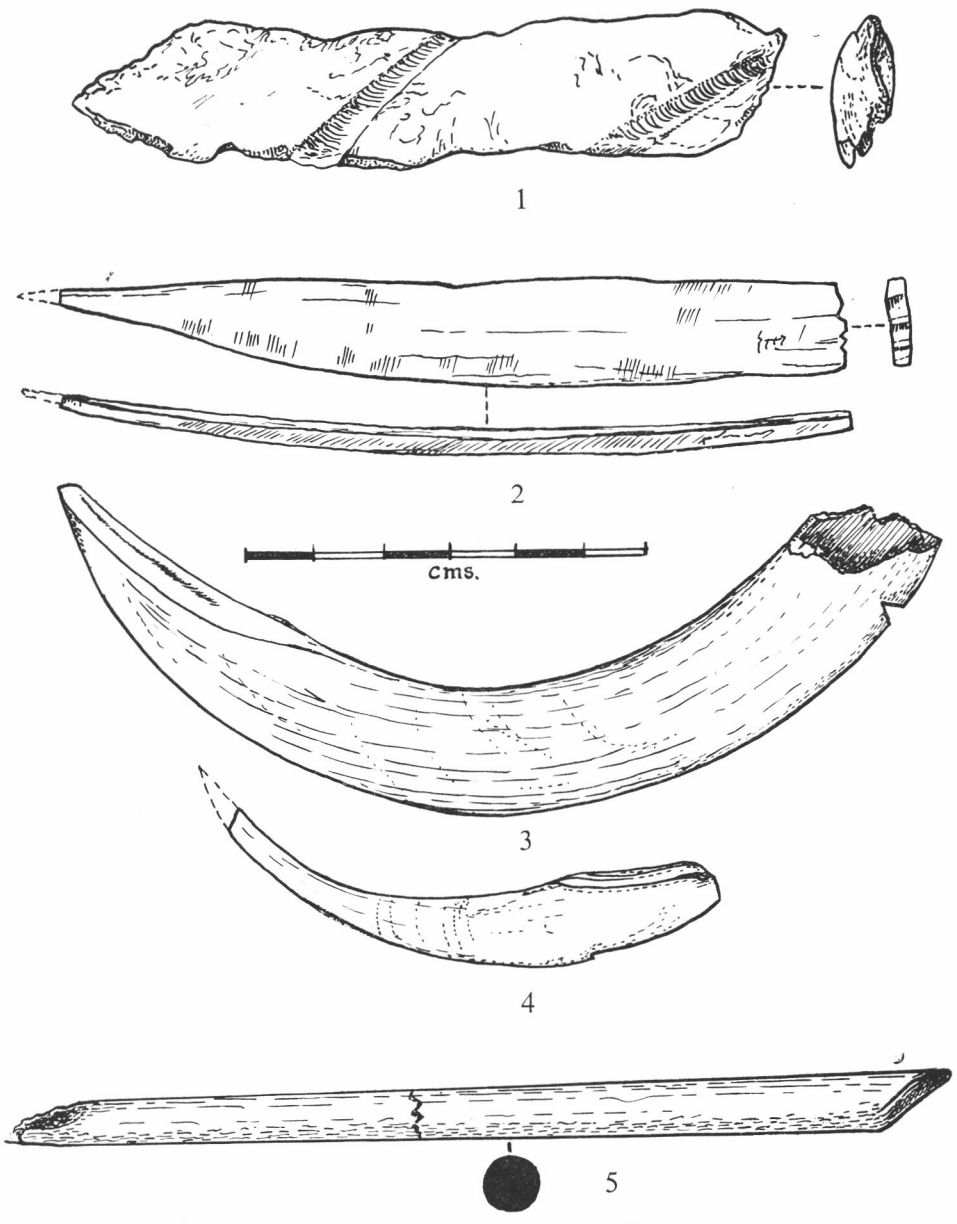

FIG. 4. Fox Hole Cave : Bone Artifacts.

indiscriminately mixed with animal bones. The whole of C1 gives the impression of being thoroughly mixed and puddled, probably by trampling. No Beaker sherds were found in this layer and few artifacts, but one of these was outstanding, being a small greenstone polished axe-head (fig. 3 no. 3). The material of this axe-head was sectioned at Birmingham University and proved to be of Group VI, originating in one of the Langdale quarries. There seemed to be some evidence of working of bone and teeth by these late Neolithic folk, and illustrated is a small and effective knife fashioned from a boar tusk (fig. 4 no. 4), and a piece of rib of a large animal, perhaps ox or red deer, bearing two smooth grooves as though made by the rubbing action of thongs (fig. 4 no. 1). One suggested use is as a bow strengthening piece. A small sandstone pebble was found with a V-shaped notch in one side (fig. 3 no. 9), and there were one or two worked canine teeth of bear, one chipped into a circular scraper and the other into a small axe or wedge-shaped implement. Animal remains include brown bear, wolf, cat, dog, badger, fox, red and roe deer, sheep or goat, pig, hare, duck, goose, hedgehog, mole, voles, mice and shrews. There were ox bones of small and larger varieties.

The C2 sediments differed from C1 in being drier and having a more sandy constituency, but were still yellow. Human occupation ceased but animal bones continued, the fauna being typical of primitive woodland as one would expect of an area unaffected by settlement. Woodland rodents such as wood mouse and bank vole were present, and the larger mammals included brown bear, wolf, cat, badger and fox. Deer would also be present but, in the absence of human hunters, would rarely be brought into the cave. The long occupation of the cave by badgers has led to some mixing by burrowing, mainly along the east side of the Main Passage where an old burrow, containing a skull was noted. Among the bird remains of C2 were jackdaw, bullfinch and black grouse, the latter bird indicating areas of lighter woodland and also appearing at Beaker level. Some leaf impressions of two species of tree, preserved on slabs of stalagmite have not yet been identified. Numerous impressions of the wings of caddis flies are also present on the same flakey stalagmite and indicate the work of bats which feed on these insects. Increase in stalagmite formation is a natural consequence of wet, mild weather conditions, which suggests that the period represented by C2 was that of the post-glacial climatic optimum, the so-called Atlantic period, ranging from perhaps 5,000 to 3,000 B.C.

Mesolithic or Upper Palaeolithic

Below C2 came the drier and more sandy sediment, D, where the presence of horse in the fauna is indicative of an open landscape, with extensive grasslands. The presence of this animal in the cave was due to a brief occupation by a hunting group of people of Mesolithic or late Upper Palaeolithic culture. The main evidence for the determination of the culture consists of three pieces of patinated flint. The best specimen

is a large microlithic type of point which might equally well be classed as a shouldered point (fig. 3 no. 4). This was found in association with a little charcoal and split bones of horse and red deer, while other elements of the accompanying fauna were brown bear, wolf, badger, fox and pine marten. A few fragments of flat antler, almost certainly of reindeer, have been found in other parts of the cave, also a bone of *Bos* or Bison, but it is uncertain whether the reindeer belongs exactly to this level. On balance it would seem that this is a late Upper Palaeolithic culture, closely related to that found at Ossom's cave, Manifold Valley,[6] and the recently-described site at Sheldon Moor.[7] The other two flint pieces are a core trimming flake (fig. 3 no. 5), and a truncated blade (fig. 3 no. 8), bearing a light retouch on the plain side and showing wear on this edge. The small amount of flint for study prevents any serious comparison with the recent finds at Robin Hood's cave and Mother Grundy's Parlour, Creswell,[8] but the fauna at Mother Grundy's Parlour bears a close resemblance to that at Fox Hole.*

The provenance of the Fox Hole microliths (fig. 3 nos. 6 and 7) is still not satisfactorily solved. The smaller one was found by us on the tip, after it had become washed out of clay by rain. It is patinated and could well belong to the three above, but the black chert specimen, and others not available for examination, are said to have been found among late Neolithic material at the cave entrance. This could well be as microliths do occur as late as Early Iron Age times at a settlement between Ashford and Bakewell.[9] A further item, probably of D layer age, is the well-worked rod of probable red deer antler, found in the earlier time of the Peakland Archaeological Society's excavations in the Bear Chamber. The implement bears a slightly hollow bevel at each end and so would not appear to be of much use as a lance point, but the length and style are favourable to a late Upper Palaeolithic culture (fig. 4 no. 5).

Before leaving the human occupation levels there is a further feature which deserves mention, but which is difficult to date. This was the occurrence of a purposeful burial of a brown bear skull at a point some 9 ft. beyond the First Chamber, in the Main Passage. Unfortunately the sediments at this point were more or less pure limestone slabs, so it became difficult to tie the burial to any of the known horizons. The skull lay inverted on rocks and was covered by a flat slab, recalling the purposeful burials in stone cists, from several Continental sites, of cave bear skulls. The practice is found to occur from Mousterian times, and exists today, in modified form among Eskimo and some Siberian communities, the skulls in the Siberian case being placed on poles on a local eminence.[10] The level of the Fox Hole burial seemed to agree best with the Mesolithic/Upper Palaeolithic stratum.

* Since this paper was written, a fine backed blade of flint, with opposed oblique truncation, was found in Layer D in the First Chamber. The blade, of a type sometimes described as a 'pen-knife point' (ref. 8), is 42 mm long and 12 mm at maximum width. The find tends to support the premise that the culture is late Upper Palaeolithic rather than Mesolithic.

The earlier deposits

Below D came a nondescript transitional layer with some bear remains but without any good indicators of climatic conditions. This transitional material could be just the weathered surface of the underlying E material, which was a true cave earth, attaining a thickness of 30 in. in parts. The sediment was gritty in texture, due chiefly to a big fraction of decomposed stalagmite, the gritty feel being due to the numerous isolated stalagmite crystals. There was also clay in the composition and many slabs of limestone and stalagmite. The latter consisted of fragments of wall formation (stalagmite curtain), and also pieces of ancient floor bearing stalagmites, and broken stalactites and stalagmites embedded deeply in floor formation. The whole series was rich in remains of brown bears, larger than those met with above this level. These animals were the "glacial" or Ice Age form of the brown bear, some 20% in excess of the present European specimens, as described in Kurtén's recent study of Pleistocene Mammals of Europe.[11] The bear remains found at Fox Hole are in all stages of growth, from foetal to old adults, but all the remains have suffered considerable damage. It does seem probable that some of the bears might have been able to hibernate in the cave at one period in its history, and that the bones lay on a floor at a higher level, which has since become undermined or affected by icy currents, causing its collapse. A similar state of affairs has affected many European caves, including another Peak District cave, Elder Bush, in the Manifold Valley.[12] One other large vertebrate from E was a lion, of which a lower jaw and some paw bones were recovered. Cave lion remains are usually larger than present-day specimens of African lion, and the Fox Hole lion bones follow this rule. Small vertebrates are scarce in the E sediment, evidently due to the abrasion as the sediment moved along in a sludge-like state. Those identified are: common fox, hare, weasel, mole, bats, bank vole, continental field vole, northern vole, arctic lemming, skylark and a grouse or ptarmigan. The majority of these forms inhabit open, mostly treeless landscapes, while the lemming is most certainly a tundra species, indicating that E should be assigned to a cold phase, probably during the early part of the last (Weichselian) glacial stage of the Pleistocene.

The lowest sediment, F, does not exist in all parts of the cave and is best represented in the Entrance and First Chambers. It is impressive in having an almost 100% stalagmite composition, comprised of fragments mostly derived from the cave walls. Below this sediment the cave floor has been reached in a few places and takes the form of narrowing fissures which show signs of carrying some drainage in times of heavy rain.

ACKNOWLEDGEMENTS

To Prof. G. Brade Birks for information relating to the early digging; to Dr. G. R. Coope, University of Birmingham, for work on the identification of the stone axe material; the Derbyshire Caving Club for the survey and installation of haulage gear;

Dr. J. W. Jackson for advice and encouragement throughout the project; T. Manby for help with the script and a report on the pottery; J. Nadin and family of Wheeldon Trees Farm for a good deal of help in various ways; P.A.S. members and friends for devoted work; the late J. Radley for advice on the script; J. Salt for similar help; Dr. D. Shimwell, University of Manchester, for working on the identification of pollen with such success; and R. Thornhill for further information and press cuttings relating to the early excavations.

APPENDIX I

NEOLITHIC POTTERY

By T. G. MANBY

The prehistoric pottery from the present excavations repeats the general cultural associations of the 1929 finds.[13] However, the fragmentation of the pottery makes any total estimation of the number of vessels very difficult.

Fig. 5 no. 1. A large body fragment of a Peterborough Ware bowl. Dark grey fabric, brown exterior with dark tones. Profuse limestone grits, up to ½ in. long, erupting through the surface, some intermixture of fine sand also. Decorated over the exterior with a scatter of triangular wedge-shaped impressions made by a square-ended piece of wood or bone.

no. 2. A large sherd, possibly of the same vessel as no. 1, the fabric is more pitted however. Wedge-shaped impressions used for decoration but larger and deeper than in no. 1.

no. 3. A rim sherd of uncertain angle; either a collared rim of Grooved Ware type of a flat-topped rim of Peterborough Ware type. The fabric suggests the former — a dark grey "soapy" ware with large limestone grits. Decorated with incised herring-bone pattern and finger-nail impressions on the angular edge.

no. 4. Body sherd of Peterborough Ware. Orange surface, dark grey core, profuse crushed chert grit. Decorated with rows of diagonally placed half-moon impressions.

no. 5. Body sherd of Peterborough Ware. Laminated dark grey fabric with orange exterior, chert grit. Decorated with half-moon impressions. From the living chamber, amongst large rubble. Two similar sherds from the rubble floor.

no. 6. Small sherd, back eroded. Dark brown fabric, sandy grit. Broad groove with jab imprints. Amongst the rubble of the living floor.

no. 7. Small sherd of a Beaker. Smooth brown, dark grey interior; $^{1}/_{5}$ in. thick. Decorated with horizontal cord lines.

no. 8. Small sherd of a Beaker, weathered condition. Dark brown fabric, ¼ in. thick. Decorated with horizontal comb impressed lines. (Section 7B, Layer B. rubble.)

no. 9. Small sherd of a Beaker. Reddish fabric, $^{5}/_{16}$ in. thick. Decorated with comb impressions, horizontal with a vertical and diagonal line. Living chamber amongst rubble.

Fig. 6. Remains of a Beaker; crushed, represented by 50 sherds; 4¼ in. diameter rim, 3⅜ in. diameter base, height uncertain. No complete profile but sherds of neck, shoulder and base. Moderately hard buff to brown, dark grey core, small crushed limestone grit. The neck has a series of horizontal grooves, comb impressions forming horizontal lines with zones of short diagonal lines forming fringes. Comb impressions in the neck grooves. Short diagonal comb lines forming a zone inside the rim.

Discussion

The recent finds from Fox Hole described above add a possible Grooved Ware sherd to the Peterborough Ware and corded Beaker sherds previously reported from this site. The stylistic features of the Peterborough Ware are limited and what features there are suggest connections with the Mortlake style and not the Ebbsfleet or Fengate styles. The wedge-shaped impressions (fig. 5. nos. 1-2) used for decoration at Fox Hole can be paralleled by cave finds from the Craven District of the Yorkshire Pennines. The

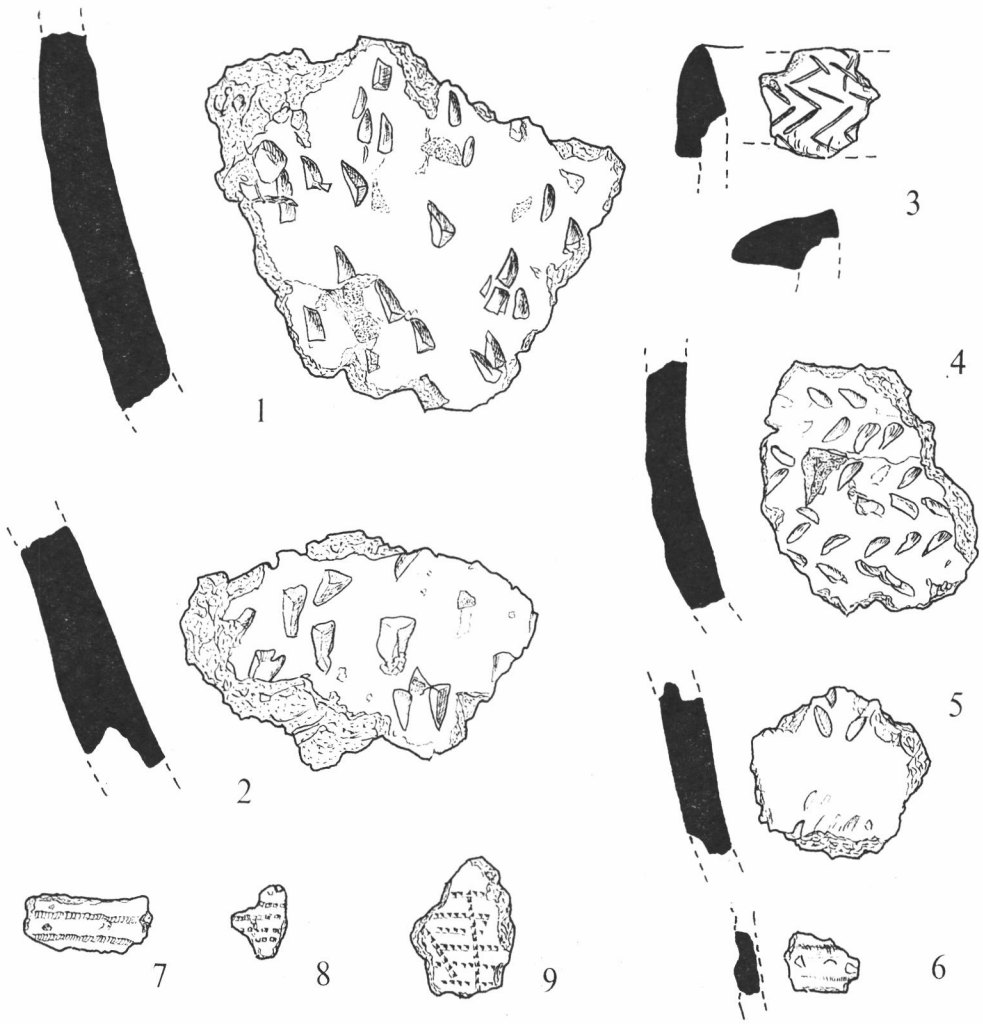

FIG. 5. Fox Hole Cave : Pottery.

decoration is present on sherds from Lesser Kelco Cave[14] and at Elbolton Cave,[15] occurring in combination with finger-nail impressions. This technique of decoration is seen again on a Peterborough sherd from Old Town Farm on the River Allen, in Northumberland.[16] Such wedge-shaped impressions are absent on the Peterborough Ware of East Yorkshire and at Southern English sites like Windmill Hill,[17] West Kennet long barrow[18] and Maiden Castle.[19]

The use of crushed chert grit at Fox Hole (fig. 5 no. 4) as a gritting agent can be paralleled in the Peak District by the sherds of coarse plain ware from the edge of the blocking material filling the forecourt of Green Low Chambered Tomb.[20] Crushed chert was also used as a gritting agent in a Peterborough sherd from the Dog Hole Cave at Warton Crag, North Lancashire.[21]

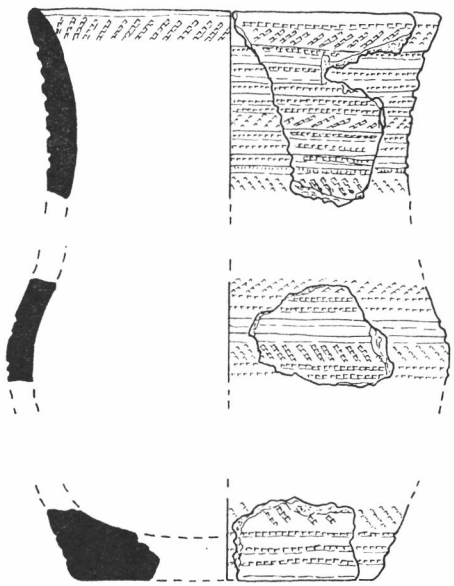

FIG. 6. Fox Hole Cave : Beaker.

The distribution of Peterborough Ware in the Peak District is at present largely associated with caves; with finds from Harborough,[22] Hartle Dale,[23] Ravenscliff,[24] Rain's,[25] Wetton Mill[26] and Reynard's Caves.[27] A burial with a bowl from a rock shelter near Monyash[28] is the only complete Peterborough bowl from the Peak District.

The Beaker associations of Fox Hole are difficult to parallel; the sherds with horizontal cord decoration from the present excavation and the 1928 finds represented a scarce Beaker variety in the Peak. Corded Beaker sherds were obtained from the excavation of Hindlow, 2½ miles north of Fox Hole, by Ashbee.[29] A complete All-Over-Corded Beaker has recently been excavated by Marsden at Bee Low, Youlgreave.[30] These few fragments from Fox Hole could also belong to the All-Over-Corded Beaker class of Clarke, one of the earliest Beaker groups arriving in the British Isles from the Rhine delta and Low Countries, *c.* 2,100-1,900 B.C.[31]

The crushed Beaker is difficult to attribute to any particular group due to the lack of a complete profile, but it is clearly not a member of the Long-necked Beaker class to which the majority of Peak District vessels belong.[32] This class has been renamed the South British Beaker Group by Clarke, and represents an insular development by the fusion of earlier Beaker Groups of Continental origin.[33] The outcurving neck of the crushed Beaker and its marked shoulder suggest it could have been Bell-Beaker-like in profile. If only a single zone of three horizontal lines is missing to complete the decoration between the neck sherd and the shoulder, and a similar zone with a fringe of diagonal lines between the shoulder and the base, this would give the vessel an original height of about 5 in. Alternatively, it is possible that a plain zone intervened between the bands of decoration on the neck, shoulder and around the base. However, none of the surviving sherds shows evidence of such plain zones. A zonal arrangement of decoration with fringe borders is a feature of many vessels found in Northern England and Southern Scotland that were derived from the Dutch Beaker Groups.[34] Such Beakers

were formerly attributed to the "Short-necked Beaker" class but belong to the closely related North British/North Rhine and North British/Dutch Beaker Groups of D. L. Clarke.[35] A grooved neck, like the Fox Hole Beaker, is characteristic of vessels of these groups in the British Isles and the Netherlands. Comb impressions are not found in the actual neck grooves of Beakers in East Yorkshire but are a feature of a number of vessels found in Northumberland.[36] This feature is seen on a North British/North Rhine Beaker from a cairn at Chatton Sandyford, Northumberland (associated with the radiocarbon date of (GaK-800) 1,670 ± 50 B.C.[37] This date accords with the arrival in Britain of these Dutch derived Beakers about 1,700 B.C.

Vessels of the North British/North Rhine and the slightly later North British/Dutch Beaker Groups are scarce south of the Humber estuary and in the Peak District. The former tradition is not represented. The Developed North British/Dutch Beaker tradition is represented by two mid-19th-century Beaker finds in Derbyshire. One is the famous neck-grooved vessel from Blakelow, Great Longstone, found in a rock cut grave with an inhumation burial.[38] Sherds of a second beaker with a grooved neck were found by Bateman at Rusden Low, Middleton.[39] The Fox Hole Beaker appears to belong with these two vessels to the same class of developed North British Beakers. The three Derbyshire finds represent an expansion of the North British Beaker people into the Peak District about 1,600 B.C., probably an offshoot from East Yorkshire where neck grooving is a characteristic of the North British Beakers of the Wolds.[40] This movement was slightly earlier than the advent of the Developed Southern British Beaker tradition to which the majority of Peak District Beakers belong.[41]

APPENDIX II

POLLEN ANALYSES FROM TWO HORIZONS IN FOX HOLE CAVE

By D. W. SHIMWELL

In July 1970, the opportunity came to sample deposits in the Bronze Age cobbled floor region of Fox Hole Cave some 12 metres from the cave entrance. The deposits had previously been protected by asbestos cement in October 1964 which during this period had changed the alkalinity of the deposits from a pH of around 6.0 to 9.5, but with no apparent adverse effects on the pollen. Crude samples were collected in the field and all external surfaces removed in the laboratory to avoid possible contamination with modern pollen. In this respect the cement provided a good guide to uncontaminated samples, i.e. those in which none of the thin asbestos spicules, visible under the microscope, were to be found. The two horizons sampled for pollen analysis were as follows:

(A) A thin layer of black, friable humic material 0.5 cms. thick at approximately 2.5 cms. above the "cobbled floor" horizon with its gritty clay and numerous rodent and amphibian remains.

(B) A layer of jelly-like humified material, purple-black in colour, situated above a thin layer of clay with rodent and amphibian remains in a depression in the cobbled floor.

The method used for pollen preparation was the standard one based on Erdtman,[42] but the procedure of Dimbleby[43] where 1 gm. of original sample is used in conjunction with a known volume of liquid and a pipette of 0.01 ml. drop size was adopted to enable calculation of Absolute Pollen Frequencies (APF). Two samples from each site

were prepared and a single slide from each was counted in full while others were scanned to check for other pollen types not represented on the chosen slide.

Results

The results are presented in Table 1 as actual numbers of pollen grains present and as percentages of total pollen.

Discussion

The problems which the pollen analysis set out to answer were twofold:

1. The nature of the two deposits and their approximate age.
2. Whether the deposits represented by sample A were associated with human occupation or badgers, and whether sample B was in a small grain store.

At the outset it must be stressed that the pollen in these deposits is all transported and that normal pollen analyses deal with pollen deposited *in situ* by wind and gravity. The agents involved in the transport of the deposits in question were either human or animal and therefore selective transport as food plants or bedding material is probable. The cereals could be human in origin or could come from the gut of one of the numerous rodents (although these are mainly water vole and bank vole), the heather from the crop of a black grouse, etc. The possibilities are endless and it is only the overall pattern of composition relative to the pollen composition of above ground plateau deposits upon which interpretation should be based.

The general pattern emerging from these latter deposits[44] from samples at Parwich Moor, Calling Low and Custard Field reveals a preponderance of grass pollen through much of the Bronze Age period (sub-Boreal Zone VIIb 2,000-500 B.C.) with little *Calluna* and the main tree species *Corylus, Quercus* and *Fraxinus*. This latter tree rises to a frequency of 11% APF at Calling Low and it is suggested that this falls within the VIIb/VIII Sub-Boreal/Atlantic Transition period of Conway[45] which she places between 1,200 and 600 B.C. The high percentages of ash and low *Calluna* values in Sample B suggest that this Middle to Late Bronze Age period is represented here. Similarly the rise in *Calluna* pollen in Sample A may indicate the onset of Atlantic weather conditions which began about 500 B.C.

This interpretation ignores the fact that these are transported deposits. But even though the pollen grains have been transported by human or animal agency they nevertheless reflect the general vegetation of the period with one or two notable exceptions. Pollen of Ligulate composites (cf. *Crepis*) is over represented as is Leguminosae (*Vicia* type) and Umbelliferae, features which are undoubtedly correlated with the high cereal pollen percentages, since these probably represent the associated cornfield weeds.

The question as to whether these deposits are due to human or animal activities now arises. It seems that both have been contributory to the pollen accumulation. The high percentage of cereal pollen suggests that the small pit was in fact a food store as originally suggested and that its shape and position in the cobbled floor indicates it to be of human origin. There is a possibility that some of the pollen has been contributed by rodents but the bulk of it must have come from the continuous use by humans because of relatively high APF values, when compared to the mineral horizons of plateau podsols. The possibility that badgers have contributed to the pollen of Sample A by their bedding cannot be ruled out because all the ingredients of badger nesting material are present — grass, herbs, bracken, etc.[46] The low frequencies of *Plantago* pollen suggest that the cave entrance was not much trampled or disturbed since high plantain frequencies usually indicate ground disturbance and human

activities (cf. the high percentage of *Plantago* at Swarkeston Barrows[47]). However, *Plantago* is wind pollinated and the grains may not have been able to reach the sample site simply by being blown, since the main draught in the cave is outwards (Bramwell, pers. comm.).

Conclusions

With reference to other pollen analyses from plateau deposits in the region, it seems reasonable to conclude that the two horizons represented in Fox Hole Cave are of two different ages. Sample B from the "food store" is of Middle or Late Bronze Age origin, 1,200-600 B.C., Zone VIIb transition period, while Sample A is representative of a later date around 500 B.C., in the early Sub-Atlantic period Zone VIII when heath formation and podsolisation of the uplands began. The higher values for *Calluna* indicate this. The quantities of cereal pollen in both samples are far above those found in any of the plateau deposits studied (some 10-15% APF higher) and the sample B is undoubtedly from a local food store. The relatively high percentages of weed pollen also tend to indicate this latter conclusion.

	SAMPLE B			SAMPLE A		
	1	2	% APF	1	2	% APF
Gramineae (Grass)	93	84	32	57	46	35
Cerealia	54	40	17	8	12	7
Fraxinus (Ash)	24	21	8	8	10	6
Quercus (Oak)	18	16	6	6	5	4
Vicia type (Vetch)	21	20	7	2	5	2.5
Liguliflorae (Dandelion, etc.)	15	22	7	16	18	11.5
Tubuliflorae (Daisy type)	6	3	2	3	1	1.5
Calluna (Heather)	12	10	4	18	10	9.5
Pteridium (Bracken)	9	12	4	8	4	4
Umbelliferae (Parsley)	15	9	4.5	3	2	1.5
Polygala (Milkwort)	1	—		—	—	
Plantago (Plantain)	3	4	1	7	1	2.5
Succisa (Scabious)	2	2		—	3	1
Geranium (Cranesbill)	1	—		—	1	
Centaurea (Knapweed)	6	3	2	—	—	
Labiatae (Hemp Nettle)	3	1		2	—	
Cruciferae (Cress)	—	2		3	1	1
Chenopodiaceae (Fat Hen)	—	1		—	—	
Agrimonia (Agrimony)	—	—		2	—	
Ranunculaceae (Buttercup)	—	—		3	—	1
Betula (Birch)	—	—		—	1	
Corylus (Hazel)	—	—		—	3	1
Artemisia (Mugwort)	—	—		—	1	
Vaccinium (Bilberry)	—	—		—	1	
Galium (Bedstraw)	—	—		—	1	
Unidentifiable	9	14	4	11	16	9
TOTALS	292	264		157	142	
Approx. no. pollen grains per 1 gm. of deposit	139,000			74,750		

NOTES AND REFERENCES

1 J. W. Jackson, "Peterborough (Neolithic B) pottery from High Wheeldon Cave", *D.A.J.*, lxxi, 1951, 72-7.
2 W. Turner, *Ancient Remains near Buxton*, 1899, 61, pl. ix.
3 W. Storrs Fox, "Harborough Cave, near Brassington", *D.A.J.*, xxxi, 1909, 89-114.
4 J. W. Jackson, *British Caving*, 1953, 209-10.
5 R. West, *Pleistocene Geology and Biology*, London, 1969, 282-3.
6 D. Bramwell, *Peakland Archaeological Society Newsletter*, 11, 1954; *ibid.*, 12, 1955; *ibid.*, 13, 1956.
7 J. Radley, "A Mesolithic Structure at Sheldon, *D.A.J.*, lxxxviii, 1968, 26-36.
8 J. B. Campbell, "Excavations at Creswell Crags. Preliminary Report", *D.A.J.*, lxxxix, 1969, 47-58.
9 T. A. Harris, Personal communication and visit to site.
10 A. Rust, *Die alt- und mittelsteinzeitlichen Funde von Stellmoor*, 1943.
11 B. Kurten, *Pleistocene Mammals of Europe*, London, 1968, 126-7.
12 D. Bramwell, "The Excavations at Elder Bush Cave, Wetton, Staffs.", *North Staffordshire Journal of Field Studies*, 4, 1964, 46-60.
13 Piggott in Jackson, *op. cit.*, note 1, 74-5.
14 Pottery in the Pig Yard Club Museum, Settle, Yorkshire.
15 Pottery in the Skipton and Bradford Museums, Yorkshire.
16 J. Tait, "Museum Notes: Neolithic Pottery from Northumberland", *Archaeologia Aeliana*, 4th series, xlvi, 1968, 275-81.
17 I. F. Smith, *Windmill Hill and Avebury, Excavations by Alexander Keiller, 1925-1939*, Oxford, 1965, 73-8.
18 S. Piggott, *The West Kennet Long Barrow. Excavations 1955-56*, London, H.M.S.O., 1962, 36-42.
19 R. E. M. Wheeler, *Maiden Castle, Dorset*. Reports of the Research Committee of the Society of Antiquaries of London, xii, 1943, 153-9.
20 T. G. Manby, "The Excavation of Green Low Chambered Tomb", *D.A.J.*, lxxxv, 1965, 13.
21 Pottery in the Lancaster Museum; J. W. Jackson, *Transactions of the Lancashire and Cheshire Archaeological Society*, xxxix, 1939, 273-4, fig. 12.
22 Pottery in the British Museum, and in the Heathcote Collection, Birchover, Derbyshire.
23 Pill, *Proc. Spel. Assoc.*, 1, 1963, 5-13.
24 Pottery in the British Museum.
25 J. Ward, "On Rain's Cave, Longcliffe, Derbyshire", *D.A.J.*, xi, 1889, 31-45; *ibid.*, xiv, 1892, 228-50; *ibid.*, xv, 1893, 161-76.
26 Information from J. H. Kelly, Stoke on Trent Museum, Staffordshire.
27 Kelly, *D.A.J.*, lxxx, 1960, 117-23.
28 S. Piggott, "Secondary Neolithic Burials at Church Dale, near Monyash, Derbyshire, 1937-39", *Proceedings of the Prehistoric Society*, xix, 1953, 229-30; J. A. Gilks, *D.A.J.*, xci, 1971, 38-40 (present volume).
29 P. Ashbee, *Archaeological Newsletter*, 5, 1954, 135.
30 D. L. Clarke, *Beaker Pottery of Great Britain and Ireland*, Cambridge, 1970, 478, no. 154. B. M. Marsden, "The Excavation of Bee Low Round Cairn, Youlgreave, Derbyshire", *Ant. J.*, 1, 1970, 190 & 204, fig. 7.
31 *Ibid.*, 66-7.
32 M. J. Fowler, "The Transition from Late Neolithic to Early Bronze Age in the Peak District of Derbyshire and Staffordshire", *D.A.J.*, lxxv, 1955, 72.
33 D. L. Clarke, *op. cit.*, 221.
34 S. Piggott, "Abercromby and After: the Beaker Cultures of British Re-examined", pp. 53-92 in I. Ll. Foster and L. Alcock (eds.), *Culture and Environment*, London, 1963 (see p. 89).
35 D. L. Clarke, *op. cit.*, 119 and 155.
36 J. Tait, *Beakers from Northumberland*, Newcastle upon Tyne, Oriel Press, 1965, nos. 40, 46, 49 and 68.
37 G. Jobey, "Excavations of Cairns at Chatton Sandyfield, Northumberland", *Archaeologia Aeliana*, 4th series, xlvi, 1968, 20-2, fig. 4, B1.
38 Sheffield Museum J93.864; M. J. Fowler, op. cit., 73, fig. 1.
39 Sheffield Museum N98; M. J. Fowler, *op. cit.*, 106
40 D. L. Clarke, *op. cit.*, 166 and 174.
41 *Ibid.*, 216 and 545.
42 G. Erdtman, *An Introduction to Pollen Analysis*, 1943.
43 G. W. Dimbleby, "Pollen analysis of terrestrial soils", *New Phytologist*, 56, 1957, 12-28.
44 D. W. Shimwell, "Pollen analysis of some podsolic soils on the limestone plateau of Derbyshire" (in press, 1973).
45 V. M. Conway, "Ringinglow Bog, near Sheffield", *Journal of Ecology*, 34, 1947, 149-81.
46 E. Neal, *The Badger*, Collins New Naturalist Series, 1948.
47 M. C. Pearson, "A pollen analytical investigation of a Bronze Age Barrow at Swarkeston", *D.A.J.*, lxxvi, 1956, 23-6.