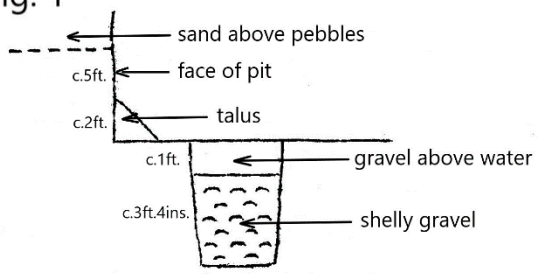
BULLETIN NO. 3

BATTISFORD RED CRAG 'DIG'

The primary purpose of the Geological Group excavation of 8 January 1967 was to expose and collect from the shelly Red Crag gravel recorded at Battisford (NGR: TM 061 538); previous literature on the site is given at the end of this article.

The excavation ('F' in Fig. 2) was in the "base of the pit. Water was struck at a depth of only one foot, hut fortunately the first shell fragments were found at about the same level; excavation into the shelly gravel continued for 3ft. 4in. below water level (Fig. 1), at which point baling and digging were reaching a state of equilibrium. A pickaxe was usefully employed on a thin but tough 'ironstone' layer near the base of the hole.

Fig. 1



Excavation of 8 Jan 1967. Shows that (allowing for talus) c.7ft. pebbly gravel is exposed above the base of the pit, giving a total of c.11ft.4ins proved (the base not being reached).

A provisional list of fossils found is given below-

<u>Bivalves</u>

Anomia sp.? (1)
Ostrea edulis
Pecten maximus (1)
Chlamys opercularis
C. harmeri
C. dubius? (1)
Glycimeris glycimeris
Venus casina?
V. sp?
Astarte obliquata
A. omalii
Woodia digitaria;
"Tapes" sp.
Cyprina sp.
Cardita senilis?
Cyclocardia sp.
Dosinia exoleta
Spisula sp
Mactra glauca?
Mya arenaria
Corbula sp.
Panopaea faujasii
Pholad
Mytilus edulis
Ensis sp.
Macoma obliqua (including double valves)
Tellina benedeni? (1)
Gastrana laminosa
Cardium edule
C. parkinsoni
C. interruptum?

<u>Gastropods</u>

Neptunia contraria N. sp. (dextral)
Nucella lapillus?
Natica sp?
Columbella sp? (1)
Turritella incrassata
Trivia sp
Emarginula reticulata?
Diodora aperta
Calyptraea- chinensis (1)

<u>Sponges</u>

Cliona (borings)

<u>Corals</u>

Balanophyllia calicula
Sphenotrochus intermedius (1)

<u>Bryozoans</u>

<u>Barnacles</u>

indet. valves

<u>Brachiopods</u>

Terebratula sp.

<u>Echinoids</u>

indet. spine

Vertebrates

Ray teeth
Wolf-fish teeth
Shark teeth, mainly odontaspid, but including Corax sp? (1).
Fish scale?
Bone fragments

Derived material

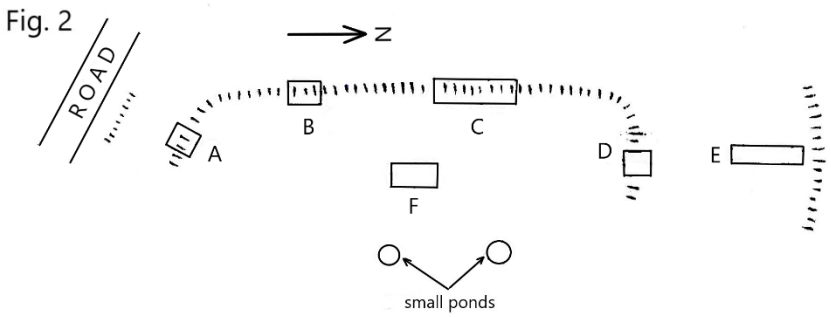
Sponge? in flint (1)
Cidarid spines
Echinocorys fragments
Inoceramus fragments (mainly as {beekite)
Belemnites (Gonioteuthis)
Ammonite chamber (phosphatised).

Boring (mollusc?) in phosphatic nodule

Most of the shells are broken. Neptunia contraria, Turritella, Glycimeris, Cardium spp., Astarte obliquata and Balanophyllia are common and characteristic. Several double valves of Macoma obliqua were found. "Tapes" fragments were unusually common, and the apparent absence of Nassa was noticeable. Of particular interest are the cf Corax tooth and the ammonite chamber (both rarities in the crag).

Most of the pebbles are flint, and phosphatic nodules are common. One large boxstone was found, but unfortunately broken at both ends by misplaced enthusiasm, and neither end collected; the centre portion measures c. 6" in length.

An investigation into the nature of the sand above the pebble bed was begun at E (Fig.2) but was abandoned due to lack of time.



The cold weather during the dig did not deter a hardy band of diggers (Messrs. C. & D. Butcher, C. Garrod, P. Grainger, M. Dix, S. MacFarlane, R. Markham, J. Norman & J. Walker, Mrs. Walker (and dog!) and the Misses S. Olley and K. Wagner. P.Madgett and two geological friends paid us a visit, as did the local Constabulary (what that gentleman thought of a dozen people digging in a disused, snow-filled pit I do not know; however, he seemed satisfied with our intent). Hot soup (chicken, and oxtail), cooked on the site, warmed us at lunch and tea, and together with an ingeniously devised plastic 'tent' and success with the excavation, did much to make cold feet, digging under water, and the snow storm so bearable.

I wish to thank Mr. T. P. Harwood for permitting us to dig on his property; also Mr. P. Laughlin for the door-to-door transport for many of us, Ipswich Museum for the use of equipment, the writer's father for supplying the soup and cooking utensils, and S. MacParlane for heating arrangements.

Notes on pit faces (from previous visits), see Fig.1.

A —coarse pebbles and sand; sharks and ray teeth, bone fragments, cheilostome bryozoans in hollows of flints, gastropod cast (?Neptunea / Nucella).

C —Chalky till on pebbles (with shark and ray teeth, bone fragments, casts of shells - Cardium, ?Spisula).

B —Till on pale yellow sand (a few inches only here) on pebble bed (see Fig.1.).

D —Pebbles; sharks (including Lamna obiqua) and ray teeth, bone fragments, cheilostomes.

Other fossils seen by the author are a rhynchonellid (derived) and two broken teeth which seem referable to Carcharodon; additional specimens already in Ipswich Museum are Chlamys ?tigerina, ?Isurus hastalis, also a mytilid (cast of double valve).

R. Markham

Previous literature:-

Cambridge, P., 1950. Trans. Suff. Nat. Soc., Vol.VII, Part II, p.66. Hascot, A New Crag-Pit. Fossils at Battisford.

At the foot of Hascot Hill, on the right of the road from Barking to Battisford, is a large excavation locally known as the Flint Pit and much overgrown by herbage. The basal six or seven feet of its face consist of fairly large water-rolled flints in a matrix of quite coarse red sand, with numerous small phosphate nodules similar to those found in the basement bed of the Red Crag, having associated teeth of Sharks and fragments of vertebrate bones. When digging in the lowest part of the pit last spring, I came across shelly sand, containing many complete mollusca and numerous debris of a typical Crag fauna; these resemble those of the Red Crag Basement Bed, excepting the much greater abundance of Cretaceous forms, the more worn condition of the derived Eocene fossils, and the total absence of Box-stones. They are: Neptunea contraria, Turritella spp., Arctica (Cyprina) sp., Astarte omali, Laj. and A. ?burtini, Cardium angustatum, C. ?parkinsoni and C. (Cerastoderma) edule, Chlamys opercularis, Thais (Nucella) lapillus, and Pectunculus glycimeris.

Spencer, H. E. P., 1951. The South-Eastern Naturalist and Antiquary, Vol. LV, p. xxvi. Geological Records. Suffolk -1 inch N.S.207; 6 inch 65 N.E.

Of the pit at Hascot Hill, mile S.E. of the Church at Battisford, P. G. H. Boswell remarks (Mem. Geol. Surv., Sheet 207)…there is much Crag detritus in the gravel". Further excavations made by P. Cambridge and the author showed the lower part of this deposit to be typical shelly Crag but abnormally stoney. The upper part of the pit consists of Chalky Boulder Clay with Glacial Sands and Gravel below, these resting on 11 ft. of pebbles with some harder Red Crag detritus (‘coprolites’, sharks and ray-fish teeth). The lower 2ft. is shelly becoming increasingly so towards the bottom which was not reached. The stoney nature of the Crag suggests the close proximity of the shore of the Red Crag Sea. The stoney Crag contains a few slightly rolled flaked flints which appear to be human artifacts.

Baden-Powell, D. F. W., and West, R. G., 1980. Proc. Geol. Assoc., 71, pp. 61-80. Summer Field Meeting in East Anglia. Report by the Directors

. ...a visit to the recently discovered beach deposits of the Crag sea... The section south-east of Battisford (62/063540) showed well-rounded flint shingle with very few other rock fragments of any kind, except for small phosphatic pebbles. As far as is known, this is the first time a shore deposit of the Crag sea has been seen in this area, and its height has been determined as about 150feet O.D. Mr. Cambridge said that as the lamellibranch Cardium angustatum has been found among other shells in the lower part of the deposit, it is unlikely to belong to an earlier stage of the Red Crag than the Newbournian. No mollusca were seen during this particular visit except one cast of Mactra sp., but derived teeth found by Mrs. E. M. Evans have been identified by Mr. Cambridge as belonging to the genera Myliobatis, Aetobatis and Lamna. Mr. Larwood has reported that members of the party also collected several specimens of Cheilostome Polyzoa' preserved in hollows in battered flint pebbles. These included Escharella immersa, three specimens; Amphiblestrum trifolium, eight specimens; and Electra sp., two specimens. One worn zoarial fragment may be assigned to Microporella sp.. Mr. Spencer said that pebble tools had been found here similar to those at Darmsden.

Spencer, H. E. P., Itinerary for Geologists’ Association Weekend Meeting at Ipswich, Whitsun 1965.

Battisford —.....The presence of polyzoan colonies encrusting pebbles proves the deposit undisturbed by ice. The beach formation rests on chalk and is buried under Glacial Sand and Till. Shells occur in the lower part of the bed and impressions of shells in the upper part proves its former

fossiliferous character. A considerable area of Crag sands are recorded from well bores west of Battisford which may have been an island in the Crag sea.

Spencer, H. E. P., 1966. Proc. Geol. Assoc., vol. 77, pt.3. p.371---'Field Meeting in the Quaternary of East Suffolk'

'...The Beach is buried below glacial deposits and consists of large well-rounded flint pebbles, some of which have encrusting colonies of Polyzoa still preserved. Hollows representing vanished mollusca were seen in consolidated ferruginous sand. Fragments of cetacean bones in a similar state of mineralisation to those from the Red Crag Basement Bed were found together with sharks' teeth, including one of Carcharodon megalodon, which was derived from the Miocene; also phosphatic nodules.

Spencer, H. E. P., 1967. Trans. Suffolk Nat. Soc., vol.13, pt.5, p. 290--- 'The Geological History of the Orwell-Gipping System'

'…Red Crag Sea, of which a remnant of the pebbly-beach deposit, about eleven feet thick and situated 150 feet above the present sea level, is preserved at Battisford (GR 061538). From well borings west of that parish, some of which appear to have over one hundred feet of Crag Sands, there seems to have been an island here in the Crag Sea.

...on the west side of the Hascot Hill valley.....where the pebble bed has been exposed to eleven feet. At the top of the bed impressions and casts of mollusca are poorly preserved but lowers down near the water table shells occur between the stones some of which retain encrusting species of polyzoa. Sharks' teeth and fragments of cetacean bone such as are found in the Crag Basement Bed sparsely occur.

The deposit is buried below glacial sand and Lowestoft Till. A well in the village penetrated ninety-five feet of glacial drift and about 100 feet of grey and green Crag Sands.'

INTERGLACIAL BEDS AT BEETLEY, NORFOLK

The 1964 discovery of richly fossiliferous 'interglaoial' beds at the Roosting Hills, Beetley, Norfolk, pit of the St. Ives Sand and Gravel Co. is of importance in deciphering the Pleistocene history of Central Norfolk.

	The following sequence was exposed in part of the pits;-	(thickness)
H	Greenish (greyish when dry) stony silt	c. 6ft
G	Pale-coloured sand	3-4ft
F	Black (grey when dry) silty sand	8-9in.
E	Pale-coloured, sub-angular sand and gravel	10in.
D	Black sand and gravel	7-8in.
C	Black (light grey when dry) organic silt	25in.
B	Grey-green (greyish when dry) silty sand, with stones and chalk pebbles	28in.
A	Coarse, yellow-orange sand and gravel	c.15ft. (max. seen)

In the northern part of the pit, the organic beds are absent, bed H apparently resting directly on A.

Typical cannonshot gravel is exposed in pits higher up the southern sides of the valley (a tributary of the River Wensum) in which the Beetley Beds occur.

Notes on Beds

B - fairly compact silty sand; large stones at base. Contains small angular and subangular flints, abundant small fragments of fairly hard chalk, Inoceramus fragment, fragments of wood (often slightly carborised) and small pieces of plant material.

C - organic silt, containing abundant small pieces of plant material and many fragments of non-marine molluscs. Pieces of conifer wood, often several feet in length, are common near the base; a fir-cone was found in situ in this bed. Fragments of plant stem (some flattened), seeds,

and pieces of moss are fairly common. There are many fragments of univalve and bivalve molluscs, but only a few have been found complete, mainly Ancylus and Planorbis spp.; operculae of Bithinia are very common. Ancylus and Bithinia are more characteristic of a body of water, preferably running. A few bivalve and one or two genera of gastropods have yet to be determined. Other fossils present include fragments of beetle elytrae and a few fish scales.

E - medium gravel. Wood fragment, a bone (part in bed E and part in bed F), and a bovid tooth (apparently from this horizon) were found during a Paramoudra Club excavation.

F - bones fairly common during Paramoudra Club excavation; shattered tusk of elephant, and rhinoceros tooth, found in situ. Small fragments of plant material are common, but do not approach the abundance as in the far less sandy bed C.

G - bones fairly common, including fragmentary long bones and ?rib. The bones from this horizon are spongy in texture and difficult to extract, quite unlike the condition of those in bed F, which are hard.

H - stony, silty sand, hard; stones generally fairly angular. A few small pieces of vegetable material. An astragalus (not in situ) may have come from this bed.

Some of the stony deposits, especially B and H, bear resemblances to certain deposits classed as 'till'.

Notes on fossils

Several mammalian species have been found

Hippopotamus amphibius Linne	Hippopotamus
Palaeoloxodon antiquus (Falconer and Cautley)	Straight-tusked elephant
'Rhinoceros' sp.	Rhinoceros
Cervus elaphus Linne	Red Deer
Megaceros giganteus (Blumenbach)	Giant Deer
Bovid, probably Bison sp.	Bison

Remains of hippopotamus are common (mandible, radius-ulna, scapula, tibia, etc.), those of elephant (upper molar, etc.) and bovid (fragment of horn-core, radius, teeth) less so, while rhinoceros (upper molar) red deer (frontal and antler bases) and giant deer (base of shed antler) are represented by only a few specimens. The giant deer antler is more heavily mineralised than the other fossils. Most of the bones are now in Norwich Castle Museum. It is suggested that the majority of these bones (most of which were found loose), because of their colour an hardness, have in fact been derived from horizon F where similar remains are found in place).

No microtine remains or artefacts have been found, to my knowledge

The many loose cones found on the spoil heaps seem most likely to have come from stratum C, from where one cone was in place, and in which conifer wood is common.

Some loose shelly blocks yielded bivalves, particularly Sphaerium.

Periglacial Action

Cryoturbation phenomena are seen below bed H., and a large frost wedge was found cutting down through bed F.

Notes on Sequence

The freshwater snails in bed C have already been commented upon; the quantity/ of well-preserved fir-cones and conifer wood shows the dominant trees of the neighbourhood.

Assuming the bulk of the recorded mammalian fauna to have come from horizon F, a temperate climate is indicated at this stage; the association of animals also suggests a partially wooded landscape (presumably deciduous).

Colder conditions after the warm phase are shown by the structures mentioned under 'Periglacial Action'.

Dating

The mammalian fauna is close to that recorded elsewhere from zone f of the Ipswichian interglacial (perhaps 1000,000 years ago). The presence of cannonshot flints and a basket-work patina flint in the pit also suggests a post-Gipping age.

R. Markham.

CELESTINE (STRONTIUM SULPHATE)

This mineral, although of unusual composition, is worked only on a small scale and at one place in Britain. Yate near Bristol, due to the small (now increasing) demand.

The celestine occurs as a nodular deposit in the red Keuper Marl (Upper Trias). The present exposures consist of small, shallow pits, since the mineral occurs only a. few feet below the surface. The so called "marl" (marl-implies a high calcium carbonate content) is in fact a sandy hematitic clay, mottled grey-green in places where the red hematite has been reduced by recent decaying vegetation. The celestine nodules are about one foot in diameter and occur as a fairly continuous layer. They are quite pure and no other evaporite salts occur in association. Most of the nodules are hollow, and contain well developed colourless crystals exhibiting the tabular orthorhombic form (identical in fact to barytes, barium sulphate). The mode of formation was presumably in a continuously evaporating enclosed sea, but the origin of such a large amount of strontium is difficult to imagine.

The distinguishing feature of strontium is the crimson colour it imparts to a flame, and hence its traditional use for distress flares and fireworks. Present industrial uses include the manufacture of certain plastics and paints.

P. Grainger.

NOTE ON 'WILLIAM'S PIT', CLAYDON.

A shallow pit, no longer dug; NGR: TM 135 491. A maximum of c.15ft. of chalk is exposed, covered by c.6in. of soil. The top of the chalk is shattered and disturbed; in the top one foot, small chalk blocks lie in many directions, and green-stained flints (Bullhead bed type) and small lenticles of sand may be found, showing the disturbed nature.

Fossils from the chalk here (collected by writer, or by students and seen by writer) are:- Sponge; Echinocorys sp.; Rhynchonellid; Ostrea vesicularis; fish scales; ?base of coral.

Of particular interest in this pit is a small channel in the S.E. corner? infilled with up to c.4ft. of more or less unstratified material, not unlike loose, crumbly, brown chalky till to look at; it contains abundant sub-angular chalk fragments, with a few angular flints and small rounded quartz (in the examined sample). Land gastropods are relatively abundant; most have still to be identified, but Ceciliedes acicula (Muller), a subterranean species which lives in calcareous soils, is quite common. One Ostrea was found in situ, and C. Garrod has found bone fragments and a piece of pottery, the latter showing the recent age of the deposit.

R. Markham.

SOME EXAMPLES OF RECENT INDURATION FROM THE NORFOLK COAST.

Whilst walking along the coast just west of Sheringham, I noticed what appeared to be a conglomerate resting on the Chalk at an anomalous level; on closer inspection, it proved to be a mass of metal bottle-tops, with a few pieces of wire and tin lids, cemented together with iron compounds and firmly attached to the chalk, a piece of which also came away when I hammered the specimen free. I left the "bottle-top conglomerate" for collection on my return when, alas, the tide was full, leaving me only this story to bring back!

Paddling in the sea at Mundesley during the month of January is not to be recommended, unless of course there is a "fossil skull" below low-water mark; on the occasion I tried this, an hour of hammering and tugging under water showed the "skull" to be remnants of wartime defences and beach pebbles firmly cemented together, very similar to the Forest Bed iron-pan. Though hardly worth the effort expended, the 'find1 is of interest in showing the rapidity of induration along this coast.

Most of the wood found in the local geological deposits is not heavily mineralised, and it may be that the mineralisation of many of the pieces found loose on the beach is of comparatively recent origin.

R. Markham.

(Gratefully reproduced from Norfolk Research Committee Bulletin 16 (1966)).

A FOREST BED HORSE JAW PROM PASTON, NORFOLK

In the collection of Dr. W. H. Miller of Mundesley is a fine mandible of horse, found on the beach at Paston; the state of preservation and adhering matrix leave little doubt as to its derivation from nearby Forest Bed deposit.

Most of the left side and portion of the right side are preserved. On the left side, the ascending ramus is missing; all six cheek-teeth are present, also the canine, but of the incisors, only I_1 is perfect, $_2$ and $_3$ being broken off below jaw level, On the right side, all the incisors are broken below jaw level; the canine and one cheek tooth (second premolar) are present, the jaw being broken off behind this.

Left side

Diastema length, I_3-P_2	113mm. (measured between base of teeth; difficult, as I_3 broken).
Length of cheek-tooth row, P_2-M_3 (grinding surface)	207mm. (measured from end of parastylid of P_2 to end of hypoconulid of M_3).
Length of premolar series (grinding surface)	108mm. (measured from end of parastylid of P_2 to outer edge of hypoconulid of P_4).
Height of ramus at P_4M_1	106mm. Height of ramus at centre of M_3 c.132mm.(min.)
Height of ramus at rear of M_3	c.147mm.(min.)

Right side

Diastema length I_3-P_2	c.115mm. (measured between base of teeth, at edge of socket; difficult, as I_3 broken

Adhering matrix obscures the metastylid-mesostylid valley in LM_3, LM_2 and LpM_4, but in the rest of the cheek teeth, it is close to the "U" shape of the caballine horses and is unlike the "V" of the so-called zebrine group. The parastylid of P_4 is obscured. The complete incisor shows the cup or 'mark' on the wearing surface.

I wish to thank Dr. Miller for permission to examine and note this specimen.

The grinding surface of the teeth is figured for the first time on page 25 of this Bulletin.

R. Markham.

(With minor alterations, the above note first appeared in Bulletin 16 (1966) of the Norfolk Research Committee; see "Notes on Three Mammalian Jaws from the Forest Bed", p.3.)

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(Bibliographical Material extracted by R. Markham)

THE BOURNE PARK TRENCH EXPOSURES

Account of trenches as seen by writer on July I7th and 24th 1967.

The trenches were seen in the northern area of Bourne Park, Ipswich, and appeared to be following the contours around a low hill. It appears that sewerage pipes were being laid.

The site was first visited on July 17th 1967 when the following sections were recorded;-

At point A (see diagram, page 14);-

Top soil	10ins	}
Soily rubble	1ft 10ins	} 4ft 2ins
London Clay	1ft 6ins	}

The soily rubble appeared to be hill wash and contained brick fragments and much organic matter.

At point B

Topsoil	8ins	}
Soily rubble	10ins	} 4ft 3ins
London Clay	2ft 9ins	}

At point C

Topsoil	8ins	} 6ft 6ins
London Clay	5ft 10ins	

In section at point C the hill wash was not seen and a much thicker exposure of London Clay was seen.

In all sections the upper parts of the London Clay had been contaminated to some extent by leached materials from the hill wash or topsoil.

On the 24th July 1967 the site was revisited and it was found that the trenches had been extended, the following section was recorded at

point D

Top soil	10ins	}
London Clay	9ft 0ins	} 10ft 9ins
Oldhaven Beds	2ins	}

The London Clay was seen to contain a layer of septaria 6ft from the surface.

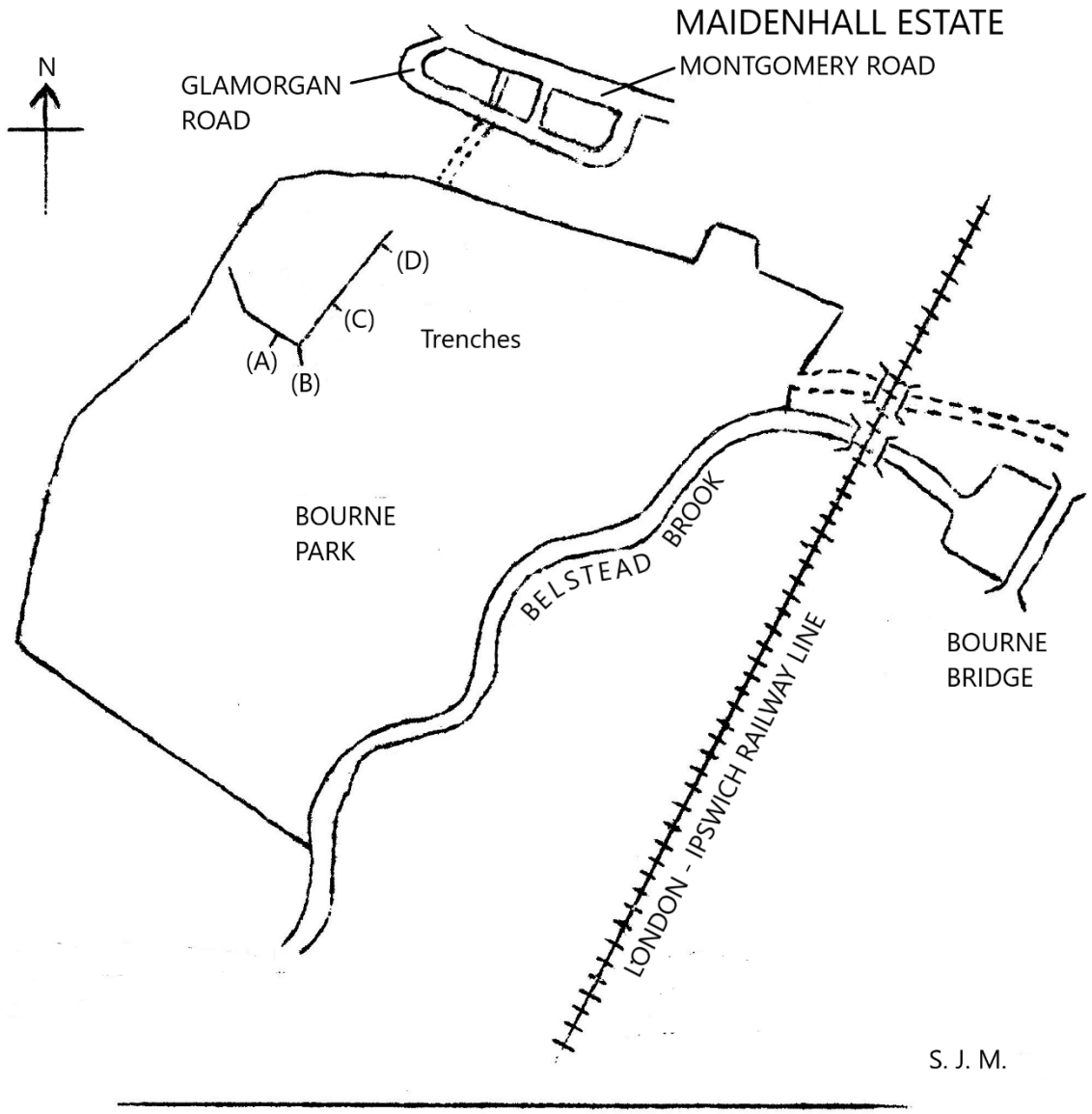
The layer below the London Clay consisted of a blue silty clay and is believed by the writer to be Oldhaven Beds.

No shell fragments were found but the deposit contained green nodules, Thanet remnants?, and several pieces of carbonised wood were seen.

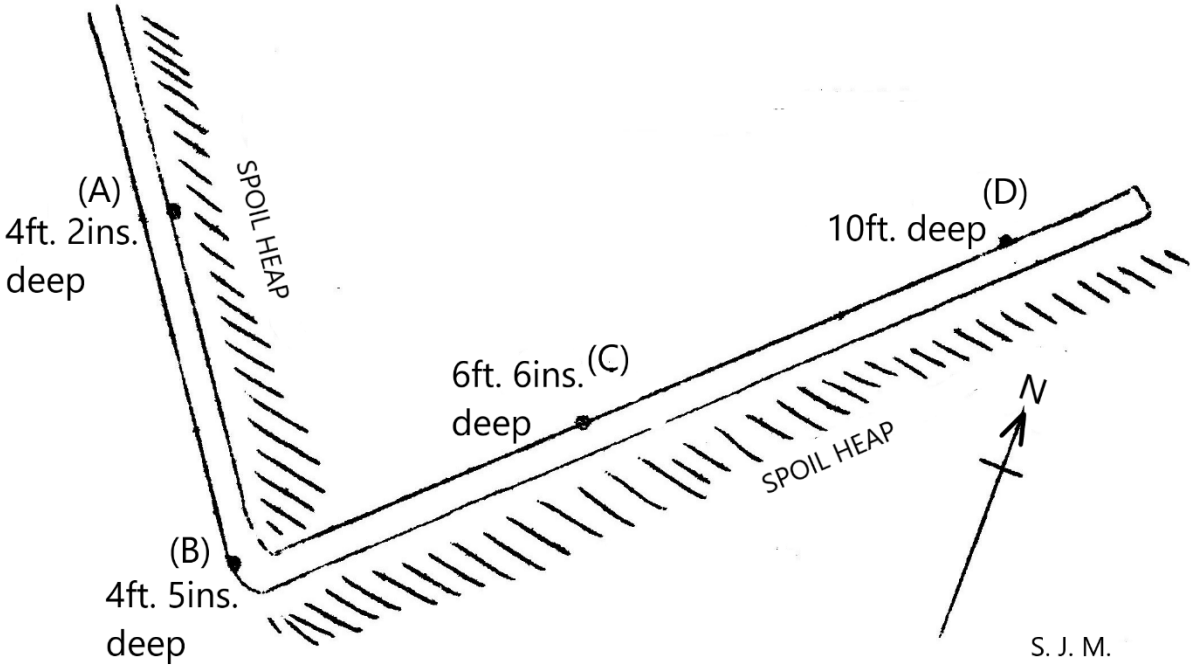
The writer expresses his thanks to Mr. L. Penning who first reported the site and to Mr. J. Norman who accompanied the writer on both visits to the site.

S. J. MacFarlane

GENERAL LOCATION OF SITE



THE TRENCHES



NOTE ON A DEFORMED ELEPHANT-TOOTH FROM THE FOREST-BED

The specimen (no. 1800, Norwich Castle Museum, Fossil Catalogue; R. J. Colman Collection) is from Corton, and is apparently a lower tooth ??? - RM/3 - (the grinding surface is concave, the plates are normal to the grinding surface, and the angle between the worn and the unworn crown is typical of lower teeth).

Plates are x17x; 6-4 cusps on unworn plates; posterior talonid small. No medial expansion of worn discs, but little worn.

Notes on worn portions;- the anterior talonid is on the buccal side; the first ridge (plate) is part in wear, part broken, with five conules (the two buccals being larger than the others). In the second ridge, the conules are worn down to form a plate; there is some complication on the lingual side - what appears to be either in part an intermediate conule between plates 1 and 2, or an extra enamel ridge between anterior and posterior portions of the enamel figure. There are two intermediate conules (in wear) on the lingual side of the tooth, between plates 2 and 3. The 3rd plate has six conules - the two buccal and two central conules being joined (in wear), and two separate enamel rings on the lingual side.

(see sketch on page 25)

All measurements are approximate-

Thickness of enamel	to 3mm.
Width of worn enamel of third plate	c.65mm. (c.2½ins)
Height of third plate (just in wear)	c.125mm.
(measured on buccal surface; would be greater on lingual surface in this specimen)	
Length of crown	c.351cm. (c.13¾ins)
Length-lamellae ratio	
-crown surface of tooth – 351/17½ = 20	
-about midway between base of plates and crown, measured on lingual surface (length c.10ins = c.255mm) = 255/17½ = c.14½.	
Lamellar frequency (no. of plates in 10cm. anteroposterior length)	
-measured on anterior portion of tooth	
-on buccal surface	5½-6
-on lingual surface	6-6½
-on crown	5

I wish to thank Mr. B. McWilliams for reading this note.

R. Markham.

The tooth has been previously mentioned by Dr. C. Wells, in Proceedings of the Geological Society of London, 1615, pp.52-55, published 22 June 1964, in which he says

'It is the molar tooth of an elephant, presumably Elephas antiquus, from the Forest Bed deposit near Corton, Suffolk, and now in the Castle Museum, Norwich. Its gross deformity leaves room for doubt as to whether it is an upper or lower tooth but on balance I think it is a 3rd. right mandibular. Its peculiarity is that it has been folded laterally on itself through almost 180 degrees. Not only does it have this longitudinal hairpin bend with the posterior half of the tooth lying beside and intimately applied to the anterior half of the buccal surface, but it is also twisted vertically so that the occlusal surface of the posterior half faces obliquely into the alveolus. There are about seventeen plates. The anterior three or four are moderately worn but their exposed conules show considerable asymmetry of attrition.

'There is no suggestion of caries or any other infection in this specimen and the recurved mass is certainly not a tumour. That the condition is developmental in origin seems certain, but it is difficult to decide whether it results from a genetic mutation or whether it was produced by injury to the germ plasm of the tooth …... it is not easy to visualize what dynamic process could produce this deformity. Nothing of the kind (Fractures) is present here but it is perhaps possible that an early fracture of the alveolus, with subsequent healing by dense callus, might have sufficiently impeded the process of formation and eruption to give this extreme deformity.

'This suggestion is far from unassailable……. What is,

possibly, an interesting secondary result is the presence of a lobulated, somewhat flattened, tumour in close association with its under surface. The precise nature of this must remain uncertain but it is strongly suggestive of an irregular odontome.'

(see sketch, page 24)

SUDBOURNE PARK CORALLINE CRAG DIG, 14 MAY 1967.

The object of the Geological Group's 'dig' in the shallow disused pit just north-west of Sudbourne Hall was to expose a section in the Pliocene Coralline Crag and to record the fauna, a preliminary list of which is given below-

BIVALVES
Arctica islandica
Pecten maximus
Chlamys opercularis
Chlamys tigerina
Chlamys harmeri
Pseudanmssium gerardi
Ostrea sp.
Anomia sp.
Venus casina
Venus imbricate
Venus ovata
Lucina borealis
Dosinia sp.
Ensis ensis
Corbula sp.
Nucula sp.
Glycimeris glyenmeris
Limopsis pygmaea
Cardita senilis
Cardita scalaris
Cardita corbis
Spisula triangulata
Spisula sp.
Circe minima
Cardium decorticatum
Astarte mutabilis
Astarte basteroti
Astarte burtini
Woodia digitaria
Arca lactea
Arca pectunculoides
Thracia inflata
Panopaea faujasi
?Hiatella
?Pitar
Hippagus cardiiformis

GASTROPODS
Turritella incrassata
'Natica'
Scalaria spp.
Emarginula reticulata
Diodora aperta
Calliostoma sp.
Ringicula sp.
Girdulus subulatus

SCAPHOPOD
Dentaliuur sp.

SPONGE
Cliona sp.

CORALS
Spenotrochus boytonensis
Spenotrochus intermedius

BRYOZOANS
Fasicularia
Trigonophora monilifera
Cellaria
"Cellepora"
Bryozoan spp.

BARNACLES

ECHINOID
Echinus sp. - test fragments and spines

BRACHIOPODS
Terebratula sp.
Lingula dumortieri

FISH
Ear ossicle
Shark tooth

It must be stressed that the above list makes no pretence at 100% accuracy, but is merely given as a guide to the 'dig' finds.

Chlamys opercularis, Anomia, Venus ovata, Cardita senilis, Spisula triangulata and Astarte spp. were the commonest shells; Limopsis pygmaea, Cardita senilis, Cardita corbis, Panopaea faujasi and Thracia inflata were found as double valves. Bivalve molluscs and Bryozoa formed the bulk of the fossils.

The author has also found, on previous occasions, - Chlamys dubia, Diplodonta rotunda, Gastrana sp., ?Mytilid and Astarte omalii, also an annelid tube.

On May 1967, four shallow holes were sunk in the northern part of the pit, one (A) at the edge of the pit, one (D) some yards to the south and in the lowest part of the pit, and two intermediate holes (B & C).

A:-

Soil	c.1ft. 2 ins.
Mainly non-aragonitic crag	4ft. 6ins.
Aragonitic – shell crag	1ft. 0ins.

a solution pipe, width 8 – 9ins., descended 3ft.+ into the 'mainly non-aragonitic crag'.

B:-

Soil	9ins.
Shell bed, with Cyprina (Arctica), etc	6ins.
Crag	4ft. 4ins.

C:-

Rather black crag	2ft 9ins. in-situ

D:-

water level reached at only a few inches depth.

Each hole had its point of interest – the decalcification stages in the upper part of A, the bed of large shells (Cyprina islandica, Cardita senilis, Astarte spp., etc) in B, the black)presumably manganese stained) crag in C, whereas apparently had the greatest variety of molluscs. The excavations were not correlated as to layers and levels.

Occasional isolated phosphatic nodules were found in the crag here, and thin but hard limestone bands are characteristic of the upper part.

The excavations were filled in at the end of the day.

Messrs. C. Campbell, M. Daynes M. Dix, C. Garrod, P. Kemp, S. MacFarlane, R. Markham, J. Norman, G, Ransome,, Mrs. M. Hawkings, and Misses. H. Belsher, A. Calver, M. Connor, J. Hauxwell, S. Hauxwell, S. Olley and K. Wagner were present as diggers and auxiliaries, and also managed to appreciate the delights of a large box of chocolates during the afternoon's heavy rain. Thanks must also go to Mr. Belsher and M. Dix for providing mass-transport, and C. Garrod for driving. Orford was at a convenient distance for shopping, and also enabled one member to display his musical talents, not perhaps to the overall approval of the others.

R. Markham

In a fairly recent paper by D. F. W. Baden-Powell (Geol. Mag. – full reference to be given in next bulletin), a list of Sudbourne Park shells is given; he gives the following which were not found on our dig –

Asrarte ?parvula	Turitella, 2 spp.
Astarte cf. pygmaea	Capulus sp.
Astarte triangularis	

He comments on the absence of Pseudomussium gerardii, a species found during our dig in holes A and D.

P. G. H. Boswell ("The Geology of the Country around Woodbridge, Felixstowe and Ipswich", Memoir of the Geological Survey, 1928) says, p.24, '…. Pit…. nearly ¼ mile north-west of Sudbourne Hall. About 12ft. of shelly sands are here seen. The surface is deeply excavated by solution-pipes, but the crag as a whole is free from decalcification and induration. The loose sands teem with mollusca and bryozoan, including fragile and small species of the former'. Fig. 6 shows solution-pipes in Coralline Crag, Sudbourne, but no scale is given.

C. Reid ("The Pliocene Deposits of Britain", Mem. Geol. Surv., 1890) says, pp28 – 29, '…. A large shallow pit in loose calcareous sands or marls which is extensively dug for making paths… the sand is full of well preserved mollusca. Large and perfect specimens of Cardita senilis and Cyprina islandica, often with the valves united, are abundant, and many fine specimens of Terebratulata grandis have been found. …A box of the sand was taken…. for more minute examination, but the results were somewhat disappointing, for the minuter forms of mollusca were scarce, though shells down to the size of

the smaller species of Cardita and Astarte occurred in large numbers. Scattered grains of glauconite were fairly numerous in the sand. Mr. Dalton observes that in this pit the surfaces of the thin irregular bands of limestone are covered with delicate bryozoa, indicating probably the contemporaneous deposition and solidification of the stone'.

OBSERVATIONS AT THE SITE OF ST. ALBANS SECONDARY SCHOOL, IPSWICH, August 7th 1965

At the time I visited this site the preliminary trenches had been dug and foundations and drainage pipes were being laid.

Some trenches had been concreted in but enough exposures remained for me to ascertain that the site rested mainly on red-brown coarse-grained sands and gravels with much flint all of which appeared to be water worn. I came to the conclusion these deposits were glacial and in fact the site is very typical of the area.

An interesting feature noted was that in some areas ??????? fine yellow sands were seen and in these areas solution pipes appeared to be numerous while they occurred far less commonly in the coarser red-brown sands.

In a trench at the eastern end of the site a lobe of very fine yellow sand was seen and unlike other areas of yellow sand, no solution pipes were seen. However, this area was some 5ft higher than the rest of the site and drainage from this area could explain the lack of solution pipes.

The site was previously agricultural and a topsoil of average depth 1ft 6ins was observed all over the site.

S. J. MacFarlane.

SOME MEAT EQUIVALENTS OF BONES FROM A ROMAN RUBBISH PIT

A semi-serious exercise resulting from the task of identifying bone fragments from rubbish pits of Late Roman age, Stonham Aspal, Suffolk.

As a light relief, it was decided to convert one of the boxes of meat bones into consumable meat, using the following formula

Weight of bone = c.7.5% of weight of each animal.

Utilizable meat = c.½ of total weight; somewhat more (c.70%) for short-legged animals (e.g. pig), somewhat less for skulls; lower legs taken as uneatable.

The box chosen contained the following weights of bone (skull and unidentified bone not counted).

Ox bones 3 lb.; Pig bones 10oz.; Sheep bones 2½ oz.

which, using the above data, may be worked out as a meat equivalent of (approx.)

20lb. beef, 5¾lb. pork and 11lb. mutton !

It may here be noted that several factors were not taken into account for this brief note.

I wish to thank Miss E. J. Owles for the use of her archaeological bone material.

R. Markham.

THE FOXHALL MANDIBLE

- a short account of a human jaw-bone allegedly found in the Red Crag over one hundred years ago and now unfortunately lost.

In 1855, a human jaw-bone was purchased by Mr. John Taylor, Druggist, of Ipswich, for 2s. 6d. (to secure a glass of beer) from an agricultural labourer, according to whom it was thrown out at Mr. Packard*s manure factory with coprolite carted from the pit at Mr. Laws farm, Foxhall, near Ipswich.

It appears that Taylor called the attention of Dr. Robert Hanham Collyer (an American physician (M.D.., Berkshire Medical College, Pittsfield, Massachusetts, U. S. A., 1839) apparently resident in London for many years) to the jaw, and Collyer visited the pit in 1855 immediately after the jaw bone was found, and ascertained that it had been worked for over a year, and that the jaw probably came from sixteen feet below the surface.

Taylor had possession of the jaw for nearly three months, before presenting it to Sir Thomas Beaver of Norfolk (Beaver's son was then staying with Taylor, and Sir Thomas exhibited great interest in the inquiry as to the antiquity of the jaw) in whose possession it remained until March 1857, when it was presented to Collyer.

In the same year (1857), Collyer took the jaw to Professor Queckett (then curator of the Royal College of Surgeons, London); Queckett showed it to Professor Richard Owen (the comparative anatomist) who kept it for two years without expressing any opinion. In 1859, Collyer submitted the Jaw to Professor Prestwich (geologist).

In April 1863, in consequence of Sir Charles Lyell's work on 'The Antiquity of Man', Collyer wrote to Professor Huxley (an advocate of evolution) a short history of the 'coprolite jaw'. Soon after, the jaw was exhibited at a meeting of the Ethnological Society of London (April 1863), the morning after the meetings Huxley called upon Collyer, pronounced the jawbone to be a "most extraordinary specimen" and took it away to hand to Professor Busk for examination. Huxley wrote to Collyer that the jawbone showed "some peculiar features", but not adequate to ascribe the bone to an extinct or aberrant race of mankind, and the condition of the bone is not such as I should expect a Crag fossil to be". Busk and Hugh Falconer (palaeontologists) took the jaw to Paris, and a statement appeared under their names in the Natural History Review, July 1863, p.37 ("An account of the proceedings of the late conference held in France to inquire into the circumstances attendant on the asserted discovery of a human jaw in the gravel at Moulin Quignon near Abbeville") which says (of the Foxhall jaw) "….retains portion of its gelatine, is infiltrated through and through with iron. The Haversian cords are filled with red oxide, and the section of the fang shows that the ivory is partly infiltrated with the same metal". Busk also wrote to Collyer "contains a great amount of iron, although still retaining c.8% animal matter".

In a letter dated 13 November 1866, Taylor wrote to Collyer from 97 Fore Street, Ipswich, giving details of the findings; the doctor was apparently then residing in Boulogne-sur-Mer, and still had possession of the jaw.

"The Fossil Human Jaw from Suffolk" by R. H. Collyer, appeared in the Anthropological Review, vol. V, no. XVII, April 1857, pp. 221-229, and the following is of interest-

'specific gravity greater than that of a recent bone of like size, infiltrated throughout its entirety with oxide of iron, surface presents peculiar metallic lustre..... its condition corresponds in every respect with the coprolites in whose contact it was found'. Collyer's article mentions a small portion filed off; on application of heat, emitted a slight odour peculiar to burnt gelatine.

The condyloid processes are 1½ins distant from the alae, and from the condyles to the posterior angular protuberance it recedes full 45 degrees, and the same receding angle is shown from the mentum ????prominens to the alveolar processes of the place formerly occupied by the incisor teeth; the alveolar portion of the jaw, where the incisor teeth were inserted, is closed, and the molar teeth worn down. The jaw was figured by Collyer (see Bull. p.25).

The Foxhall jaw is mentioned in Vol. II, on p. 616, of the Palaeontological Memoirs of Hugh Falconer, 1868;- "...although retaining a portion of its gelatine, is infiltrated through and through with iron. The section of the cortical layer is dark; oxide of iron is seen filling the Haversian canals; a dark crust of the same metal covers the walls of the cancelli; coarse grains of sand, with red oxide of iron, line the walls of the dental canal; and a. vertical section of one of the fangs of a molar shows that the dentine is partly infiltrated with iron..."

Dr. Collyer was a personal friend of the American craniologist Dr. Morton, of the Academy of Natural Sciences of Philadelphia, with whom he corresponded about the jaw.

Dr. Collyer registered (for practise) in England on 23 June 1868. His last known address was 199 Brompton Road, London S.W., which was his registered address in 1878, in which year his name lapsed from the Medical Register in consequence of this address having been found to be inaccurate.

This would seem to be the last known record of Dr. Collyer and of the Foxhall jaw.

An outline drawing of the Foxhall jawbone is given: on p.200 of A. Keith's

"Antiquity of Man", 1915., and he remarks that it is of "modern" type (p.224).

J. Reid Moir, in "Further discoveries of Humanly-Fashioned FIints in and Beneath the Red Crag of Suffolk" (Proc. Prehist. Soc. East Anglia, 1921, pp. 389-430, gives details of excavations at Foxhall Hall, in a pit just south of the Hall (once known as Mr. Law's Farm), and mentions that the chief reason which influenced him to carry out excavation was the Foxhall jaw. It is noted that the Geological Survey Memoir of 1835, "The Geology of the Country around Ipswich, Hadleigh and Felixstowe" mentions a nodule bed sixteen feet down from the surface; Moir then brings attention to Collyer's article of 1867. Moir then gives details of his excavations, photos of the pit, and notes on flints found. The Foxhall jaw-bone was evidently not in the highly mineralised condition of the majority of the bones found in the sub-Crag detritus-bed. A quantity of bones, in fragmentary condition (and unidentifiable) wore found during Moir's excavations, and the vast majority did not exhibit the advanced state of mineralisation such as is exhibited by many sub-Crag specimens. Two classes of bone were recognised by Herepath (Survey Memoir) - (a) very frangible and (b) very solid. Moir had a representative sample of Foxhall 16ft. level bones analysed –

Moisture	3.05 – 3.75 % by weight
Organic matter	5.55 – 6.50
Phosphate of Lime	62.41 – 67.91
Phosphoric Acid	28.59 – 31.11

and suggests that the condition of the Foxhall jawbone was originally probably compared with the heavily-mineralised class b type, and that the c. 8% organic matter of the jaw compares well with the up-to 6½% of the above analysis. The "peculiar metallic, lustre" of the bone surface (as mentioned by Collyer) was found by Moir to be characteristic of many localities, but especially of the Foxhall 16ft. level. Moir reminds us that acceptance of even Early Palaeolithic flint implements was, in 1857 by no means general. Moir placed advertisements (with the intent of finding the Foxhall jaw-bone) in various newspapers and other journals, but these failed to bring it to light; he says there is reason to believe that Collyer returned eventually to America taking the Foxhall jaw-bone with him.

Similar details to above are contained in "The Human Jaw-Bone found at Foxhall, Suffolk, England" by J. Reid Moir (American Journal of Physical Anthropology, Vol. VII, No. 4, Oct.-Dec, 1924, pp.409-420), in "The Pliocene Man of Foxhall in East Anglia" by Professor Henry Fairfield Osborn (Honorary Curator, The American Museum of Natural History) (Natural History, Vol. XXI, Ho. 6, Nov.-Dec. 1921, pp.565-576) (he mentions that the "jaw apparently had a prominent chin), and in "'Man Rises to Parnassus" by H. F. Osborn, (Princetown University Press, 1927).

Aleš Hrdlička, in "Critical Notes on the Foxhall Jaw", American Journal of Physical Anthropolgy, 7, p.420-424, 1924, says –

"c.8% organic material" - by weight doubtless; dry fresh human bone - a little over 30%; Foxhall jaw considerably infiltrated with iron and to that extent heavier. Discounting the iron, the true proportion of animal matter to bone must have been materially higher than 8%. "Condyloid processes are 1½ins distant from alae" – 'alae' no doubt coronoid processes: - in published figure, distance from tip of coronoid to uppermost point of condyloid process is 1½ins, - illustration of jaw is true size; size in range of recent jaws. Rather wide angle - originally determined as female; such an angle found now and then in males. Development of condyle of ascending ramus, strength of chin, and height of horizontal branch, - male. Dimensions (as far as may be measured from illustration) –

Horizontal angle (most prominent point of chin to most posterior point of the angle)	8.75cm.
Minimum breadth of ascending ramus	3.1cm.
Height of ascending ramus	c.5.7cm.
Height at symphysis (alveolar process damaged)	c.3.5cm.
Alveolar length (from anterior edge of ascending ramus to furthest point on the alveolar process forward)	5.25cm.

The measurements, especially that of alveolar process; moderate size of teeth; prominence of chin (further witness to shortening of dental arch) - all comparable with recent white male.

In "Prehistoric Archaeology and Sir Ray Lankester" (1935). J. Reid Moir says "So far as was ascertainable, Dr, Collyer had evidently left

England and had died in America, but while Prof. H. F. Osborn and the editors of the Scientific American made every effort to find where Collyer died, these efforts came to nothing."

Loren G. Eiseley, in "A Neglected Anatomical Feature of the Foxhall Jaw", Transactions Kansas Academy Science, vol.46, 1943, pp.57-59, notes "that the drawing of the left side of the mandible shows three foraminal openings (rare in Homo sapiens). 'The sapiens nature of the find, the pronounced character of the mental eminence (accentuated, however, by the age of the individual and loss of the lower incisors in life). Line engraving of jaw is of left side of mandible, and shows three foraminal openings several mm. apart and arranged in a sort of triangle; two large openings located respectively under Pm1 and Pm2 and the third, somewhat smaller and, unlike the other two, directed forward.

Dental foramina;- Lower Primates - multiplicity of foramina; Higher Anthropoids - tendency towards multiple foramina, though condition variable; Sinanthropus - opening consistently multiple, ranging from two to as high as five foramina; Heidelberg jaw - three foramina on right side, two on left; Neanderthal specimens (including Mount Tabun material) - generally characterised by two foramina; Mount Carmel Skul types (which approach sapiens in many diagnostic features) characterised by single foramin marking typical condition in sapiens; Homo: sapiens - single foramina is the rule, the opening ordinarily lying just beneath Pm2; condition varies -quite a number of sapiens mandibles show 2 foraminal openings, at least on one side - in such cases the association of the two openings is often close, sometimes little more than dividing sliver of bone across what would otherwise be a single opening; three openings - decidely rare. Simenton, F. V. (1923) - none In Caucasian material examined, but single ????? instance each amongst his American Indian and negroid material. Statistical chances involved in the discovery of an individual with triple mental foramina at Foxhall; 3 foraminal openings have an incidence of 0.19%. More than three openings have never been observed in modern man. One wishes both sides of the jaw had been illustrated so that there would be the possibility of comparison. ?one of the "peculiar characters" referred to by Huxley 1863.

In the Daily Mail of 25 February ?1948, Dr. T. T. Paterson was claiming sub-Crag workshops at Sheringham and said he was going to watch for bones, but that first he would "try to locate 8 inches of bone found over 100 years ago and taken to America by an emigrating English doctor. It may be the jaw of the 'Man of the Dawn".

H. E. P. Spencer, in "The Contemporary Mammalian Fossils of the Crags".*, Trans. Suff. Nat. Soc., Vol.12, Part 5, pages 333-344? says "...the condition of the bone as described closely resembles that of the true Crag fauna (i.e. the contemporary fossils), to which in all probability the Foxhall jaw belongs."

"The Foxhall Man" by H. E. P. Spencer appeared in the East Anglian Magazine, April 1965; is noted that the Red Crag was thought to be Pliocene at the time of the discovery of the jaw, and that it is now classified as Lower Pleistocene. Mr. Spencer also mentions that 'As early as 1846 the Rev. Professor Henslow expressed the view that it was the less mineralised bones from the Crag which were the true fossils of the period. As a result of the newest discoveries..... in Africa, authorities on the evolution of man's ancestry will have to reconsider the problem of Foxhall Man.'

It is hoped that the above notes have extracted some of the more factual material about the Foxhall mandible. Until similar material turns up (in beds of similar age), or until the original jaw is found for modern critical analysis, the true age and origin of this famous specimen will no doubt continue to fascinate and tantalise the student of such matters.

Extracted by R. Markham.

AN AUGER TRAVERSE NEAR BLACKSMITHS CORNER, BELSTEAD.

The following article is an account of trial geological mapping carried out by the writer and Mr. J. Norman: on the 28th, May 1967.

The area augered was a small valley (now mainly dry) near Blacksmiths corner, Belstead (see map, p.23).

Samples recorded were from full auger depth (2ft 6ins). An auger was used since the area is lightly wooded and very few exposures were observed.

The first auger line was taken parallel to the main valley across a small secondary valley at right angles to the main valley (this second valley is not marked on O.S. sheet 150).

Line (A) approx. 60 yds. Long.

Distance between auger holes	No. of auger hole (see diag.)	Deposit found	Difference in height of land
	(1)	coarse gritty deep orange sand	
15 yards	(2)	orange brown fine loam	4 ft drop
10 yards	(3)	brown soily clay	4 ft drop
15 yards	(4)	coarse soily brown sand	5 ft rise
7 yards	(5)	stony brownish sand (much flint)	3 ft rise
10 yards	(6)	orange sand (pure)	3 ft rise

A second auger line was made at right angles to the first and this line was carried across the main valley and in a curve through the wood (mixed woodland) on the south west side of the main valley.

Line (B) approx. 400 yds. long

Distance between auger holes	No. of auger hole (see diag.)	Deposit found	Difference in height of land
	(1)	this is no. (6) of line (A)	
15 yards	(2)	orange sand (pure)	3 ft drop
10 yards	(3)	light brown loam (very wet)	5 ft drop
15 yards	(4)	gritty soil only	6 ft drop
15 yards	(5)	brickearth/alluvium	6 ft drop
25 yards	(6)	brickearth/alluvium	no change
8 yards	(7)	brickearth/alluvium	no change
2 yards	(8)	sandy loam (light yellow)	5 ft rise
8 yards	(9)	sandy loam (more orange)	4 ft rise
20 yards	(10)	sandy loam light yellow	6 ft rise
50 yards	(11)	sandy loam light yellow	no change
70 yards	(12)	sandy loam light yellow	no change
100 yards	(13)	sandy loam light yellow	8 ft drop

Holes (8) and (13) were in thick woodland. A very marshy stream ran between holes (5) and (6). Hole (7) was in a dry stream bed.

The distances in the last column are the differences in vertical distance between one hole and the next (these were estimated).

The writer expresses his thanks to Mr. J. Norman for his valuable assistance with this map work.

S. J. MacFarlane.

NOTES FOR BEGINNERS

Introductory literature and sites to visit are the chief requests of many people, and it is hoped that the following may be of some use –

B00KS & MAPS

"Fossils" By F. H. T. Rhodes, H. S. Zim and P. R. Schaffer, 5s. 0d

"Rocks and Minerals" by H. S. Zim and P. R. Schaffer, 5s. 0d

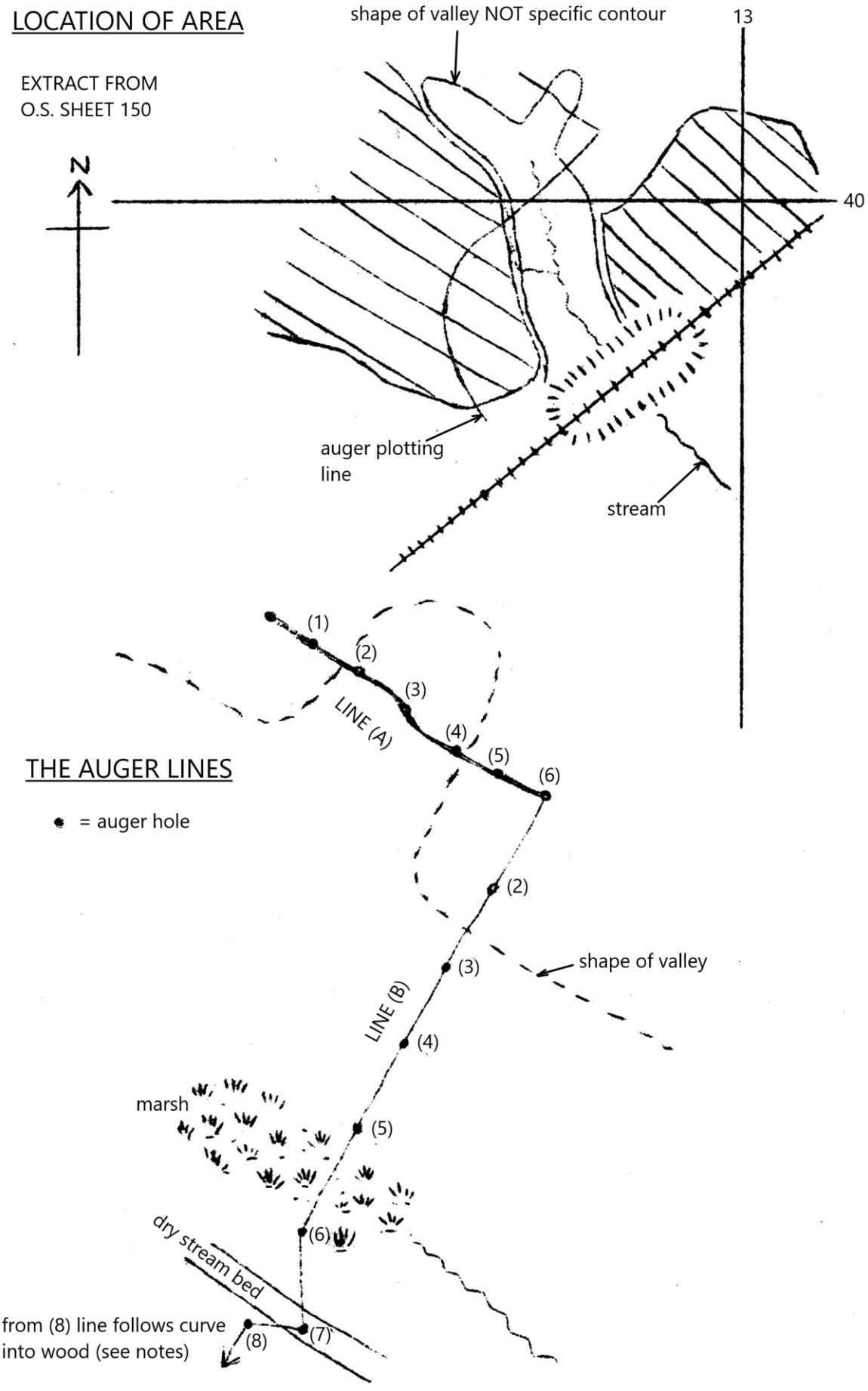
Both published by Paul Hamlyn, London, they contain a great deal of information, are in colour, and inexpensive.

"East Anglia and Adjoining Areas" by C. P. Chatwin "London and Thames Valley" by R. L. Sherlock - British Regional Geology Series (Geological Museum, London); c.6s 0d

good introductory books to the geology of the areas mentioned;

(continued on Page 24.)

LOCATION OF AREA



Explanations of Illustrations, page 25.

Left - grinding surfaces of teeth of horse-jaw from Forest-Bed, Paston (see p.7.)

LpM_2^ - left pre-molar, lower second, etc.

IM_1 - left molar, lower first, etc.

I - incisor.

Right, top: - grinding surface of deformed elephant-tooth (see p.15)

T – talonid; 1, etc. - nos. of plates,

(not to scale)

Right, centre:- diagrammatic view of deformed elephant-tooth (see p.16)

- after drawing in article by C. Wells (Proc. Geol. Soc.), reduced.

Right, lower:- the Foxhall Mandible (see p.20)

- after drawing in article by J. Reid Moir (Proc. Prehist. Soc. East Anglia) (after R. E Collyer).

(Notes for Beginners, continued from page 22)

Geological Maps (Geological Survey;-

25 miles to One Inch, British Isles. c.3s 6d.

One inch to one miles - Sheet 206 – Sudbury

207 – Ipswich

208 & 225 - Woodbridge & Felixstowe. c.5s 0d each

British Museum (Natural History) publication;-

"British Caenozoic Fossils" 6s 0d - illustrations of Crag and Eocene fossils) two very useful

"British Mesozoic Fossils" 12s 6d - illustrations of Chalk and Jurassic fossils) books for fossil

) identification.

"Man the Toolmaker" by K. P. Oakley c.4s 0d - for flint implements.

"Instructions for Collectors, no. 11. Fossils, Minerals and Rocks" 1s 0d

SOME CLASSIC LOCALITIES TO VISIT: -

Essex:-

Walton-on-the-Naze cliff, NGR: TM 2625, - London Clay, Red Crag, coast and erosion features

Suffolk:-

Stutton cliff, TM 151330, - London Clay, Stutton Brickearth, estuary features.

Battisford, Stone Cottages pit, TM 061538, - pebbly Red Crag.

Creeting Hill, Creeting St. Mary, TM c.094555, - Sands, Gipping Glaciation deposits.

Great Blakenham (Mason's Pit) TM 113800,- Chalk, Lowestoft and Gipping Tills, glacial features.

Bramford ('Coe's Pit'), TM 130482, - Chalk, Thanet and Reading Beds, Red Crag (non-shelly), Gipping Till.

Bawdsey cliff, TM 345385, - London Clay, Red Crag, coastal features.

Sutton, Pettistree Hall, TM 304440, Coralline Crag.

Butley, Neutral Farm, TM 372511, - Red Crag.

Chillesford, Church pit, TM 383523, - Chillesford Crag, Chillesford Clay.

Sudbourne Park, TM 407514, - Coralline Crag.

Aldeburgh brickworks, TM 454571, - Coralline Crag, Pleistocene Crags.

Easton Bavents cliffs, TM 514773 to 518792, - Norwich Crag, Baventian Clay, Westleton Beds.

Corton cliffs, - Cromer Forest Bed Series, North Sea Drift, Corton Beds, Lowestoft Till.

Hoxne brickworks, TM 175767, - Hoxnian Beds.

Norfolk-

Caistor St. Edmund, TM 238046, - Beeston Chalk, Norwich Crag gravels.

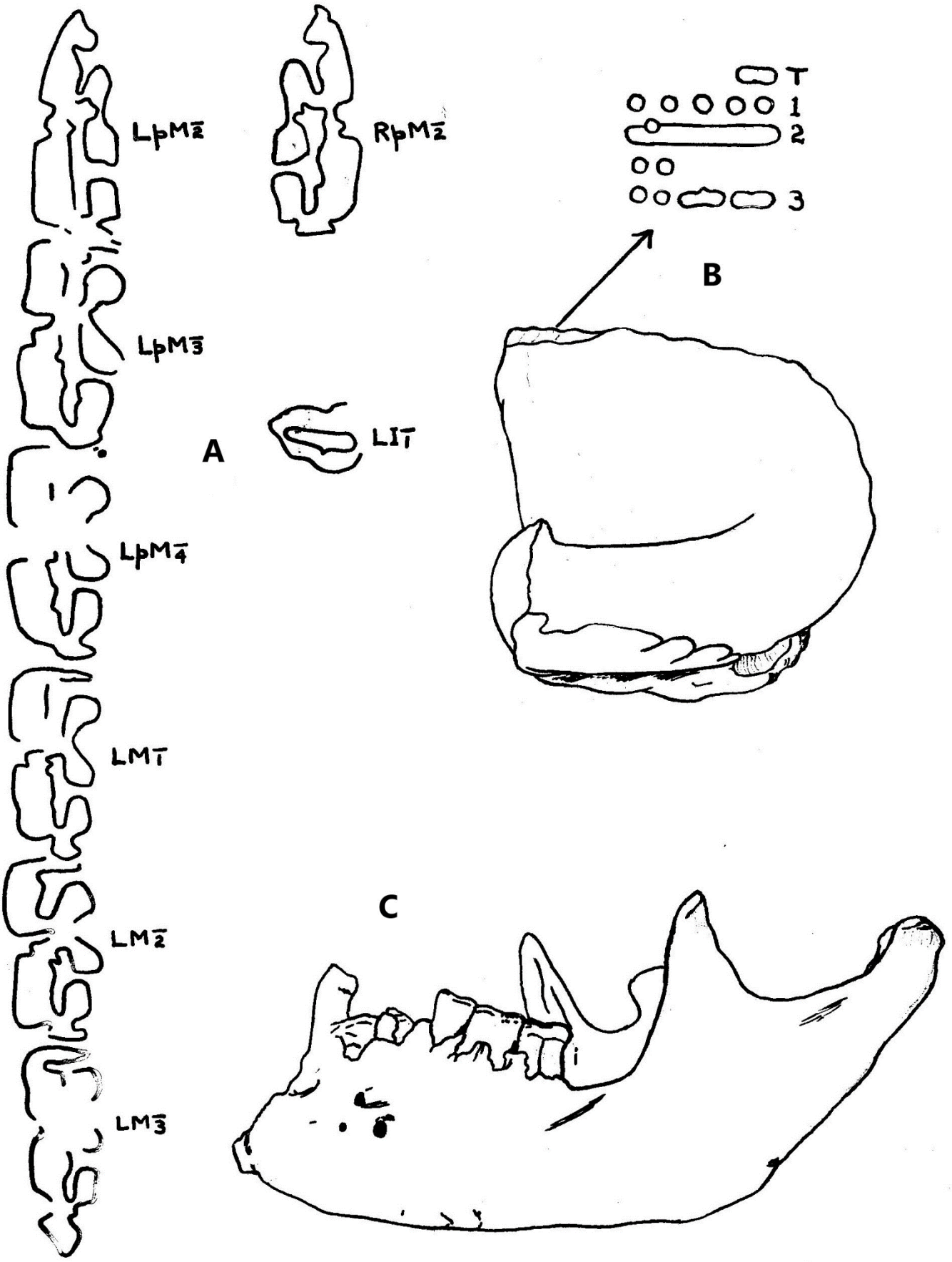
Bramerton, TG 295060 & 299061, - Norwich Crag.

Mundesley cliffs, TG 3253579, - Cromer Forest Bed Series, Glacial Deposits.

West Runton cliffs and foreshore, TG 185432, - Lower Chalk, Cromer Forest Bed Series, Glacial deposits.

Hunstanton cliff, TF 675420, - Carstone, Red Rock, Lower Chalk.

(grid refs. not checked)



see page 24 for explanation

COMMENT, AND NOTES ON 1966-1967

The Geological Group publications and fieldwork meetings of the last year (1966-1967) may perhaps be said to have had their conception in the mid 1950s, when the writer, then at school, first began his serious study of the geology of the Ipswich area, encouraged by, among others, Mr. H. Spencer, then of the Ipswich Museum. Soon after, Colin Hawes and Chris Allen, occasionally with others, were to join in fieldwork, two of the most important 'digs' being at Beggars Hollow, Ipswich (Summer 1960) and Tattingstone (April 1963). The matter of starting a local geological publication was considered in the early 1960s, but was prevented by several difficulties/

In 1965, on becoming based at the Ipswich Museum, the writer was soon to gather a keen group of 'diggers' -John Norman, S. ('Mac') MacFarlane, Peter Grainger, Claude Garrod and Miss S. ('Olley') 0lley forming the nucleus, occasionally joined by others. Three of the activities which were to point to the future pattern were –

Sat. 19 - Mon. 21 March 1966 - Dr. P. Norton's 'dig' at Aldeby.

Sun. 24 April 1966 - coach-trip to Hunstanton and Sandringham Warren (with Mr. Hawes's school group).

Sat. 28 May 1966 - Paramoudra Club (Norwich Geological Group) fieldtrip to Gipping Valley (Bramford, Claydon, Creeting, Great Blakenham, Battisford), led by Mr. Spencer; local enthusiasts participated by kind invitation of the Paramoudra Club.

Publication started in the Summer of 1966, and since then the following: have appeared –

Newsletters nos. 1 (18 June 1966, - 3 pages), 2 (10 August 1966, - 1 p.). 3 (3 November 1966, - 1p.), 4 (30 December 1966, - 1p.), 5 (11 April 1967, - 1p.), 6 (14 June 1967, - 1p.).

Bulletins - no. 1 (August 1966, published Sept. 1966, - 27pp.), no. 2 (February 1967, published March 1967, - 22. pp.).

Finance of publications, June 1956 to May 1967 –

Expenditure	£	s	d
Postage, Newsletters 1-5	1	19	2
Postage, Bulletins 1 & 2	1	1	0
Envelopes, Newsletters 1-5		9	5
Envelopes, Bulletins 1 & 2		7	0
Stencils, Newsletters 1-5		7	0
Stencils, Bulletins 1 & 2	2	2	0
Duplicating Ink		16	6
Duplicating Paper	4	14	3
Paper fasteners		10	4
	£12	6s	8d

(Typing, duplicating, time, labour, certain postages, - not charged above)

Income	£	s	d
Subscriptions	11	3	0
Bulletins purchased		15	0
Donation		8	8
	£12	6s	8d

(The income and expenditure figures were checked by J. Norman and R. Markham

Meetings have been –

Wed.	22 June	1966	Church Lane pit, Claydon	(evening)
Fri.	15 July	1966	Tuddenham St. Martin	(evening)
Sun.	31 July	1966	Levington Creek	
Sun.	14 Aug.	1966	Harkstead	
Sat.	20 Aug.	1966	Bramford	(evening)
Sun.	13 Nov.	1966	Bramford old brickyard	
Sun.	8 Jan	1967	Battisford	
Sun.	14 May	1967	Sudbourne Park	

Fieldtrips on which group members have been invited were -

Sun.	3 July	1966	Sudbourne, Butley, Sutton, Waldringfield (coach -Conchological Society)
Sun.	16 July	1967	Sudbourne, Butley, Sutton, Waldringfield (Essex Field Club, Geology Group)
Sat.	22 July	1967	West Runton (Conchological Society

Finance of coach trips has been disappointing. The joint fieldtrip of 3 July 1966, because of a number of people not turning up, made a loss of £1 10s 0d. which had to be made up by private donation. Proposed fieldtrips (by coach) to Sevenoaks, and (joint fieldtrip) to Suffolk Crags have had to be cancelled.

From a study of the yea's events and from comments received, the activities of the next year will be directed at

(i) - continued publication of the Bulletin, the object being to encourage interest and research into local geology. Students in particular can use this as a medium to start their scientific and literary careers (it's really quite easy'.) in the form of short notes. Professionals can give valuable help in the form of articles.

(ii) - concentration of the Group's own field activities on two or three 'research digs'; these have proved useful and popular in the paste Individual studies will be encouraged. We have been invited to participate in a joint field-meeting (to the Waveney Valley) in the near future; meetings of this type enable a welcome enlargement of our programme from time to time.

(iii) - production of the newsletters to inform members of local geological activities. Several local Societies hold geological lectures and fieldtrips, and it is policy to encourage these by advertising them in our newsletter.

Subscription is 10s 0d. for one year.

Articles appearing in the first two Bulletins were

<u>No. 1 (August 1966)</u>

Spencer, H. E. P. "Geographic and Geological Notes on the Ipswich District" p. 1-3.
(Agas, R. reprint) "An Account of Dunwich in 1589" p.4.
MacFarlane, S. J. J '"The Crag Exposure to the West of the Water Tower on Rushmere Heath" p.5-7.
Markham, R. A. D. "Marsupites from the Gipping Valley Chalk" p.6
Markham, R. A. D. "Note of some Crag fossils in the Museum of the Geology Department of Birmingham University" p. 6.
EX. "Illustrations of Common Crag Molluscs" p. 8-10.
Holcombe, C. "Section through junction of Red and Coralline Crags, "The Rocks" Ramsholt" p.10-12.
EX. "BibliographysParamoudra Club Bulletin" p.11 & 13.
(Frere, J, reprint) "Account of Flint-Weapons discovered at Hoxne in Suffolk" p.14.
(Smith, W, reprint) Extracts from "Strata identified by Organised Fossils" p.15.
EX. "Bibliography: Proceedings of the Prehistoric Society of East Anglia" p.16-19.
Allen, C. "Fossils collected from the London Clay, 1968" p.19-20.
EX. "Simplified Table of Local Strata" p.20.
Markham, R. A. D. "An Excavation in the Coralline Crag at Tattingstone" p.21-23.
Markham, R. A. D. "Waldringfield Crag" p.24-25.
Markham, R. A. D. "Notes on Weavers Pit, Tuddeniiam St. Martin" p.25-27.

<u>No. 2 (February 1967)</u>

EX. "Fossils Recorded from the Gipping Valley Chalk" p.1-3.
Markham, R. "Fossils from the Gipping Valley Chalk, and a Note on the Zones" p.3-4.
Allen, C. "Chalk in the Orwell Valley" p.4.
EX. "Bibliography -Transactions of the Norfolk and Norwich Naturalists' Society" p.5-7.
EX. Bibliography - W. G. Clarke" p.7.
EX. Bibliography - Proceedings of the Prehistoric Society" p.8-9.
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(EX. = extracted by the editor)

R.M.

GEOLOGICAL GROUP, IPSWICH. BULLETIN NO. 3. AUGUST 1967.
Editor, R. A. D. Markham, c/o The Museum, High Street, Ipswich, Suffolk. The editor wishes to thank the people who have made this bulletin possible - contributors, subscribers, duplicator, and Ipswich Museum for facilities granted; stencils typed by editor. It has been again necessary to hold over the notes on the Church Lane, Claydon, pit. Permission to visit pits and sections should always be obtained from the owner or occupier of the land.