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A REVIEW OF THE CHILLESF0RD BEDS

INTRODUCTION AND HISTORIC BACKGROUND

The pit behind the church at Chillesford, Suffolk (grid ref, 382523| on O.S. one-inch shoot 150) is the type locality for the Chillesford Beds, which form a sinuous outcrop pattern on G.S. one-inch sheet 208. The section shows an unfossiliferous brown/ grey laminated micaceous clay (Chillesford Clay), which overlies a series of loams and crags (Chillesford Crag), in turn resting on the Red Crag. The main problems in dealing with the section have been concerned with the stratigraphic position and continuity of the Chillesford Clay, the connection, between the Red Crag and Chillesford Clay - that is, the interpretation of the Chillesford Crag, and the environments of deposition of the Chillesford Crag and Clay.

The pit was first described by Prestwich (1849), who said that the Chillesford Beds were approximately 20 feet thick, and lay unconformably above the Coralline Crag and Red Crag. Because of the abundance off muscovite flakes (compared to the Red Crag) and presence of many lamellibranchs with the valves still together (compared with the broken shells in the Rod Crag), Prestwich considered that the Beds were of a distinct mineralogical and palaeontological character, and the argillaceous structure indicated tranquil accumulation. He concluded that the deposits were a deep water facies of the Norwich Crag. Fisher (1866) considered that the Chillesford Bods underlay the Norwich Crag.

The heavy mineral assemblage of the Chillesford Crag does not vary a great deal from that of the Red Crag, there being a dominance of the metamorphic minerals garnet, andalusite, staurolite and. kyanite. The source area is thus accepted to be the Ardennes, since that is the nearest area with such an assemblage. However, the sand grains are less well rounded, than the Red Crag, and have a smaller average diameter, (0.15 mm compared to 0.20mm).

Most of this older work was interpreted by Harmer (1901) as indicating that the Chillesford. Clay was formed as the estuarine deposit of an ancient Rhine distributary - the estuary opening to the north and the sediments thus forming a sinuous outcrop. However, this conclusion seems to have been based, on the correlation of several outcrops of "clay with mica" lithologies comparable to the Chillesford Clay, on the assumptions that the different outcrops were at the same stratigraphic horizon, and that the post-depositional erosion has been negligible (which would have altered the outcrop shape on the map). It has been proved, partly by boreholes, that several horizontally discontinuous "clay with mica" lithologies are developed in the Norwich Crag, at different horizons.

Downing (1959) recognised the existence of more than one clay bed, and also said that there was no evidence for a channel, but for marine/estuarine conditions during deposition. MacFadyen's (1932) work on foraminifera led to his conclusion, that the environment was one of a rather cold, shallow sea, perhaps somewhat brackish. Funnell (196I) states that the unique mollusc and foram fauna suggests an interglacial type of climate, and tidal flat/ lagoonal environs during deposition. But the specialised character of the fauna means that a correct stratigraphical position, is indeterminable (for example, the Chillesford Crag forams indicate a climate warmer than that during Norwich Crag times). Funnell concludes (in my opinion correctly) that the term "Chillesford Clay" should, be restricted to the formation, in the type area only, there being no evidence for correlating the Clay with any other clay bed in Norfolk or Suffolk.

DESCRIPTION OF THE PIT

The pit was examined on several occasions during July, 1971. Only minor excavations are now taking place in the pit. The beds can be divided into five separate groups:

V Chillesford Clay

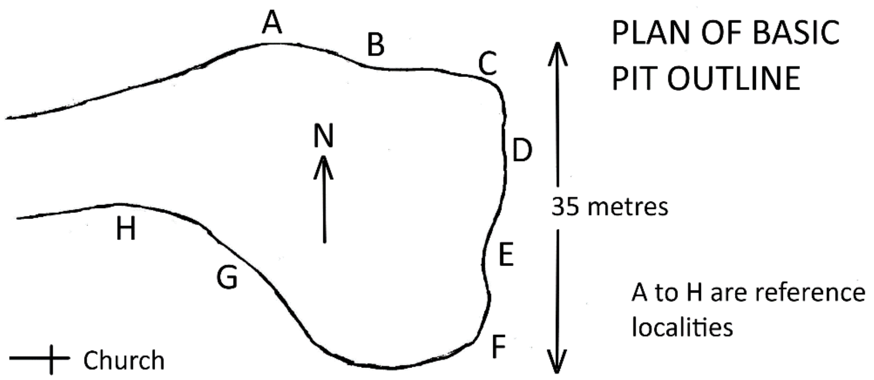
IV Undifferentiated loams

III Loams with intercolated crags and clays

II Shelly crag with intercolated loams and clays

I Red Crag

Although these groups are fairly consistent, the boundaries between groups II, III and IV are somewhat arbitrary since the groups form a bread transition from loamy crags at the base to clayey loams at the top. Owing to the horizontally discontinuous nature of the beds, and rapid lateral facies variation, detailed minor subdivisions of the major groups are pointless, if not impossible, and comments are confined to group description.

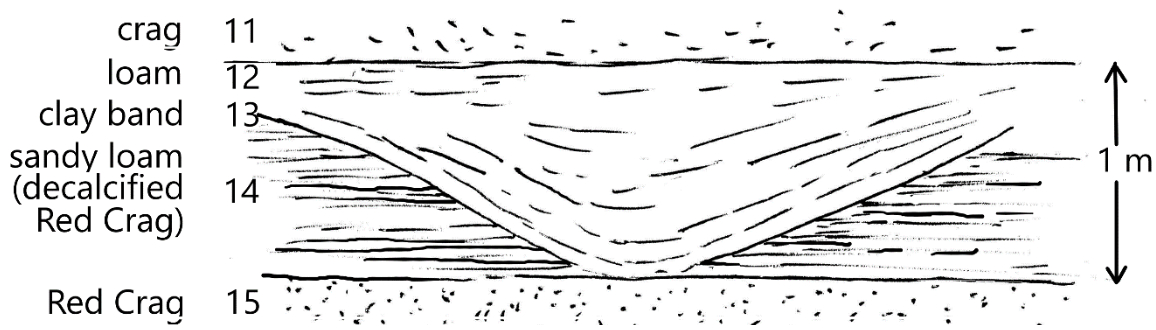


GROUP I

The thickest Red Crag section can be seen at location D, where typical red-grey, coarse grained, shelly sands are found (unit 16). This gets finer upwards from the pit floor, and becomes lighter in colour, and pass into 150 cm of coarse, false-bedded crag (15) - again typical of Red Crag. Unit 15 shows a marked concentration of vertical worm tubes of Sabellid type, most of which appear to start at ferruginous clay bands, which emphasise the bedding. The top of the crag is marked, by a rapid transition to a thin band of loam (14) which attains a maximum thickness of 45 cm at location B, and is truncated "by the overlying beds so that at location D it is only 7 cm thick, and. at location G is non-existent.

GROUP II

The base of group II is formed by a clay band averaging 5 cm in thickness. This clay (13) is a definite marker horizon, and I have used it to demarcate the first of the post-Red Crag sediments, since beneath it is a definite disconformity. Between locations D channel can crag loam clay band and E evidence of a post Red Crag-pre clay (13) be seen, indicating some amount of erosion.



The clay (13) thus covers the post Red Crag surface. Further evidence of a definite break in sequence is afforded by the nature of the clay itself. It varies from a much bioturbated clay/loam with many of the original worm tubes left (location D), to a laminated, light grey-brown clay seam (location G). At location B the clay has developed into a pebble horizon, the pebbles being fairly well rounded, less than 2 cm diameter, and fairly abundantly scattered within, the bed (typical of static or just transgressive intertidal mud flats). Again, worm tubes stem from this horizon (13) into the Red Crag.

The sequence above this is comprised mostly of shelly crag which, although ironstained, is distinct from the Red Crag in its colour, texture and palaeontological character - noticeably in its abundance of Scrobicularia. Intercolated within this crag are loamy beds which appear to be the result of lateral facies variation.

There are also a number of thin clay scams, each seldom exceeding 1 cm thickness. Location F, unit 10 (see table) shows over fourteen ripple drift clay partings occurring in loam, the unit being 9 cm thick (a similar structure can. be seen at the same horizon in the very much overgrown pit just to the south). Northwards at location E, unit 10 develops into several thin subhorizontal seams (the unit is 12 cm thick) together with some U-shaped, Chaetoptorus type worm tubes. At location E, unit 8 consists of two more clay seams (each 1 cm thick, 8 cm apart) which are divided by fine grained crag; this unit, which can be traced, at all other locations, I take as forming the top of group II, since it is the last unit to occur in association with regular crag deposit

The crag units 11 and 9 are false bedded on quite a large scale and. clay partings often, occur on, and. emphasise the false bedding planes. At locations G and H, this gives the misguided appearance of a major angular unconformity. In some of the more loamy parts of the crag can be found Mytilus nests up to 20 cm across, as well as burrowing lamellibranchs (e.g. Mya) with both valves together. These biocoenoses are significant.

GROUP III

This group consists predominantly of loams impersistent clay seams and some intercolated craggy loams. Apart from the loamy crag (unit 7) at location F, nowhere is crag well developed. However lenses of fine to medium grained shell fragments do occur, within the loams. There is also a randomly scattered marine fauna, with a high percentage of the lamellibranchs entire and in the life position. The basal clay seams (at the top of unit 8) truncate false bedding in the underlying crag. The top of the group is represented by the last dominant clay seam (top of unit 5).

Throughout groups II and III there appears to be a type of rhythmic sedimentation, represented by clay seams (at the base), - loam, - crag (at the top) sequences, many of which are interrupted. Within the large scale false bedding, the false bedding planes are emphasised, by clay seams which show the relationship:

sand/crag

clay seam — 1 to 2 cm

sand

shell fragments

GROUP IV

This group consists of loams, varying from sandy to clayey, with lenses of finely comminuted shell fragments. The beds represent a transition from group III to group V (the Chillesford Clay), becoming more clay rich upwards, and the boundary between, groups IV and. V is not precisely definable (for example, the change from clayey loam to loamy clay). The group contains a fragmentary indeterminable fauna, and scattered, entire (but very easily broken) lamellibranchs in the life position.

GROUP V

The Chillesford Clay is not a pure clay; it is more of a brown, weathering green-grey mud, and is quite silty in parts. There are however horizons with a high clay fraction, otherwise the clay is featureless and unfossiliferous. Prestwich reports the finding of a 31 foot vertebral column of Balaena at this horizon from a nearby pit. Some fish vertebrae have been reported.

Above the Chillesford Clay lies a maximum of 1 m. of chalky boulder clay.

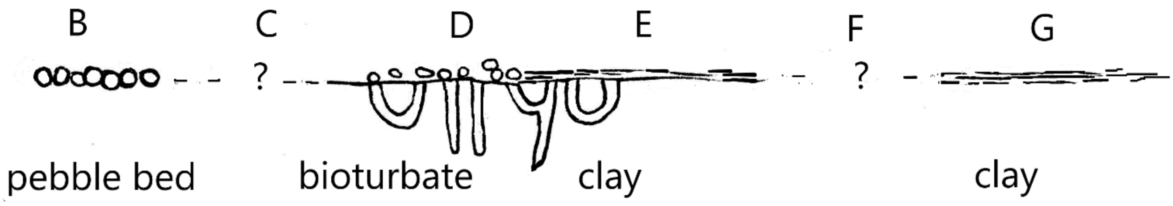
INTERPRETATION

An interpretation of the palaeo-environment of the Chillesford Crag can be gained from an assessment of, a) the sediments themselves, lithological variations and sedimentary structures; and, b) the fauna.

1) SEDIMENTOLOGY

Two important features, both of which are typical of an intertidal or littoral environment, can be seen in the Chillesford Crag series. Firstly there is the development of flaser (and lenticular) ripple bedding, which come under the general term of mud drapes, as seen at location F, unit 10.

The sand ripples are formed by tidal currents, while the mud settles out from suspension. Many of the smaller ripples throughout the Chillesford series show different orientations again diagnostic of a littoral environment. Destructive wave action must have been slight, or the structures would have been destroyed. Secondly, there is the development of the transgressive pebble bed at unit 13.



This unit appears.at the base of the Chillesford series and must indicate the onset of conditions which fluctuate from the intertidal to sub-littoral. Intertidal conditions can be seen within the clay bands throughout the sequence. Thus the intertidal clays represent minor disconformities.

A sublittoral, high energy environment is represented by the crags, where shell fragments are part of the mechanical sediment, and large scale cross bedding occurs. The loams represent shallow water, low energy deposition (the preservation of fragile faunas supports this view) during the transition from intertidal to sublittoral conditions. The recognition of a form of rhythm indicates that due to structural activity (as part of the North Sea basin downwarping) there was slight sporadic submergence of the area. In this case, the tidal flat was slowly submerged giving a shallow water loam environment; as the water became deeper, the dominant sediment was high energy crag, which rapidly filled up the basin giving rise to intertidal conditions again.

2) FAUNA

a) Macrofauna

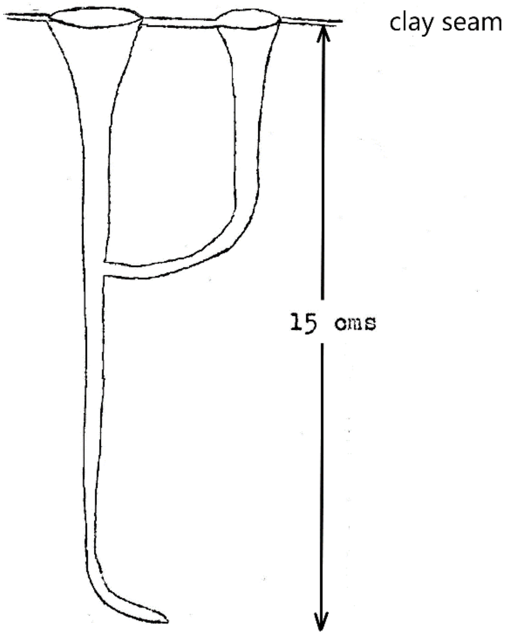
All the fossils from this locality are marine forms and are listed in the "Woodbridge and Felixstowe" Geological Survey district memoir, which need not be repeated here. However, several aspects are noteworthy. The fossil content varies between the Chillesford Crags and loams. In the crags the fauna is largely fragmentary, and because of the nature of the sediment, is largely derived (that is, a thamnatocoenosis). In the loams, although there is still fragmentary material, the fauna is more representative of the animals living at that time at that place. The loam fauna, dominated by Spisula, Macoma and Mytilus, is generally widely scattered, but is preserved entire and often in .a life position, though now rather fragile and friable. Some of the forms present, for example Mya, Mytilus and Balanus, are specially adapted to littoral or just sublittoral conditions. Biocoenoces can be seen in the occurrence of Mytilus nests and Mya in its natural vertical burrows; these forms cannot have been transported by current action, which must have been tranquil (as the sediment itself shows), and they must have been buried, soon after death. These conditions are not the norm in faunal associations.

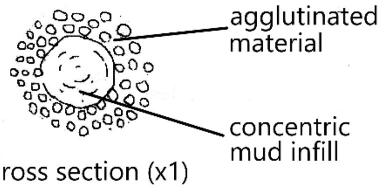
b) Microfauna

MacFadyen and Funnell give accounts of the microfauna, and I will be doing more detailed work shortly. Six forams are found in the Chillesford Crag - Rotalia beccarii (the dominant one), Polymorphina lactea, Truncatulina lobatula, Polystomella crispa, P. striatapunctata, and Bulimina elegans. They are generally abundant and well preserved. Without going into detail, the association suggests a shallow marine environment, with perhaps a small amount of brackish water, e.g. tidal flats, just sublittoral or estuarine (R. beccarii is a useful indicator). The climate was rather cool (perhaps interglacial in type), but not as cold as today’s Arctic Sea. For example, Elphidium arcticum (found near the base of the Chillesford Clay) points to a cold, climate, but R. becarii limits the degree of cold.

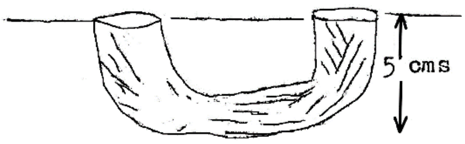
c) Worm tubes

Tubicolous Polychaete worm tubes again indicate an intertidal or just sublittoral environment. The lithologies in the pit provided, a very favourable environment during their deposition for Polychaete habitation, for they not only provided food, for the worm, but also had a consistency that enabled the burrows to retain form and remain open. The annelid remains (apart from calcareous Serpulid tubes) are in the form of tubes and burrows; these nearly always begin at clay seam horizons and extend downwards into crags and loams. The majority of tube forms are agglutinated types averaging 30 cms in length and tapering gradually from 7 cm at the top downwards. They are usually funnel-shaped at the top, 'l' shaped at the tail end, and maybe branched.





Cross section (x1)



Other forms are 'U' shaped, non-agglutinated forms 5-10 cms in total width and infilled with silt or mud. Sabella, Sabelluria, Arenicola and Chaetoterus types of tube have been recognised; their development at certain horizons signifies that a lull in sedimentary deposition occurred - in this case in an intertidal environment.

Some structures, originally mistaken for worm tubes have been identified, as "concretions formed round, rhizomes". Again these appear to begin, at clay seam horizons, and reach up to 40 cms length. Since the pit faces are more or less being actively removed (preventing a permanent modern flora developing), these concretions must be the remnants of a syn-depositional flora formed at a time of emergence or during intertidal conditions. (N.B. some concretions do form around present roots, but these differ slightly in morphology from the forms described.)

CONCLUSIONS

The Chillesford. Crag forms a transition from the Red Crag to the Chillesford Clay, which must pass into the Norwich Crag and may even, be a shoreline facies of the Norwich Crag. The transition is in. the nature- of intertidal and just sublittoral sediments. This conclusion can be based on the sedimentary structures and the nature of the lithologies. The Red Crag and Chillesford Crag are also petrographically similar. Faunal evidence for this transition agrees very well, not only environmentally, but also climatically and stratigraphically. The Chillesford Clay, however, remains something of an enigma, and I consider that the deposits may be lagoonal - certainly the environment was one of low energy and prohibitive to life: further work may elucidate the matter.

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1849	Prestwich	Q.J.G.S., vol. 5.
1866	Fisher	Q.J.G.S., vol. 22.
1871	Prestwich	Q.J.G.S., vol. 27.
1900	Lomas	Q.J.G.S., vol. 56.
1901	Harmer	P.G.A., vol. 17
1902	Double	P.G.A., vol. 17
1932	MacFadyen	Geol. Mag., vol. 69.
1959	Downing	Geol. Mag., vol. 96.
1961	Funnell	Trans. Norf. & Nor. Nat. Soc., vol. 19
1890	Reid	Mem. Geol. Surv. (Pliocene Deposits of Britain)
1928	Boswell	Mem. Geol. Surv. (Geology of country around Woodbridge, Felixstowe and Orford)

ACKINOWLEDGEMENTS

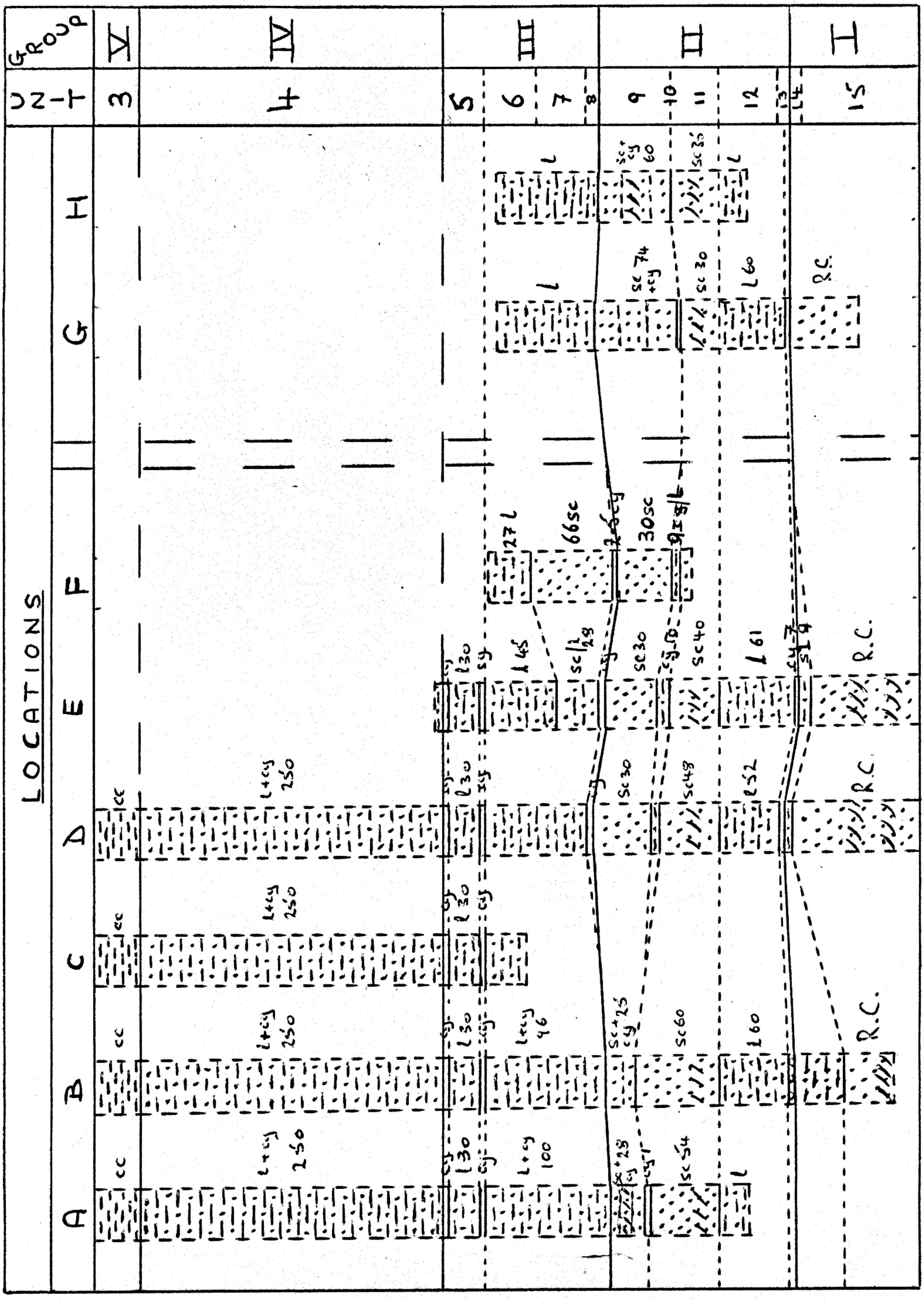
I would like to thank Mr R Markham for valuable suggestions and criticisms, the British Museum (Nat. Hist.) for identifying some specimens, and Kingston Polytechnic for providing laboratory facilities.

R.G. Dixon.

(The index to the table on page 9. is as follows:

c c Chillesford Clay
1 loam
cy clay seam
sl sandy loam
sc Scrobicularia Crag
Rc Red Crag

thicknesses are in centimetres.)


GROUP
V
IV
III
II
I
UNIT
LOCATIONS
A
B
C
D
E
F
G
H
R.C.

THE LOWER PALAEOLITHIC DEPOSITS AT HOXNE, SUFFOLK

POSITION

Hoxne is a village in the northern part of East Suffolk, close to the border of the County of Norfolk. It lies 155 km. (97 miles) N.E. of London, 6 km. (4 miles) E. of the small town of Diss, and. 5 km. (3½ miles) N.E. of Eye. The National Grid reference is TM 180773 and the village is about 30 m. above sea level. The surrounding country is richly wooded and agricultural; a uniform flat plain rising rarely over 36 m., dissected by small streams.

The archaeological site lies on a spur of land between the River Dove and. the Goldbrook, immediately south of the village of Hoxne, and within the same administrative parish, at National Grid reference TM 175767. It is on the road to Eye.

HISTORY OF INVESTIGATION

The discoveries at Hoxne are the result of exposures made by the digging of clay for brick-making. A clay-pit was in existence there in the 18th century and continued to be dug until after the last war, since when, it has become overgrown, and. much of it is used, as a contractor's depot. The older workings were on the East side of the Hoxne- Eye road, where the brick-kilns and other buildings remain, and the newer part (probably in operation, from the 1870's, but apparently extended between the World Wars) is on the opposite, west, side and is known as the Oakley Park Pit as it cuts into the ground of that Park.

The site is notable for being the first place where hand-axes were found (about 1795) recognised not only as being the tools of non-metal-using prehistoric people, but of being of great antiquity because of their relationship to the stratigraphy. It is also notable for being the type-site of the Hoxnian Interglacial phase of the British Pleistocene chronology.

1. J. Frere

It was J. Frere who made the acute observations about the hand-axes found at the end of the loth century, including his much quoted statements that the flints were "fabricated and used by a people who had not the use of metals", and "The situation, in which these weapons were found may tempt us to refer them to a very remote period indeed, even beyond that of the present world.

His report was communicated in the form of a letter to the Society of Antiquaries, London.

Ref: Frere, J. 1800. Account of Flint Weapons discovered at Hoxne in Suffolk. Archaeologica, 13, 204-5, pls. XIV - XV.

2. J. Prestwich

This famous geologist visited the site shortly after he returned from his examination of Boucher de Perthes' sections in the Somme Valley, which resulted in he and John Evans publishing their acceptance of the contemporaneity of hand-axes and extinct fauna.

Prestwich made several boreholes and sections, on the basis of which he correctly interpreted the site as a silted-up lake within a hollow of boulder clay, covered by variable superficial deposits of sand, gravel and clay.

Ref: Evans, J. 1860. On the occurrence of Flint Implements in undisturbed Beds of Gravel, Send and Clay. Archaeologica, 38, 80-307.

Ref: Prestwich, J. 1861. On the occurence of Flint-implements, associated with the Remains of Animals of Extinct Species in. Beds of a late Geological Period., in. France at Amiens and Abbeville, and in England, at Hoxne. Phil .Trans., 150, (2) 277 - 317.

3. T. Belt

He made an. investigation of the Hoxne deposits in 1876 but his interpretation of them was obscure and is no longer valid.

Ref: Belt, T. 1876. On the geological age of the deposits containing flint implements at Hoxne. Quart. Journ. Sci. (n.s.) 6, 289.

4. H. B. Woodward

A section at Hoxne in 1878 was recorded, by Woodward. He concluded that the merging of clay and gravel on the eastern side of the pit was due to subsequent cutting of the valley of the Goldbrook, the gravel becoming mixed with hill wash.

Ref: Woodward, H. B. 1887. The Geology of England and Wales, 2nd ed. London: George Philip and Son.

5. Clement Reid

The Committee of the British Association for the Advancement of Science conducted investigations at Hoxne in 1895-6, supervised by Clement Reid. Twenty borings were made, and some test sections. The East - West section across the deposits which he constructed on the basis of this work differed fundamentally to the modern accepted one, especially in the interpretation of the upper deposits in Oakley Park Pit, Reid considered the lake muds were completely truncated and covered by superficial deposits, where as it is now evident that this was not so. Archaeological material, belonging to the earlier lake beds, was thus related to more recent deposits, where Reid had included these beds with the superficial ones. The situation is complicated by archaeological material also occurring in the latter.

Ref: Reid, C. and Ridley, H.N. 1888. Fossil Arctic Plants from the Lacustrine Deposit at Hoxne, in Suffolk. Geol. Mag., 5, 441-4.

Reid, C. 1896. The relation of Palaeolithic Man to the Glacial Epoch. Rep. Brit. Assoc. Liverpool, 400-16.

6. Reid Moir

The Committee of the British Association conducted further excavations in 1924 - 6, this time supervised by Reid Moir in collaboration with Boswell. He opened several sections but found nothing to make him alter the interpretation, of the deposits made by Clement Reid. It is not clear, because of this, which of the artifacts and faunal remains he found (none in great quantity), if any, belonged to the actual Lake beds. Finds of mammoth and reindeer associated with an arctic fauna, 8 - 10 ft. from the surface in a gravel seam, must relate to post-Hoxnian disturbances.

He carried out further work in 1934 and identified two levels of artifacts which he described as Late Acheulian and, overlying it, early Mousterian (or Clactonian III). Both appear to have come from the actual lake beds.

Ref: Moir, J.R. 1926. The silted-up lake of Hoxne and its contained Flint Implements. Proc. Prehist. Soc. East Anglia. 5, 137 – 65.

Moir, J.R. 1935. Lower Palaeolithic Man at Hoxne, England. Bull. Amer. Sch. Prehist. Res. 2, 43 – 53.

7. R. G. West

The last series of investigations at Hoxne was made by R.G. West of Cambridge University, in 1952. Numorous boreholes and test sections, coupled with pollen analyses, have provided a sound basis for the chronology and stratification, of the site, summarised in the table on page 13, reproduced from the lucid, and detailed publication by the investigator. West also re-examined, the results of previous workers and it is evident that all the archaeological material recorded prior to Moir, including Frere's hand-axes, came from the deposits above the lake mud and were thus derived. West found very few flint artifacts in the course of his excavations, but these were made primarily for geological reasons. However, the few he did find could be tied in by pollen analysis to the end of the Early Temperate stage (Ho II d.) immediately below a deforestation stage. Pollen scraped from an isolated hand-axe showed that it was actually contemporary with this same deforestation stage, that may be a natural succession but could reflect the activities of the Acheulian hunters.

These artifacts constitute the only securely dated, pre-Gipping Acheulian tools in Britain.

A survey by C.M.B. McBurney of the artifacts known, to have come from Hoxne concludes that, typologically, the Acheulian industry of Hoxne finds a food parallel with that of Comments' workshop site at Bultel Tellier at St. Acheul, Amiens, France.

Until a suitably large, unselected sample of the Hoxne Acheulian Industry, can be obtained in-situ it is not possible to press typological considerations any further.

Ref: West, R.G. and McBurney, C.N.B. 1955, The Quaternary Deposits at Hoxne, Suffolk, and their Archaeology. Proc. Prehist. Soc., 20, 131 – 54

West, R.G. 1956. The Quaternary deposits at Hoxne, Suffolk. Phil. Trans. Roy. Soc., series B, 239, 265-356, pls. 4-6.

Table: Summary of the Stratigraphy and of the Lake, Vegetational and Climatic History of the Hoxne Interglacial

stratum	sediment	mode of deposition	stage	vegetation	archaeology
A2	clay and gravel	? glacial	Gipping glacial	-	derived artifacts
B	stratified clay, sand and gravel	solifluction	periglacial	-	derived artifacts
C	silt, drift mud and brecciated clay-mud	solifluction and reworking of lake deposits	early glacial	park tundra	
D	detritus mud	lacustrine	late temperate Ho III	decline of mixed oak forest. rise of pine, spruce and silver fir.	
E	clay mud	lacustrine	early temperate Ho II	d. includes deforestation stage	charcoal, hand-axe flakes, bones
				c. mixed oak forest	
				b. rise of mixed oak forest	
				a. formation of closed forest with mainly birch	
F	clay mud and marl	Lacustrine with some solifluction	late glacial Ho I	e. open parkland with birch copses d. Hippophae scrub c. Hippophae scrub b. Hippophae scrub	
G	formation of lake in boulder clay basin		glacial Ho Ia		
H	boulder clay glacial basin		Lowestoft glacial		

Recommended Books (additional to the specialised reports on Hoxne previously cited)

General Introductory

Man the Toolmaker	K. P. Oakley	British Museum
Flint Implements	N. Watson	British Museum
Adams Ancestors	L. S. B. Leakey	Methuen
History of the Primates	Le Gros Clark	British Museum

Pleistocone Geology

Pleistocene Geology and Biology	R. G. West	Longmans, Green
Environment and Archaeology	K. W. Butzer	Methuen
Pleistocene Period	F. E. Zeuner	Hutchinson

Pleistocene Chronology

Dating the Past	F. E. Zeuner	Methuen
Frameworks for Dating Fossil Man	K. P. Oakley	Weidenfield and Nicholson

British Lower Palaeolithic

Lower Palaeolithic Archaeology in Britain	J. J. Wymer	John Barker
Ancient Stone Implements of Great Britain	J. Evans	Longmans, Green

General Lower Palaeolithic

The Archaeology of Early Man	J. M. Coles & E. S. Higgs	Faber
The Old. Stone Age	M. C. Burkitt	Benham & Company

Archaeological Method

Archaeology from the Earth	R. E. M. Wheeler	Penguin Books
Field Archaeology	R. J. C. Atkinson	Methuen
Science and Archaeology	D. Brothwell & E. S. Higgs (eds)	Thames and Hudson
Digging up Bones	D. Brothwell	British Museum

Fauna

Bones for the Archaeologist	I. W. Cornwall	Phoenix
Pleistocene Mammals of Europe	B. Kurten	Adline Publishing Co

This article is from an information sheet in connection with the present Hoxne work by the Department of Anatomy, University of Chicago, of which Mr. J. J. Wymer is the Field. Director.

P. G.

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The Foraminifera of the Crag, Pt.1. Monogr. Palaeont. Soc.

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R. Markham.

REPORTS CF FIELD MEETlNGS WITH THE SUFFOLK NATURALISTS SOCIETY

(Taken from "Suffolk Natural History" (Proceedings))

SUNDAY, 18 APRIL 1971.

Some sixteen members of the Society and the Ipswich Geological Group met at Little Cornard Brick Works where Messrs. C. E. Hanson, and R. A. D. Markham began the tour of four pits to study Glacial, Eocene, and Cretaceous deposits.

Mr. Bettridge thanked Messrs. Markham and Ranson for the very interesting and informative excursion and we are very grateful to the owners of the pits for allowing us to visit them.

COMMENTS

LITTLE CORNARD BRICK WORKS (TL 089334) owned by Messrs. Grimwood ltd. of Sudbury.

Here the geological succession, in the lower pit near the road appeared to be:

Pleistocene {	Sand and Gravel	0 – 6ft
	Grey-brown chalky boulder clay	5 – 6ft
Eocene {	Mottled brown—red—green clay	1ft
	Greyish sands	5ft+

In the central part of the pit coarse gravels underlie bedded calcareous clays and silts in which Dr. Charles Turner found fossil remains of freshwater invertebrates.

BALLINGDON CHALK PIT (TL G604O6) used by Sudbury Borough Council for refuse disposal and SUDBURY CHALK PIT, Waldingfield Road (TL 878417) owned by P. H. Jordan Ltd. of Sudbury.

Both show chalk overlain by up to ten feet of Eocene sands and clays. In the latter pit the Eocene beds are covered by the basal phosphate bed of the Red Crag and associated shelly sands, and the upper part of the succession is composed, of three to six foot of chalky boulder clay capped by a variable thickness of glacial -ravel. There is little doubt that this boulder clay and gravel is the same as that seen at Little Comard Brick Works.

EDWARDSTONE SAND AND GRAVEL PIT (TL 933434) owned by P. H. Jordan Ltd. of Sudbury.

Here the upper part of the geological succession of the Sudbury area was studied in more detail. At various times, depending upon how the pit is being worked, the full succession can be seen;

Soil and leached boulder clay	1 — 3 ft
Chalky boulder clay with numerous flint and chalk pebbles and occasional large boulders	5 – 20 ft
Orange angular flint gravel	c.20 ft
Pale grey quartz-quartzite-flint pebble gravel	5ft+

The lowest bed is being studied by Dr. R. Hey of Cambridge. It is found immediately beneath the glacial sequence over much of East Anglia and is peculiar in its very high proportion, of small rounded pebbles, most of which are of quartz or quartzite. The origin of these pebbles is not yet understood.

The boulder clay is probably the same as that seen at the other exposures and is certainly the same as that seen in the pits at Acton and elsewhere in central Suffolk.

C. E. Sanson.

PRE-GLACIAL DEPOSITS

The pro-glacial succession was best seen at Jordan’s Pit, East Street, Sudbury, where below the glacial deposits Red Crag rests on Lower London Tertiaries (Thanet Beds) which rests on the Chalk.

The Chalk yielded lamellibranchs (Ostrea, Chlamys), an echinoid (apparently Echinocorys) fragment, and Miss N. C. Williams found a plate of the zonal crinoid Marsupites. The Thanet Beds consist of loamy sand, on a greenish basement bed with flint nodules (the Thanet Bed-Chalk junction was also studied at Ballingdon). The Red Crag, a ferruginous sand containing phosphatic nodules, is near its western limit; the gastropods Neptunea contraria and Ilucella lapillus were found by Mr. G. L. Ransome.

R. A. D. Markham.

SATURDAY, 14 AUGUST 1971

LEVINGTON CREEK

(By invitation of the Ipswich Geological Group). The purpose of this meeting, under the leadership of Mr. R. Markham, was to study the environmental development of recently laid down materials. These strata demonstrate clearly the manner in which estuarine deposits are subsequently preserved as positive geological features. Mr. Markham writes;-

"The area studied was the West Bank, at the junction of Levington Creek and the Orwell estuary; such areas provide a changing environment, both physiographically and ecologically, and make interesting long-term study projects.

Two distinct areas, High Salt Marsh and Mud Flat, are separated by a low cliff and beach. On the High Marsh., plants grow on a dark blue-grey clay containing abundant plant remains, forming a "mat” on the surface of the marsh mud; vibrations may be caused by jumping on this area. Zonation of vegetation is evident, particularly near the tidal creeks which cross the marsh. At low tide, ragworm tubes were demonstrated in the creek mud. "Salt-pans” are shallow pools of trapped water with a fauna of erodes and small fish.

The cliff line at the Marsh-Plat junction shows eroded "islands" of salt-marsh and a "shell beach". The shell beach has a drifted fauna, appearance, with much broken shell and with bivalves generally having the valves separated. The mollusca fauna is estuarine, containing Mya arenaria, Mytilus, Macoma balthica, Cardium, Scrobicularia, Littorina, and Hydrobia.

On the Mud. Plat, exposed, at low water and covered, at high tide, the light blue-grey silt is crossed by shallow channels, and has ''hillocks" of molluscs forming a topographical feature towards the main channel of the Orwell. These "mussel-banks" contain a living assemblage of Mytilus edulis (mussels, with byssus threads holding together "clumps" of shells and stones), Cardium (cockles), Littorina (winkles), barnacles, chitons, and minute crabs.

Traversing the mussel-banks means wading up to the knees in mud.
In Levington Creek itself, plants such as Glasswort were seen, colonising the mud."
The botanists saw several interesting plants. By the roadside entrance was an unusually large patch of Common Horsetail, and, in the grass at the entrance to the creek, an isolated plant of Rest Harrow.

Mrs. H. Stephenson noted the following: Zostera harnemanniana (Narrow leaved Eel-grass), Atriplex littoralis (Grass-leaved Orache), A. patula (Common Orache), A. portulacoides (Halimione) (Sea Purslane), Suaeda maritima (Common Seablite), Salicornica europea (Glasswort), Aster tripolium (Sea Aster), Armeria maritima (Thrift), Limonium vulgare (Sea-lavender), Beta vulgaris (Sea beet) and Sportina maritima (Lesser Cord-grass).

SATURDAY, 29 APRIL 1972

WALDRINGFIELD HEATH

The main visit of the afternoon was to a large pit at Waldringfield Heath (TM 263448), by kind permission of Wilding & Smith Ltd. This is a working quarry and is not normally available for public inspection.

The excavation shows 6 or more feet of light-coloured Upper Pleistocene sand and gravel resting on 15 feet or more of Red Crag, the lower part of which contains fossil molluscs.

The lower part of the Crag is strongly current-bedded, and. contains many small phosphatic nodules and a mollusc fauna characterised by Arctica islandica, Glycymeris, Astarte, Spisula, Cardium, Neptunea contraria, Nucella lapillus.

The upper part of the Crag is a deep brown ferruginous sand from which the calcareous matter has been dissolved. The decalcification junction between shelly and non-shelly sand is usually clean cut, but moulds of shells sometimes occur in ironstone in the upper beds

The upper part of the Crag in this pit also contains numerous vertical ferruginous tubes; they may be 6 inches or more in length, they taper downwards and some are curved at the face. They generally descend from definite horizons and are probably a form of trace-fossil. Both plant and animal origins have been suggested for these structures.

R. Markham.

LIST OP GEOLOGICAL GROUP MEMBERS, 1966-1971

Year 1 = 1966-67, 2 = 1967-68, 3 = 1968-69, 4 - 1969-70, 5 - 1970-71.

R.A.D. Markham	Ipswich	1 2 3 4 5
S.J.J. MacFarlane	Ipswich	1 2 3 4 5
J.N. Norman	Nottingham & Ipswich	1 2 3 4 5
P. Grainger	Chelmsford	1 2 3 4 5
C. Garrod	Ipswich	1 2 3 4 5
C.J. Hawes	Ipswich	1 2 3 4 5
L.J. Hyde	Ipswich	1 2 3 4 5
C. Allen	Ipswich	1 – – – –

G.L. Ransome	Woodbridge	1 2 3 4 5
J.C. Walker	Ipswich	1 2 3 4 5
K.R. Leeder	Norwich	1 2 3 – –
P.O. Cambridge	Norwich	1 2 3 4 5
B.C. Butcher	Ipswich	1 – 3 – –
C. Butcher	Ipswich	1 – – – –
D. N. Richer	Ipswich	1 2 3 4 5
C.E. Hanson	Sudbury	1 2 3 4 5
P.G. Wake	Bedford	1 – – – –
P. Brown	Norwich	1 – – – –
Prof. J. P. Kirkaldy	London	1 2 3 4 5
Dr. C. Turner	Cambridge	1 2 3 4 5
Dr. R.G. West	Cambridge	1 2 3 4 5
P.A. Madgett	Luton	1 2 3 4 5
P. Christie	Southampton & Bury St.Edmunds	1 2 3 4 5
Miss S.L. Olley	Ipswich	1 – – – –
Mrs. M. Hawkings	Ipswich	1 – – – –
H.E.P. Spencer	Ipswich	1 2 3 4 5
P. Applegate	Brentwood	– 2 3 4 5
Mrs.A. Eden	Harleston	– 2 3 – –
C.R. Jones	Colchester	– 2 – – –
Mrs. P.M. Gallacher	Felixstowe	– 2 – – –
M. Sullivan	London	– 2 3 4 5
J.V. Todd	Ipswich	– 2 3 4 5
K.J. Green	Woodbridge & Felixstowe	– 2 – – –
C. Campbell	Ipswich	- 2 3 4 5
M. Woods	Woodbridge	– 2 3– 5
Miss J. Holden	Chelmsford	– – 3 4 5
D.R. Brown	Dovercourt	– – 3 – 5
P. Aldous	Ipswich	– – 3 – –
H. Grimes	Ipswich	– – 3 – –
S. Grimes	Ipswich	– – 3 – –
Miss P. Cresswell	London	– – 3 – 5
Miss M. Daniels	Ipswich	– – 3 – –
Miss S. Giles 3 -	Newcastle	– – 3 – –
li. Zirableraan	Woodbridge	– – 3 – –
R.B . Beck	Cambridge	– – 3 4 5
R. Dixon	New Malden & Woodbridge	– – 3 4 5
Dr. P.E.P. Norton	Glasgow	– – 3 4 5
Miss J. Hudson	Ipswich	– – 3 – –
R. Forsdike	Ipswich	– – 3 4 5
T. Clifford	Ipswich	– – – 4 –
Miss B. McAteer	Ipswich	– – – 4 –
Miss C. Taylor	Ipswich	– – – 4 5
J. Blair	London & Stowmarket	– – – 4 –
Miss V. Love	Ipswich	– – – 4 5
G.E. Fletcher	Clacton	– – – 4 5
Mrs.R. J. Markham	Ipswich	– – – – 5
Earl of Cranbrook	Saxmundham	– – – – 5
R.G. Cooper	Ipswich	– – – – 5
G. Whitehead	Sheffield & Woodbridge	– – – – 5
Dr. P.E. Long	Leicester	– – – – 5
P. Allen	Romford	– – – – 5

FINANCIAL STATEMENT : GEO} OGICAL CROUP, 1970 - 1971.

September 1970 - August 1971.

EXPENDITURE

	£.	p.
Postage, Newsletters 23-26	6	40
Postage, Bulletins 9 and 10	2	20
Envelopes, Newsletters 23-28		51
Envelopes, Bulletins 9 and 10	1	73
Stencils, Newsletters 23-20		34
Stencils, Bulletins 9 and 10	2	04½
Duplicating Ink		88
Duplicating paper	3	57
Receipt book (from 1969-70)		12½
	£ 17	80

INCOME

	£.	p.
Carried forward from 1969-70	5	23
Subscriptions (received late for 1969-70)		50
Subscriptions, 1970-71	17	50
Postage stamps received		18
	£23	41

Carried forward to 1971 - 1972: £5 - 61

(Prepared 25.1.1972)

R.A.D.M.

EDITOR'S MOTE Please send information and articles for publication in Bulletin No. 12, which will hopefully appear in the Spring, 1973. Short notes on exposures, field trips and specimens are just as welcome as longer articles.

The Bulletin Editor's new address is:

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CHELMSFORD,
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P. Grainger.