GEOLOGICAL GROUP, IPSWICH Autumn, 1969

BULLETIN No. 7

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REPORT OP THE IPSWICH GEOLOGICAL GROUP FIELD MEETING AT READING, 22 JUNE 1969.

The purpose of the meeting was to compare the Lower Tertiary deposits of the Reading area with those of East Anglia

The Group met at Reading General railway station and proceeded to the first exposure, near Theale, about five miles west of Reading. In a disused chalk pit, known as Pincent's Kiln (SU 651 720), the junction of the chalk and Reading beds was seen exposed. The top of the chalk is here a marine erosion surface, penetrated to a foot or so by a network of burrows, some showing scratch-marks (presumably of crustaceans). The chalk is overlain by a few inches of dark green glauconitic sand, containing green-coated flints, which also fills the burrows. This passes upwards into the bottom ten feet of the Reading beds which consist of grey/buff clay and bedded loam.

The next stop was at a former brickworks in Dee Road, Reading (SU 682 732), now the site of a new housing estate. Here the Reading beds/London clay junction, was well exposed. The topmost part of the Reading beds is a buff sand on which rests the basement bed of the London Clay; the latter consists of sandy shell beds alternating with brown loam. In. places the shell beds are cemented with calcite, and although the shells are poorly preserved, those hardened nodules provide good casts.

(Note: This site is adjacent to the Grovelands Pit section, not now exposed, described in IGG Bulletin No.4, p.18)

The third site visited was Knowl Hill Sand Pit (SU 818 796), seven miles NE of Reading. Here, also, Reading beds and the basement bed of the London clay wore exposed. In the bottom of the pit variously coloured bands of Reading clay were seen exposed on a shallow slope. Above those are pale sands, in places cross-bedded, and also exhibiting faults. In parts, a layer of sand, about a foot thick, is cemented, with calcite forming material similar to "sarsen" stones, but generally with flat surfaces. The upper part of these sands is riddled with brown silt-filled pipes (possibly burrows?) left outstanding by weathering. The basement bed of the London, clay is marked by a thin pebble-bed of small black rounded flints. Immediately above this is a band of worm-tubes, and, higher up, shell beds.

From here the Group returned to Ipswich. The following members attended the meeting:
P. Grainger, R. Markham, S. MacFarlane, Miss. J. Hudson, and D. Richer.

P. Grainger

REPORT OF THE IPSWICH GEOLOGICAL GROUP FIELD MEETING AT LEVINGTON CREEK, 8 JULY I969.

The purpose of the meeting wss to make a detailed map of part of the salt-marches on the shores of the River Orwell, near Levington Creek (TM 235 382). These marshes are, at present, diminishing due to erosion by the river and due to extension of the system of small creeks and salt-pans. It is hoped to re-map the area annually and so be able to reach conclusions as to the rate of erosion and the factors governing it.

Surveying was done by chain triangulation, starting from a 100ft baseline near the sea-wall, the ends of which were left marked by stakes. Creeks and shoreline were mapped by offsets at ten foot intervals along the chainlines. In most places the line mapped was the limit of vegetation, which corresponds to the major topographical change from the flat marsh top. This also approximately the mean high water mark. The accuracy was sufficient to produce a map on the scale of one inch to ten feet. (continued on Page 3.)

If anyone is interested in any aspect of salt-marsh study, in this area, e.g. botanical, sedimentological, conchological, would they please contact the author. The author would like to thank the Ipswich Museum for loan of equipment, and the following people for assisting with surveying; Miss. J. Holden, R. Markham, J. Herman.

P. Grainger

REPORT OF THE IPSWICH GEOLOGICAL GROUP MEETING OH SUNDAY 21st SEPTEMBER AT GREAT BLAKENHAM BOULDER CLAY PIT.

The party of ten including members and guests assembled at the entrance to the pits on the A1100, NGR: TM 121 501, and began the trek down to the working clay pit where a fresh face had quite recently been exposed.

A few general observations were made about the boulder clay. Two distinct layers could clearly be discerned; that nearest the surface which was light, yellowish brown in colour, and that immediately beneath it which was a blue grey. Two distinct horizons of boulder clay have boon recorded here - Gipping till and Lowestoft Till - both said to represent different glaciations. They wore previously distinguished here as being different colours, brown and blue respectively. Members disscussing this put forward the idea that the brown clay seen during this meeting could, be weathered blue clay. The two types of clay were also differentiated according to the erratics they contained. One kind of boulder clay contained erratics of Hunstanton Red Rock and the other did not. However, some members had found this erratic in both boulder clay horizons. This problem could provide an interesting piece of local research and help to bring about some well-argued conclusions on the subject.

The search for erratics was an enthusiastic one. It soon became clear that a large percentage of the erratics were flints derived from the chalk. An unusual find was made when one flint was split in half. It was found to have a quartzite pebble at its core. Chalk is often found at the centre of flints but quartzite must have been introduced into the chalk sea. Members then began speculating about its origin. Other interesting characteristics of this flint are the grey concentric rings in the flint round the central pebble. The specimen was later given to Mr. Markham for the museum.

Besides Hunstanton Red Rock, specimens of Kimmeridge shale, mudstone quartzite and limestone were found. The Kimmeridge Shale proved to be highly fossiliferous and contained many small ammonites and lamellibranchs although they wore not in a well preserved state. The limestone found looked like a gritty, coarse sandstone at first glance but it proved to be too soft for this and later an acid test confirmed that it was limestone.

Fossils found were derived from older strata and included Gryphea and other lamellibranchs and ammonites found in mudstone of Jurassic age. Fragments of belemnites of Cretaceous age were also found.

The meeting seemed to pass very quickly but it did prove that collecting erratics can be interesting and that a wide variety can be found at Great Blakenham.

Jill Holden.

THE CRAG ELEPHANT - Archidiskodon mcridionalis.

NEW LOCALITIES.

While working on mammalian, remains in the Geological Survey Museum two bones were discovered from hitherto unrecorded sites, among unsorted specimens

One is an Os Magnum from the fore foot of a not fully grown animal from the Norwich Crag of Coltishall, Norfolk.

The second is a Metacarpal from Badingham in the Aide Valley in East Suffolk.

Coarse sand coated with ferruginous matter encrusts the new Norfolk specimen as is common with bones from Crag and the Westleton Beds, in which the Crag mammalian fauna is richly represented; the fossil condition of both bones is typical of mammalian bones from Crag sands.

There is also the lower part of an elephant Humerus and other bones recorded from Kessingland the condition of which is more akin to bones from Crag and unlike those obtained from the Forest Bed exposures on the coast to the North. The fossliferous deposit here is recorded as occurring low on the foreshore where it is exposed only at the lowest spring tides and it is desirable that a re-examination of this exposure should be made in view of the fact that the Crag Mammalian Fauna had a range in time from the Red Crag to the Cromerian Forest Bed.

H. E. P. SPENCER.

A PRELIMINARY NOTE ON THE REOPENED CRAG PIT AT HILL FARM, WANGFORD, NGR: TM 462 777.

Crag pits in this area are reviewed by Whitaker (1887 pp. 12 - 14). Whitaker quotes Lyell's and Fisher's remarks about finds of Mammalia. The old Wangford exposure was also interesting because of the possibility of relationship between the shelly crag and the Westleton Beds which are exposed in the Hill Farm Gravel nits (Hey 1967 p.436). The Mollusca are of current interest also. A new face was opened in the coppice at the extreme southwest corner of the field occupied by the southern gravel pit at Hill Farm, base a metre or so above the river flat. Excavation was by a JCB digger hired from Pointer's on a grant from Glasgow University

The section here is:

Depth in cms. Zero at base of gravelly sand.	Lithology
above +150	disturbed sandy loam.
0 to +150	gravelly sands faintly stratified, with two lenses of silt.
0	base of gravelly sand, higher on left (west) side.
0 to -29	laminated silty sand without shells, interfingered by crag to left.
-29 to -460	crag: light-coloured medium profusely shelly clean sand. lens of brown, laminated silt at -50 cms. and another slightly above to left.
-460	water- greenish sand with few shell fragments.

Samples were taken for Mollusca, and by Dr. R. G. West for Pollen.

(continued on Page 5.)

The micaceous clay referred to by Fisher was not found. No mammalian remains were seen though they may occur in the samples. The relationship to the Westldton Beds was not seen. Hey (personal communication) does not consider the gravelly sand, to be Westleton Beds. There can not however be much difference in level between the top of the succession just described and the base of the gravels in the pit higher up the field. It remains to work out the relationship.

Of the Mollusca, it may be given as a first impression that the assemblages are of littoral aspect. The samples are yet to be quantitatively studied. Cardium, Littorina, Nucella, Mya, much broken shell material and the extinct Macoma obliqua all occur in profusion. The deposit is remarkable for its constant profusion of shells from -29 cms. downwards, and is for this reason well worth a visit.

Cited:

Hey, R. W. 1967 The Westleton Bods Reconsidered. Proc. Geol. Assoc. 78 (3) 427-445

Whitaker, W. 1887 The Geology of Southwold and the Suffolk Coast, from Dunwich to Covehithe.

P. E. P. Norton.

A LIST OF EAST ANGLIAN RECENT BIVALVE MOLLUSCS.

Most of the records are taken from the following papers and publications:

Mayfield, A. 1901 "Norfolk Marine Mollusca". Journal of Conchology, Vol.10, No.2, April 1901, pp.49-50.

Mayfield, A. 1908 "The Marine and Estuarine Mollusca of Suffolk". Journal of the Ipswich and District Field Club, Vol.1, Part 1, pp.5-9.

(- - - - - - - -) 1938 "The Mollusca of Suffolk". Trans. Suffolk Nat. Soc, Vol.IV, Pt.l, pp.2-22.

Tebble, N. 1966 "British Bivalve Seashells". British Museum (Natural History).

Davis, D. S. 1967 "The Marine Fauna of the Blackwater Estuary and Adjacent Waters Essex". Essex Naturalist, Vol.32, Pt 1, pp.2-61.

The status (e.g. ‘living,’ 'single valves’, etc.) is not known;

	N = Norfolk S = Suffolk E = Essex ‘common’, 'rare’, etc. are after the above authors.
Nucula nucleus (Linnaeus).	N. & E. (common); S. (Gorleston, Lowestoft, Aldeburgh, Felixstowe).
H. turgida Leckenby and Marshall. (= N. nitida G. B. Sowerby)	N. (rare): S. (not common: Gorleston, Bawdsey, Felixstowe).
N. tenuis (Montagu)	E. (common).
Nuculana minuta (Muller	N. & E. (rare).
Arca lactea L. (= Barbatia lactea)	N. (rare).
Anomia ephippium L.	N. (common); S. (Felixstowe).
Heteranomia squamula (L.) (= A. aculeata Muller)	N. (The Wash).
Mytilus edulis L.	N, S. & E. (very common).
Modiolus modiolus (L.)	N. (common); S. (Gorleston, Dunwich, Aldeburgh, Felixstowe, Orwell Haven); E. (fairly common).

M. barbatus (L.)	N. (rare)
Musculus marmoratus (Forbes) (=Modiolaria marmorata)	N. (The Wash); S. (Gorleston, Hopton, R. Orwell)
M. discors (L.)	N. (common); S. (common; Lowestoft, Aldeburgh, Felixstowe); E. (occasional)
M. nigor (Gray)	N.
Ostrea edulis L.	N. (common); S. (common; Aldeburgh to Felixstowe, Ipswich); E.
Crassostrea virginica (Gmelin)	E. (rare; now extinct in British seas)
C. angulata (Lamarck)	E.
Chlamys varia (L.) (=Pecten varius)	N. (common); S. (common; Kessingland, Walberswick, Aldeburgh, Bawdsey, Felixstowe); E. (common)
C. opercularis (L.)	N. (rare); S. (rare; Felixstowe); E. (rare)
Astarte triangularis (Montagu) (=Goodallia triangularis)	N. (rare)
Loripes lucinalis (Lamarck) (=Loripes lacteus)	N. (Yarmouth, Gorleston)
Lucinoma borealis (Linn.) (=Lucina borealis; =Phacoides borealis)	N. (rare); S. (Bawdsey); E.
Kellia suborbicularis (Montagu	N. (The Wash)
Mysella bidentata (Montagu) (=Montacuta bidentata)	N. (Yarmouth); S. ('off coast'); E.
Acanthocardia echinata (L.) (=Cardium echinatum)	E.
Parvicardium ovale (Sowerby) (=Cardium fasciatum)	N. (rare)
Parvicardiura exiguum (Gmelin)	N. (common); S. (Aldeburgh; Orford; Felixstowe); E. (common; Burnham-on-Crouch).
Cerastoderma edule (L.) (=Cardium edule)	N. (common); S. (very common; Oulton Broad; Blythburgh); E. (very common Burnham-on-Crouch)
C. lamarcki (Reeve)	S. (Dunvich); E. (Burnham-on-Crouch
Laevicardium crassum (Gmelin)	E. (rare)
Dosinia exolota (L.)	N. (rare)
Venus ovata Pennant	N. (rare)
V. fasciata (da Costa) (=V. gallina)	N. (rare)
V. mercenaria L.	S.
Venerupis aurea (Gmelin) (=Tapes aureus)	S. (Felixstowe); E. (common)
V. rhomboides (Pennant) (=T. virgineus)	N. (rare); S. (Felixstowe, R. Orwell)
V. pullastra (Montagu) (=Paphia pullastra)	N. (common); S. (Southwold; Bawdsey; Felixstowe); E. (common)
V. docussata (L.)	E. (occasional)
Petricola pholadiformis Lamarck	S. (Corton; Lowestoft; Dunwich; Felixstowe); E. (common)
Mactra corallina (L.) (=M. stultorum)	N. (common); S. (Walberswick; Dunwich; Felixstowe); E.
Spisula elliptica (Brown)	N. (rare); S. (Bawdsey); E. (common)
S. Solida (L.)	N. (Wells); S. (Gorleston; Southwold; Walberswick; Bawdsey; Felixstowe),
S. subtruncata (da Costa)	S. (Southwold; Felixstowe); E.

Donax vittatus (da Costa)	N. (rare; Holkham); S. (rare- Felixstowe)
Tellina tenuis da Costa	N. (plentiful); S. (Lowestoft; Felixstowe) E. (not common)
T. fabula Gmelin	N. (rare; Holkham Bay): S. (Gorleston; Lowestoft; Orford.); E. (not common)
T. pygmaea Loven (=T. pusilla)	N. (The Wash)
T. donacina Linnaeus	N. (rare)
Gastrana fragilis (L.)	E. (occasional)
Macoma balthica (L.)	N. (common); S. (very common; Breydon Water; Gorleston; Blythburgh; Aldeburgh; Felixstowe; Ipswich); E. (very common; Walton-on-Naze)
Scrobicularia plana (da Costa) (=S. piperata)	N. (plentiful); S. (common; Breydon Water; Oulton; Southwold; Aldeburgh; Orford; Ramsholt; Orwell Haven; Ipswich); E. (very common)
Abra tenuis (Montagu) (=Syndosmya tenuis)	S. (common; Lake Lothing; Southwold; Aldeburgh; Orford; Woodbridge; Felixstowe; Ipswich)
Abra alba (Wood) (=S. alba)	N. (frequent); S. (not common; Gorleston; Lowestoft; Aldeburgh; Bawdsey; Ramsholt; Felixstowe) E. (common)
Abra nitida (Muller) (=S. nitida = Scrobicularia nitida)	N. (Yarmouth); S. (Aldeburgh; Orwell Haven); E.
Gari depressa (Pennant) (=Psammobia depressa)	N. (rare)
G. tellinella (Lamarck) (=P. tellinella)	N. (The Wash)
Ensis onsis (Linnaeus)	N. (frequent); E.
E. arcuatus (Jeffreys)	E.
E. siliqua, (L.)	N. (plentiful; Scolt Head Island); S. (Kessingland; Covehithe; Easton; Southwold; Walberswick; Dunwich; Aldeburgh; Felixstowe); E. (common)
Solen marginatus Montagu (=S. vagina)	N. (rare); S. (Kessingland); E.
Cultellus pellucidus (Pennant)	E.
Mya trucata Linn.	N. (plentiful; Scolt Head Island); S. (Southwold; Walberswick; Aldeburgh; Felixstowe); E. (common)
Mya arenaria Linn.	N. (plentiful); S. (Breydon; Felixstowe; Ipswich); E. (very common)
Sphenia binghami Turton	N. (The Wash); E.
Corbula gibba (Olivi)	N. (rare)
Hiatella arctica (Linn.) (=Saxicava arctica, and including H. gallicana =S. rugosa)	N. (The Wash); S. (Gorleston; Bawdsey); E. (common)
Pholas dactylus Linn.	N. (Yarmouth); S. (Southwold; Bawdsey; Felixstowe); E.
Barnea candida, (Linn.)	N. (common); S. (plentiful; Gorleston; Lowestoft; Kessingland; Southwold; Walberswick; Dunwich; Aldeburgh; Bawdsey; Felixstowe); E. (vary common)
Barnea parva (Pennant)	S. (rare; Felixstowe); E.
Zirfaea crispata (Ljnn.)	N. (frequent); S. (Walberswick; Bawdsey; Felixstowe); E.
Teredo navalis Linn.	N. (common); S. (Gorleston; Lowestoft; Covehithe; Southwold; Dunwich; Sizewell; Bawdsey; Felixstowe); E. (common; Leigh-on-Sea)

THE VIVIPARIDAE

This large and varied family of freshwater gastropoda is by virtue of its having two species (V. viviparus (k.) and V. contectus (Millet)) living in English rivers, well known to British collectors.The Viviparidae enjoy an almost world-wide distribution, being found on all the continents except S. America and. Antarctica. It is divided into two subfamilies. Vivaparinae, inhabiting Europe, Asia Minor northern Asia and N. America, and Bellaminae in Africa, tropical Asia and Australia. They differ in the male sexual gland, which is interwoven with the digestive gland in the Vivaparinae, but free from it in the Bellaminae. Furthermore the embryonic whorls of the shell are banded in the former, but not in the latter.

The only common major factor in their distribution is through water channels and some have been introduced by man, e.g. Bellamaya malleata (Reeve) a large Japanese species, into the Western United States. Low temperature may play an important part in their distribution as it exists at present, but beyond the fact that they do not occur in the Polar regions, there is apparently no definite observation on the influences of this facto

As the name suggests, the family is viviparous and according to some authors ovo-viviparous. The sexes are separate. They are operculate, having a horny or semi-calcareous operculum. Respiration is entirely aquatic and is performed by means of a ctenidium. Food consists of aquatic plants, algae, etc. They occasionally become carnivorous. In many countries where they occur, these snails are used as food, by man and domestic animals.

Distribution: Europe. In Europe these snails do not extend their range beyond lat. 50°N. in Scandinavia and this appears to be their northern limit also in Russia. In Asia Minor they extend to about 30°E. Only one species is found south of the Appenines and none are known from the Iberian Peninsular. Bourguignat divided the European species into 7 sub-groups and no less than 50 species ! Kobelt however recognised only two main types, V. viviparus and V. contectus.

America. None are known living in Central or South America. One small isolated species, (Orb), occurs in Cuba.

In North America there are besides Viviparus s.s. four endemic genera, Tulotoma Haldeman, Campeloma Rafinesque, and Lioplax Troschel. The two common European species have been introduced into the eastern states and two Japanese species into the western seaboard.

Asia. None are found in. the greater part of Asia Minor, Arabia, Afghanistan, Tibet, the whole of central Asia, Mongolia, the greater part of China and with the exception of the Amur Basin, the whole of Asiatic Russia.

In India, the Bellamaya bengalensis group is common and widely distributed, whilst the Chinese species B. chinensis and the Japanese, B. malleata and B. japonica are the largest forms known. A small smooth unhanded species B. javanica is typical of the Bellamaya found throughout the Phillipines and the Greater Sunda Islands, although Lake Lanas on the Philippine island of Mindanao has a number of peculiar endemic species.

Australia. Known only from Northern Territory, Queensland and. parts of Eastern Australia. A very unusual form (B. fragilis Preston) with a strongly keeled and paper thin shell, has been described from New Guinea, living 8,000ft up in the Central Ariak Mountains.

Africa. Bellamya, is widely distributed in tropical Africa. The typical form is B. unicolor (Olivier) which is found fossil in deposits of Miocene age and is now found living in all the great lakes and. major river systems. In Lake Tanganyika the large and striking genus Neothauma is common and another species N. ecclesi has recently been discovered in Lake Nyasa. Numorous sub-species of B. unicolor have been described from Lake Victoria. Lake Minerva has a very distinct species, perhaps allied to Neothauma.

Fossil Viviparidae. Many fossil species, attributed to this family have been described, especially from rocks of Caenozoic age. The earliest fossil records are from Jurassic strata of the Inferior Oolite (Bajocian). The record of a supposed form of Viviparus (V. carbonarius Garwood) from the Carboniferous of Yorkshire is undoubtedly based on incorrect identification.

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It is also now considered most likely that the Jurassic species (V. scoticus Tate) was correctly referred to this family. From the Cretaceous onwards, however, there is no doubt that members of this family became definitely separated from the ancestral marine and estuarine forms and took to a freshwater life.

The first extensive occurrence of Viviparidae and one which can without any doubt be assigned to the family, is that of the Purbeckian forms of Upper Jurassic age and those found in the Wealden strata of Lower Cretaceous age, in south west England. Three species form the main constituents of the famous Purbeck Marbles.

During the Tertiary many species were living in most parts of the world. In Britain, the Bembridge Beds of Oligocene age, in the Isle of Wight contain several species of which V. lentus (Solander) is typical. This species is also found in the Woolwich Beds of Lower Eocene age.

The magnificent series of Viviparus found in the Pliocene of Slavonia have attracted attention from early times and the literature on them is very extensive. They have been frequently referred to in studies on evolution. The highly sculptured and otherwise specialised species of the Pliocene lakes of Eastern Europe had been produced, under very favourable lacustrine conditions and were not able to adapt themselves to the changing conditions, and all perished without leaving any descendants whatsoever. The less specialised smooth-shelled species persisted and spread over the entire area, giving rise to such species as V. diluvianus (Kunth) found in Pleistocene deposits in Britain and still living on the continent, and V. medius (Woodward), and finally to V. viviparus (L) and V. contectus (Millet). Widely distributed over this area today.

Elsewhere fossil Viviparidae are found in countries where the family is still living, the exception being South America, where the discovery of a true Viviparus in Upper Cretaceous deposits in Brazil and another from beds of Tertiary ago in Chile, suffice to prove that the family was represented there at least until the Early Tertiary. The causes which lead to its extinction are uncertain, as other freshwater molluscs like the Ampullariidae still live there. Possibly the flooding over the area in which the family flourished by the sea was responsible for its disappearance.

T. Pain & D. Beatty.

NOTE ON THE GEOLOGY OF STONEHAVEN, KINCARDINESHIRE

The foreshore and cliffs northwards from Stonehaven, by Cowrie, the Old Kirk Shore and Ruthery Head to Craigeven Bay and Garron Point show, within a short distance, an. interesting variety of rocks, - Dalradian metamorphics (Pre-Cambrian - Lowest Palaeozoic), Highland Border Series (Cambro-Ordovician) and Lower Old Red Sandstone. Metamorphic, igneous, and sedimentary rocks may be seen, also the effects of the Highland. Boundary Fault. A geological map of the district is to be found, on page 45 of 'The Grampian Highlands' (British Regional Geology) by H. H. Read and A. G. MacGregor (2nd. Edtn.,1948, reprint.1956-57).

The writer visited the area in August 1969.

DALRADIAN SERIES

Schistose Grits: not seen, by writer, except as beach pebbles, mica conspicuous.

Slates and phyllites are also shown on the geological map, as well as dolomite along the line of the Highland Boundary Fault, which separates the Dalradian from the Highland Border Series.

HIGHLAND BORDER SERIES

Spilitic lavas, with bands of black shale and jasper; the latter was not seen in situ, but pebbles could be found on the beach.

Fosills recorded from this series are the brachiepods Linguella, Obolella, Acrotreta, Linnarssonla, Siphonotretat, a phyllocarid bivalve and a tubular worm.

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LOWER OLD RED SANDSTONE

The Stonehaven Beds, belonging to the Downtonian Stage of the Lower Old Red Sandstone, rest unconformably on the Highland Border Series. On the foreshore the strata are almost vertical, striking N.E.- S.W.

The succession is:-

5.	Grey sandstones with bands of shale, including a fish-band and a Dictyocyris band	600ft.
4.	Red sandstone	60ft.
3.	Volcanic conglomerate and. tuff	30-40ft.
2.	Sandstone, purple, grey and brown, with silt and volcanic debris.	1060ft.
1.	Basement breccias (Ruthery Head Breccia) and silts	200ft.

Fossils recorded from these beds are:-

Malacostracan;-	Ceratiocaris
Myriadopods;-	Archidesmus; ?Kampecaria
Eurypterids;-	Pterygotus; Hughmilleria
'Fish';-	Traquiraspis; Phialaspis; Hemitelaspis; ?Pterolepis

Dyke-like intrusions of quartz-porphyry may be seen cutting the Stonehaven Beds.

QUATERNARY

Indigo till containing striated marine shells is recorded at Stonehaven.

R. Markham.

"... TO ENCOURAGE INTEREST AND RESEARCH INTO LOCAL GEOLOGY." - IGG Bull.1, 1966.

This is the aim of the Geological Group as stated in its first publication. The membership figure for 1968 - 69 was 40, including 14 new members. This suggests that the interest is present; research, however, is at present being left to the few.

It seems that the majority of members, who have had no geological training, regard research as something for the specialist. This need not be true. All geological research begins with observation, usually of exposures, and this anyone can do. Later stages, of explanation and formulation of theories, it is true, can only be done with a background of geological knowledge.

Permanent exposures such as cliffs and most large pits and quarries, have usually been well investigated and documented (although oven these are continually changing). However, a wealth of information is lost, in the form of temporary exposures, simply because nobody is at the right place at the right time. Under this category come trenches (for pipes, cables, etc.), foundation diggings for buildings, road cuttings, boreholes, etc. - all very common these days.

Admittedly, on peering into a trench and seeing, say, four feet of sand and gravel, one may think, of what use is that information? By itself, probably little, but as part of an overall pattern it will provide a missing link.

With the help of all those members living in East Anglia (especially in the Ipswich area) we would like to compile information from such exposures. For the assistance of those who are not sure how to go about this, the following is a guide.

Assuming an exposure is a vertical section, the first thing to do is decide if there is more than one distinct layer, and if so, where the boundaries between them occur. Making a simple diagram to illustrate the relative positions of the bods, measure or estimate the thickness of each. (Note: there will usually be a soil layer or "made ground" at the top.) If the exposure has appreciable horizontal extent, and there is some variation in thickness of beds, or structure, indicate this on the diagram.

Then describe each layer (labelled on the diagram). Most exposures

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in our area will consist of 'soft' (i.e.. unconsolidated) rocks, with the exception of chalk. The latter needs no further classification, but anything else should be classified, primarily, by its grade.

The four easily recognised divisions of grade, in decreasing order of grain size are:- gravel, sand, silt, and clay. A combination of grades may occur together e.g. sand and gravel; loam (sand and clay); boulder clay.

Other special layers may occur, e.g. peat. (Notes a thin pebble layer at the base of a bed may be important).

As a further classification, the finer grades may be described in terms of colour. Gravel can also be described by the amount of rounding of the individual stones - as angular, sub-angular, rounded.

Look for fossils and note their abundance and position in the exposure, (identify type or keep for later identification).

Similarly for any problematical material, take a sample and keep for identification.

To localise the exposure, give an. Ordnance Survey grid reference (as instructed on each map) if possible, or tie in the position relative to local landmarks, roads and rivers.

Remember: exposures of unconsolidated material are liable to cave-in, and can be extremely dangerous.

Remember: always seek permission of owners or workmen.

The written article can be as brief or long as you like, and no great literary skill is necessary. (Once you have written a few it is quite easy). And what do you get out of it? The satisfaction of doing original research and getting your name in print, - and a thicker bulletin.

P. Grainger

RADIO-CARBON BATING AND THE WEICHSELIAN

Quaternary Research Association meeting, 3rd-4 th January 1969, held at University College London.

The meeting was divided into two sessions

I Techniques of radio-carbon dating and the collection and assessment of material.

II Radio-carbon dating and Weichselian stratigraphy.

Firstly, in session I, the various pieces of apparatus in use in Britain were described.

The British Museum apparatus - H. Barker

Recently changed from the more usual proportional gas counting system to liquid scintillation counting. The beta decay of C-14 is measured from benzene synthesised from the sample. Most B.M. current research concerned, with post-glacial material. The accuracy of dates obtained depends on the time taken on measurement, the size of the sample, and the degree of contamination. With a relatively pure sample, dates back to 35,000 years B.P. are reasonably accurate with 3gm. of material.

Cambridge University apparatus - V. R. S. Switsur

Uses gas proportional counting technique. Activity of carbon dioxide, extracted from sample and highly purified, is measured.

Birmingham apparatus - D. J. Blundell

Gas proportional counting. Uses methane; easier chemical preparation than carbon dioxide. Careful pre-treatment necessary to remove contaminants. Plant materials alternately boiled in acid and alkali solutions; only collagen fraction of bones used; only inner layers of shells used.

(continued on Page 12.)

Belfast apparatus - A. G. Smith

Gas proportional counting, using methane.

Next, the collection and assessment of material from the geological and botanical samples was described.

The Geological Sample - G. S. Boulton

At the site of collection the likelihood of contamination of the sample by younger or older carbon must be assessed. Even less than two per cent contamination produces gross errors in Weichselian samples. Contamination can be due to residual humus, oxidation above the water table, replacement of carbon in shells by carbon from groundwater, etc..

The Botanical Sample - H. Godwin

Plant material, which can be dated by both radio-carbon and other method^, provides a useful means for determining the errors and validity of C-14 dating. For example, counting tree rings (dendrochronology), and pollen analysis of peat.

Session II - Radio-carbon dating and Weichselian stratigraphy was conducted on a regional basis, as follows;-

Netherlands and Belgium - E. A. Francis
Southern England and East Anglia - R. G. Test
The Midlands - F. V. J. Shotton
Ireland and the Isle of Man - G. F. Mitchell
South Wales - B. S. John and I. D. Ellis-Gruffydd
North Wales - F. M. Synge
Northern England - L. F. Penny
Scotland - J. B. Sissons

For each region a summary of the dates so far determined was given.

P. Grainger

NOTES FOR AMATEUR MINERALOGISTS

Enquiries about ‘polished stones’ are common, at the writer’s museum, and it is hoped that the following information will be of interest. The names and addresses are given in good faith. Some details taken from a display at Edinburgh Museum.

BOOKS

British Museum (Natural History), "Instructions for Collectors, No.11. Fossils, Minerals and Rocks.
Zim, H. S., Shaffer, P. R. & Perlman, R. "Rocks and Minerals” Paul Hamlyn, London.
Kirkaldy, J. F. "Minerals and Rocks in colour" Blandford Press, London.
Jones, W. R. "Minerals in Industry" Penguin books.
Read, H. H. “Rutley's Elements of Mineralogy"
Libraries and booksellers may be consulted for other books.

MAGAZINE

"Lapidary Journal" P.O. Box 2369, San Diego 12, California, U.S.A.

MUSEUM DISPLAYS

London, Geological Museum. London, British Museum (Natural History).
Cambridge, Sedgwick Museum
Ipswich Museum.

SOCIETIES

The Gemmological Association of Great Britain, Saint Dunstan's House, Carey Lane, London, E.C.2.
The Mineralogical Society, 41 Queen’s Gate, London, S.W.7.
There are often, local groups (e.g. Felixstowe, Stowmarket) and individuals (e.g. Ipswich).

MINERAL DEALERS

Gregory, Bottley & Go,, 30 Old Church Street, Chelsea, London, S.W.3.

The Geological Laboratories, 168 Moss Lane East, Manchester 15.

CUTTING AND POLISHING STONES

CUTTING

Rock-saw used; a power-driven, metal disc, the edge impregnated with crushed diamonds.

POLISHING

Grind smooth on iron wheels using carborundum abrasives; polish on special wheels using cerium oxide as polishing agent. There are variations on these methods.

THIN SECTIONS

Cut thin slab, grind down until very thin, and mount on glass for microscopic examination.

POLISHED ORE SECTION

One side cut flat, then embed in plastic. Grind both and polish till mirror-like surface appears, and examine with microscope.

CABOCHON

Rounded gems; produced by polishing.

FACETTED GEMS

Transparent materials are often cut to display glittering facet surfaces.

TUMBLED STONES

Hard attractive stones are placed in a container (or barrel) with water and abrasive. The container is usually power-driven and rotates load continuously for 2-3 weeks. Several grades of grit are used, but the final stage requires a polishing agent such as cerium oxide.

Further information, on subjects such as equipment, localities, and identification may be obtained from the first two books mentioned; much of it could equally well be applied to fossils.

R. Markham.

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Vol.71 (1960)

Baden-Powell, D. F. W. & West, R. G. "Summer Field Meeting in East Anglia" pp.61-80.
Wooldridge, S. W. "The Pleistocene Succession in the London Basin" 113-129.
Forbes, C. L. "Field Meeting in the Cambridge District" 233-241.
Straw, A. "The Limit of the 'Last' Glaciation in North Norfolk" 379-390.

Vol.72 (1961)

"Obituary. S. H. Warren; 170.

Vol.73. (1962)

Loveday, J. "Plateau Deposits of the Southern Chiltern Hills"8 3-102.
D. ,I. S. "Obituary. P. G. H. Boswell" 151-154.
Gurr, P. R. "A New Fish Fauna from the Woolwich Bottom Bed (Sparaacian) of Heme Bay, Kent" 419-447.

Vol.74. (1963)

Jeffries, R. P. S. "The Stratigraphy of the Actinocamax plenus Subzone (Turonian) in the Anglo-Paris Basin" 1-33.
S., R. J. G. "Obituary. M. A. C. Hinton" 119-120.
K., J. F. "Obituary. S. U. Wooldridge" 122-126.
Kirkaldy, J. F. "The Wealden and Marine Lower Cretaceous Beds of England" 127-146.
West, R. G. "Problems of the British Quaternary" 147-186.
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Curry, D. "On Rotten Flint Pebbles in the Palaeogene of Southern England" 457-460.

Vol.75. (1964)

McManus, J. "The Mya arenaria Bed of the Red Crag of Essex" 61-66.

Clarke, B. S. “Belemnite Orientation in the Hunstanton Red Rock" 345-355.

Vol.76 (1965)

Banham, P. H. "Pleistocene Deposits at Weybourne: New Data" 77-81.

Curry, D. "The Palaeogene Beds of South-East England" 151-173.

Hancock, J. M., et al. "The Gault of the Weald" 243-260.

Mitchell, G. F. "The St. Erth Beds - An Alternative "Explanation" 345-366.

Hey, R. U. "Highly Quartzose Pebble Gravels in the London Basin 403-420.

Vol.77 (1966)

Blezard, R. G. "Field Meeting at Aveley and West Thurrock" 273-276.

Bromley, R. G. "Field Meeting on the Chalk of Cambridgeshire and Hertfordshire" 277-279.

Greensmith, J. T. & Tucker, E. V. "Field Meeting at Bradwell, Essex" 281-282.

Greensmith, J. T. & Tucker, E. V. "Morphology and Evolution of Inshore Shell Ridges and Mud-Mounds on Modern Intertidal Flats, near Bradwell, Essex”' 329-346.

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Carreck, J. N. "Microtine Remains from the Norwich Crag (Lower Pleistocene) of Easton Bavents, Suffolk" 491-496.

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Wright, C. W. "Notes on. Cretaceous Saleniidae" 9-25.

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L., B. "Obituary. J.F„ Jackson" 385-387.

Hey, R. W. "The Westleton Beds Reconsidered" 427-455.

Vol.79. (1968)

B.-P., D. F. W. "Obituary to J. E. Sainty" 267-269.

Blondeau, A. & Pomerol, C. "A Contribution to the Sedimentological Study of the Palaeogene of England" 441-455.

Shotton, F. W. "Prehistoric Man’s Use of Stone in Britain" 477-491.

West, R. G. & Banham. P. H. "Short Field Meeting on the North Norfolk Coast" 493-512

Vol.80 parts 1-3 (1969)

Carreck, J. N. & Adams, S. J. "Field Extraction and Laboratory Preparation of Fossil Bones and Teeth, Using Expanded Polyurethane" 81-87.

Cooper, J. & Rundle, A. J. "A Temporary Exposure of London Clay at Shenfield Essex" 189-192. Sparks, B. W., West, R. G., Williams, R. G. B. & Ransom, M. "Hoxnian Interglacial Deposits near Hatfield, Herts." 243-267.

West, R. G. "Pollen Analyses from Interglacial Deposits at Aveley and Grays, Essex" 271-282.

R. Markham.

COMMENTS AND NOTES ON 1968-1969

The following publications appeared –

Newsletters nos.	12	(13 November 1968,	2 pages)
	13	{24 December 1968,	2 pages)
	14	(6 March 1969,	1 page)
	15	(7 May 1969,	1 page)
	16	(12 June 1969,	1 page)
	17	(9 August I969,	1 page)
Bulletins nos.	5	(April-June I969, for Autumn 1968,	12 pages)
	6	(July 1969, for Spring 1969,	10 pages)

Finance of publications (September 1968 - August 1969):

Expenditure	£	s	d
Postage, Newsletters 12-17	6	9	8
Postage, Bulletins 5 & 6	1	8	4
Envelopes, Newsletters 12-17	0	14	8
8 Envelopes, Bulletins 5 & 6	1	8	4
Stencils, Newsletters 12-17	0	6	7
Stencils, Bulletins 5 & 6	10	4	4
Duplicating Ink	0	19	11
Duplicating Paper	3	14	5
Correcting Fluid	0	4	3
	£16	10s	6d

Income	£	s	d
Subscriptions	19	0	0
Bulletins purchased	0	10	0
Competition at meeting	0	15	0
	£20	5s	0d
Carried forward to 1969 - 1970 ;	£3	14s	6d

(Income and expenditure Figures checked by P. Grainger and R. Markham)

Meetings were;-

Sun. 29 Sept. 1968 - Levington Creek
Sun. 1 Dec. 1968 - Chillesford
Thurs. 2 Jan. 1969 - Christmas Indoor Meeting
Mon. 6 Jan. 1969 - Badger's Bank, Ipswich, 'dig'
Sun. 30 Mar. 1969 - Walton-on-the-Naze
Thurs. 3 Apr. 1969 - Crag Sorting Livening & Informal Discussion
Sun. 22 Jun. 1969 - Reading, Berkshire
Tues. 8 Jul. 1969 - Levington Creek
Thurs. 24 Jul. 1969 - Waldringfield Heath

Meetings to which members were invited:-

15-16 Sept. 1969 - Cornwall and South Devon
10-11 May 1969 - Dorset Coast (Conchological Society)
24-26 May 1969 - Norfolk and North Suffolk (Essex Field Club, Geology Group).
Sun. 22 Jun. 1969 - Walton-on-Naze (Conchological Society)

Newsletters 12 & 13 were each of 2 pages, but 14-17 reverted to 1 page each. Bulletins 5 & 6 had less pages than previous issues, mainly for ease of publication. 1969-70 publications will follow the pattern of previous years.

Full (10s-0d) and Associateship (5s-0d) were available in 1968-69; the latter was not taken up to any great extent, and only the 10s-6d membership will be available in 1969-70.

Subscriptions became due on 1 September 1969.

Articles appearing in Bulletins 5 and 6 were;-

No.5 (April - June 1969

M. R. Leeder	"The Systematics of Belemnitella praecursor Stolley, and its distinction from Belemnitella mucronata senior Schlotheim 1813"	pp.1-4.
J. S. H. Collins	"A Guide to the identification of Crag (Plio/Pleistocene) Acorn Barnacles of the genus Balanus s.l."	4-6.
P. Grainger	"Coastal Glacial Deposits in Cork, Waterford and Wexford (S.E. Ireland)"	7-10.
(EX)	"Some Bibliographies"	10.
R. Markham	"Notes on the Hippopotamus in England"	11-12.

(EX:- extracted by the editor).

No.6 (July1969)

R. Markham	"Fieldtrip to Cornwall and South Devon, September 1968"	pp.1-2.
R. Markham	"Notes on Museums and Societies in Norfolk, Suffolk and Essex"	2-3.
R. M.	"Comment and Notes on 1967-1968"	4-5.
R. Markham	"The Blackheath Beds Fauna of Abbey Wood"	5-7.
R. Markham	"Geology of Parts of North-West Scotland"	7-10.
P. Grainger	“Notes on two boreholes near Felixstowe”	10.

R .M.

Geological Group, Ipswich. Bulletin No.7 (Autumn 1969)

Editor: R. A. D. Markham, c/o The Museum, High Street, Ipswich, Suffolk.

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Permission to visit pits and sections should always be obtained.