BULLETIN No. 5.

THE SYSTEMATICS OF Belemnitella praecursor STOLLEY, AND ITS DISTINCTION FROM Belemnitella mucronata senior SCHLOTHIEM 1813.

1. Historical review of important research.

In 1876 Barrois established the zone of Belemnites in the Upper Chalk of Britain which he later split into a lower zone of Belemnites quadratus and an upper one of Belemnites mucronatus. Up to 1948 nomenclatural confusion as to the nature of Schlothiem's holotype of Belemnites lanceolatus (Schlothiem 1813) and subsequent interpretations by Sharpe (1853-57) and Blackmore (1896) led to a neglect of belemnites as more refined zonal fossils. Brydone, a highly experienced Chalk stratigrapher, commented (1933; on the "crying need .... for a thorough study of the belemnites of the Upper Chalk."

An important series of papers by Jeletsky (e.g. 1948, 1950) finally established Belemnites lanceolatus Schloth. 1813 as the genotype of the distinct genus Belemnella Nowak 1913 and demonstrated its restriction to the Lower Maastrichtian of N.W.Europe. Belemnites lanceeolatus Sharpe non Schlothiem (1853-57, p.7, tab.i., figs.4-6) was established as Belemnitella praecursor Stolley 1897, the immediate ancestor of Belemnitella mucronata Schloth. 1813.

In N.W. Europe B. praecursor Stolley 1897 is restricted to the upper zone of the lower Campanian (zone of Gonioteuthis quadratus) and is quickly replaced at the top of this zone by B. mucronata senior Nowak 1913. a stout well mucronated form of B. mucronata Schloth 1813 which characterises the lower parts of the zone of B. mucronata (see Peake and Hancock 1961). Jeletzky emphasises (1955} that the changes between the species are not sudden and that transitional forms exist (see Fig. 1 a-c, PI. 58, p.506 - a specimen from Coe's Pit, Bramford)

2. The morphological features of a typical belemnite guard

These are shown on Fig. 1, and below are listed the nature and development of these features in B. praecursor Stolley 1897 and B. mucronata (Schloth) senior Nowak 1913. (after Jeletsky 1948. 1955).

X = important features for distinction.

	B. praecursor	B. mucronata senior
1. Shape of guard.	slender, ventrally lanceolate.	stout, ventrally conical.
2. Depth of pseudoalveolus	shallow.	deep.
3. External length of ventral fissure	short, < 25mm.	long.
4. Schatsky Index.	7-8mm.	6-10mm.
5. Ontogeny	slender, lanceolate growth stages.	short, small, nail like growth stages
6. Dorso lateral longitudinal depressions.	well developed.	better developed.
7. Dorso lateral double furrows.	well developed.	better developed.
8. Single lateral furrows.	well developed.	better developed.
X. 9. Branching vascular impressions around alveolar fissure	weak.	strong.
X. 10. longitudinal strietions	strong.	weak.
X. 11. Mucronation	often not mucronate.	always mucronate.

Jeletsky founded several sub-species of Belemnitella praecursor s.l.;-

B. praecursor praecursor — an extremely smooth form.

B. praecursor media - a feebly sculptured, form.

B. praecursor mucronatiformis – fairlyi strongly sculptured, mucronate form.

There exists a complete transition between these species, the last giving rise to <u>B. mucronata senior</u> Nowak 1913.

I have described and attempted to identify six individuals of the genus <u>Belemnitella</u> kindly lent by R. Markham from the collections of Ipswich Museum. It must be emphasised that this diagnosis is based mostly on external characteristics and must not be regarded as conclusive until internal features such as growth stages, Schalsky Index etc. have been described. The specimens are described according to the numbered features listed overleaf.

(a) <u>Descriptions</u>.

Spec. marked 'Claydon'.

1. long, stout, ventrally lanceolate. 2. approx. 40mm. 3. 1mm. 6. prominent. 7. straight. 8. prominent, joining 7. at 90 degrees. 9. no intensification but prominent on ventro-lateral surface. 10. prominent at apical end and all over ventral surface. 11.?

Incomplete spec. (1) location: Claydon.

1. slightly lanceolate, slender. 2. approx. 30mm. 3. 2.5mm. 6. weak, widely spaced. 7. fairly well developed. 8. prominent. 9. numerous and weak around 8.but none around alveolar fissure. 10. few. 11. ?.

Incomplete spec. (2) location: Claydon.

1. cone shaped. 2. 30mm. 3. 1mm. 6. - 11. not seen due to poor preservation.

Spec. marked 'D'. Location: Claydon.

1. non lanceolate. 2. 18mm. 3. 1mm. 6. extremely short. 7. long and straight. 8. not seen. 9. (guard smooth but mostly bad preservation. 10. abundant but not 'deep'. 11. ? .

Spec. marked 'C'. Location: Claydon.

1. slender, extremely lanceolate. 2. 20mm, thin alveolar wall. 3. not seen. 6. short. 7. well developed, wavy towards apex. 8. not developed. 9. none on alveolar end but two prominent ones branch off from 7. on <u>one side only.</u> 10. not well developed. 11. non mucronate.

Spec, marked 'E'. Location: Claydon

1. Lanceolate? , but only alveolar end present. 2. 27mm. 3. 5mm. 6. wide, tapering quickly. 7. specimen incomplete. 8. well marked. 9. prominent intensification to give granular appearance. (Wet first !). 10. present ventrally, but subdued by 9. 11. ?.

(b) <u>Diagnosis.</u>

The large spec. marked 'Claydon' is considered to be <u>Belemnitella praecursor</u> Stolley s.l. on the basis of its lanceolate shape, predominance of longitudinal markings over vascular imprints on the greater part of the guard (The single lateral furrows are exceptionally well seen and give rise to many other vascular imprints).

The specs. (1), (2) and 'D' are also considered to be <u>B. praecursor</u> Stolley s.l. on account of the absence of vascular imprints and dominance of longitudinal striations.

Spec. 'C', probably represents a pathological individual of <u>B. praecursor</u> Stolley s.l. due to the lack of an alveolar fissure and the unequal development of vascular markings outlined above.

Spec. 'E', may well be an example of <u>Belemnitella mucronata senior</u>, on the basis of the great intensification of vascular Markings around the alveolar slit but the lack of the greater part of the guard does not enable a definite conclusion to be made.

Fig.1. Basic morphology of a hypothetical *Belemnitella* sp.

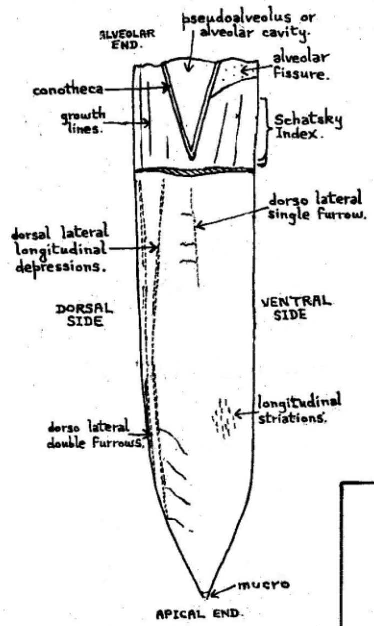


Fig. 2. Detail of alveolar end of *B. mucronata senior* Nowak 1913

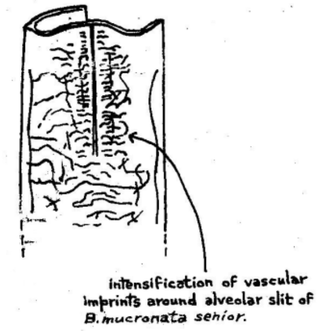
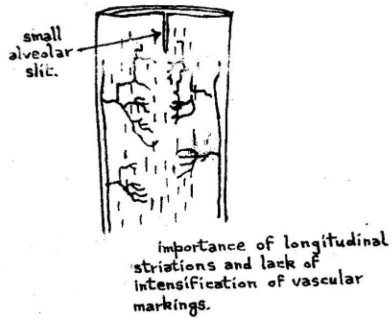


Fig. 3. Detail of alveolar end of *B. praecursor* s.l.



BELEMNITELLA

BARNACLES

Fig. 1

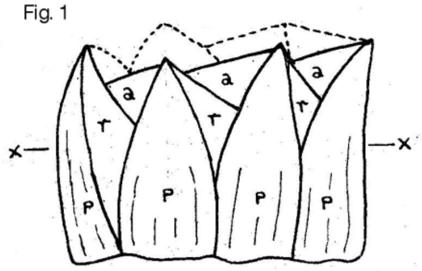


Fig. 2

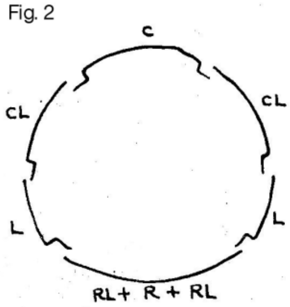


Fig. 3a

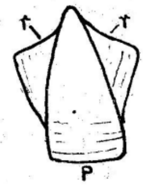


Fig. 3b

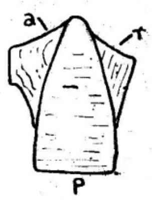


Fig. 3c

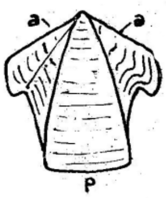


Fig. 4a

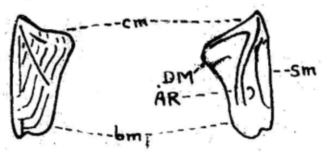


Fig. 4b

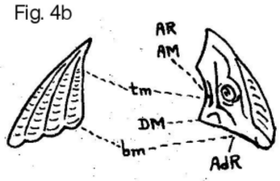


Fig. 5a

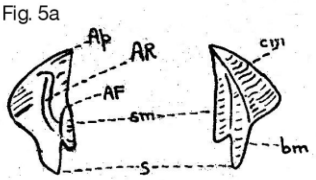


Fig. 5b

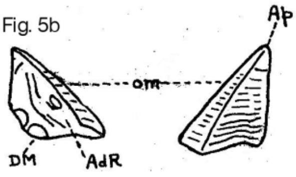
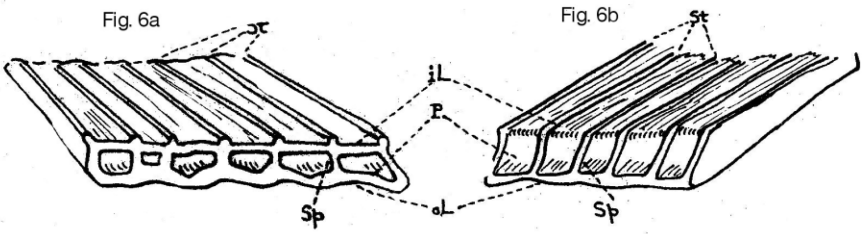


Fig. 6a

Fig. 6b



It may, on the other hand, represent an advanced form of Belemnitella praecursor muoronatiformls Jeletsky 1955, almost transitional with B. mucronata senior Nowak 1913.

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M. R. LEEDER.

A GUIDE TO THE IDENTIFICATION OF CRAG (PLIO/PLEISTOCENE) ACORN BARNACLES OF THE GENUS BALANUS s.l.

Acorn Barnacles (Cirrlpedia, Balanidae) form a predominant part of the arthropod assemblage throughout the crag deposits and whilst certain species are readily distinguishable, others may easily be confused. Specific determination may usually be achieved by the recognition of any one, or a combination, of a few major features.

The general appearance of the the shell, whether smooth or ribbed, conical or cylindrical; the shape of the orifice and nature of the radii and alae, etc, may, with practice, be sufficient evidence on which to base a specimens identity. Nevertheless, these features should not be relied upon entirely, since the appearance of the shell varies (as observations of living forms show) according, to habitat. For example, cramped conditions give rise to contorted forms, whilst exposed, individuals produce thickened shells.

The nature of the opercular valves (terga & scuta), when present, is generally sufficient to provide tolerable determination. They are seldom preserved in situ, but when valves are not obvious, it is always sound practice to probe carefully into the orifice of the shell to see if they are among the infilling debris. In many cases however, the valves are lest completely and an examination of the shell itself must be resorted to.

The compartments (walls), basis and radii of the shell are sometimes composed of an inner and outer lamina which are joined together by septa, forming a series of tubes or pores.

The presence or absence of these pores and the construction of the septa, provides a useful, but by no means final indication of the species. The relative angle of the ala and radius to the paries (plural parriets) is another important consideration.

Yet another aid to Identification consists in examining the "interlaminate figures" seen in a polished traverse section of the wall. These figures were first observed by Alessandri in 1895. Several other workers noted them, but it was not until 1956 that the late I. E. Cornwall published a paper which demonstrated their full value as specific indicators. Davadie (1963) employed and extended this technique in her extensive work (wherein references to Cornwall's work may be found) on European Balanids. Although materials needed, apart from a decent microscope, are not complicated it is a method requiring much time and patience. Little has been done in this respect with British material; thus an opportunity for research exists.

The vertical distribution of British Plio/Pleistocene members of Balanus, together with a simple guide to the parts furnished with pores, is illustrated in the table further on. It should be noted that some of the living species no longer inhabit British waters.

ACKNOWLEDGEMENTS

Thanks are due to P. Cambridge Esq., for much useful advice concerning the vertical distribution of the species listed in the Table.

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TABLE - Vertical distribution of British Crag Acorn Barnacles
& a guide to the parts furnished with pores.

	vertical distribution by geological age							pore locations		
	Liv	For	Wey	Chil	Nor	Red	Cor	walls	basis	radii
Balanus tintinnabulum (Linn)	X					X		X	X	X
B. calceolus (Pallas)	X						X	X	X	
B. spangleola Brown	X						X	X	X	
B. concavus Bronn	X			X		X	X	X	X	
B. balanus (Linn)	X	X	X	X	X	X		X		
B. crenatus Brug	X	X	X	X	X	X	X	X		
B. hameri Ascanius	X				X	X				
B. bisulcatus Darwin						X	X		X	
B. dolosus Darwin					X	X			X	
B. inclusus Darwin						X	X		X	
B. balanoides (L.) #	X			X						

Key to Table

in this species, the basis is membranous.

geological age

Liv	Living species.
For	Forest Bed.
Wey	Weybourne Crag.
Chil	Chillesford Crag.
Nor	Norwich Crag.
Red	Red Crag.
Cor	Coralline Crag.

EXPLANATION OF BARNACLE FIGURES on Page 3.

Fig. 1.	Walls of typical Acorn Barnacle.
Fig. 2.	A section across the barnacle at x - x (Fig. 1.) showing the mode of imbrication of the compartments of Balanus. In this genus, which has six compartments, the rostrum end rostrolateral compartments (RL) are congrescent, as is shown in both Figs. 1 & 2. It has become customary to refer to this composite compartment simply as the 'rostrum'. a = alae; p = parietes; r = radii; R = rostrum; L = lateral; C= carinolateral; C = carina.
Fig. 3(a)	Compartment with two radii, serving either as a rastrolateral or as a rostrum congrescent with the rostrolaterals, as in Balanus.
(b)	Compartment with a radius and an ala, serving as a lateral or carinolateral compartment.
(c)	Compartment with two alae, serving as a carina (also as a rostrum in genera other than Balanus). Symbols as in Figs. 1 & 2.
Figs. 4(a) & 5(a) & 4(b) & 5(b).	External and internal views of terga and scuta of various forms. bm = basal margin; cm = carinal margin; om = opercular margin; sm = scutal margin; tm = tergal margin; Ap = Apex; S = spur; AF = articular furrow; AR = articular ridge; AdR = adductor ridge; AM = (circular) pit for adductor muscle; DM = pit for lateral depressor muscle.
Figs. 6(a-b)	Sections, magnified many times, through parietes to show the arrangements of the septa and pores in two examples of shell construction. The figures are typical of Balanus crenatus Brug and Balanus Balanus (L). respectively.

Figs. 3, 4 & 5, after Darwin. (1854).
Fig. 2 after Pilsbry. (1916).

J. S. H. Collins

COASTAL GLACIAL DEPOSITS IN CORK, WATERFORD AND WEXFORD (S. E. IRELAND.)

Field meeting of the Quaternary Field Study Group in Ireland April,1968. (Q. F. S. G is now the Quaternary Research Association).

INTRODUCTION YO THE GLACIAL HISTORY OF S. E. IRELAND

Tentative Stratigraphic Table - Mitchell 1968.

Courtmacsherry Peat		Postglacial	Flandrian
Shortalstown Clay-mud	(Late glacial)	Last glaciation	Devensian
Gurraghcloe Moraine			
Cotts Moraine			
Cahore Beach (?)		Ipswich Interglacial	Ipswichian
Shortalstown Marine Clay			
Garry Roe & Bally Royle Tills		Gipping Glaciation	Wolstonian
Garry Roe Outwash			
Ballycroneen till			
Fethard Solifluction-earth			
Newtown Peat		Hoxne Interglacial	Hoxnian
Courtmacsherry Beach			
Courtmacsherry Erratics		Lowestoft Glaciation	Anglian
Courtmacsherry Shore-platform		Cromer preglacial	Cromerian

In immediately preglacial times, the Irish Sea was roughly as it is today but with a sea-level about 3m. above the present. This level must have been stable for a considerable period, as a shore-platform was cut around the coast, e.g. at Courtmacsherry.

During the first glaciation, an ice-sheet is believed to have advanced southwards down the Irish Sea turning S.W. with a limit in the region of Courtmacsherry.

In the following (Hoxnian) Interglacial, the sea-level rose to + 20m. O.D. washing away all traces of any boulder-clay deposited by the preceding ice-sheet, but leaving erratics from it as beach deposits on the shore-platform, e.g. at Courtmacsherry. The sea level dropped again and peat deposits, just above present sea level, as at Newtown, record a cool climate

There are three discernable phases of the second glaciation in Ireland. The first advance of ice did not reach the S.E. but large amounts of head, or solifluction-earth accumulated, eg. at Fethard. During the Second phase, a large mass of ice advanced down the Irish Sea, and round the coast as far as Ballycroneen near Cork, depositing a brown, shelly, calcareous till. As this ice melted shelly outwash sand and gravel was laid down. The third phase consisted of local ice advances, one eastwards from the Cork - Kerry Mts. as far as Garryvoe leaving a boulder clay that is non-calcarecus and contains mainly local rocks. Another advance from the N.W. reached Ballyvoyle in Waterford.

A recently discovered site at Shortalstown in Wexford includes a marine interglacial silt of Ipswichian age that has been pushed by a later movement of ice. Also, a beach deposit at Cahore may be of the same age.

The third glaciation in Ireland produced no known deposits in its first two, ie, early and middle stages, but towards the end of this period ice again came south, this time only as far as Wexford; inland it may have gone further. Deposits include a large kame of shelly sand and gravel at Cotts, and large amounts of terminal moraine at Curraghcloe.

At the end of the Ice Age, as the climate ameliorated, late glacial deposits accumulated, e.g. the mud-clay at Shortalstown.

SECTIONS VISITED THAT ILLUSTRATE THE GLACIAL HISTORY

Courtmacsherry Bay. (about 20 mls. S.W. of Cork.)

The section here (known as Howe's Strand) was chosen in 1904 by Wright and Muff, as their typical section to illustrate the lower part of the glacial stratigraphy.

It shows the preglacial shore platform cut in Carboniferous shale (a local facies of Carboniferous Limestone age) being eroded by a sea, now 2 - 3 m. below its surface. Larger rounded erratics cemented to this in places, are remains of the deposits left by the first glaciation, reworked by the sea in the Hoxnian Interglaclal. Other beach deposits of this period remain as sand and gravel, cemented in places, and blown sand, piled against an old cliff line. Overlaying these deposits is more direct evidence of the next glaciation. A lower Head, representing the advance of cold conditions, is followed by a grey till of local rocks, (Carb. shale and O.R.S.). This is Garryvoe Till. An upper Head indicates periglacial conditions at the retreat of the Garryvoe ice-sheet (or at the advance of the next one).

An interesting physical feature is a recent stack of beach sand, capped by Head, standing on the shore platform, that was mentioned by the early authors

<u>Shanagarry</u> (20 mls. E. of Cork)

Here, also, an extensive shore platform was cut, at about present sea-level. As the Ballycroneen advance began (and the sea level dropped) the surface of the shore platform, and its beach deposits were disturbed by frost action. The shattered rock fragments and beach deposits were arranged into frost polygons, and then smoothed off and cemented as the ice rode over them. Where the cemented skin has been eroded, some frost polygons are discernable with interstitial traces of beach deposits.

The cliffs behind this shore platform are the type site of the Garryvoe Till. This section consists of Garryvoe Till overlying Ballycroneen Till and separated from it in places by outwash sand. The difference between the two tills is not obvious at a distance, but examination of their content and a simple acid test reveal their different origins. The upper till being a land ice deposit, contains local rocks and is non-calcareous; the lower till is a sea ice deposit and contains flint chalk and greensand erratics from off-shore exposures, as well as shell fragments that make it calcareous.

<u>Newtown</u> (On west side of Waterford harbour.)

The complete section here, though not all visible at one place, is as follows;-

Till (Ballyvoyle), with sheared layers of head, mud and silt picked up from the lower deposits.
Head
Yellow silt
Peat (Hoxnian)
Brown silt
Beach deposit
Shore platform

This sequence, and a closer examination, suggests the following history of events. Extensive beach deposits were formed on the shore-platform during the Hoxnian interglacial; as the sea-level dropped with the return to a cooler climate, ponds were left in the undulations of the beach. These ponds gradually silted up with the accompanying vegetation forming peat. The pollen content of this peat (pine birch, willow, etc.) verifies the existence of a cool climate. As periglacial conditions set in, the peat was contorted and solifluction brought down silt and then head from the adjoining hills. There may have been two advances of ice, but if there were, the second one swept away all evidence of the first leaving a thick till that contains smeared blocks of interglacial deposits and indicates an advance from the N.W.

<u>Fethard</u>. (Just east of entrance to Waterford harbour.)

Here the shore-platform and old cliffs can be seen in section, as the present shore is more or less perpendicular to that of immediately preglacial times. Two stacks of solid rock are conspicuous in the present cliff of head, overlain by till. The head is of considerable thickness, and formed from material that was deeply weathered previous to solifluction as shown by its red/brown colour. Flow structures in this deposit indicate its viscous nature when moving.

The overlying till is rich in Leinster granite and non-calcareous, suggesting an advance directly from the north. The top of the till shows vertical wedges that intersect in polygonal fashion, but their origin could be either frost action or desiccation.

Forth Mountain (Just south of Wexford).

Forth mountain (779ft) consists of quartzites, slates and shales, probably of Cambrian age. Near its summit are frost-shattered tors, and the upper slopes are strewn with boulders. This mountain is believed by some to have remained above the surface of the ice throughout the ice age as a nunatak, because the frost shattered material has not been removed. Others seemed intent on finding evidence against this, such as striations and erratic boulders.

Much lower down (100ft) bare quartzite reefs show direct evidence of ice-smoothing.

Cotts. (8 miles south of Wexford.)

A large kame (I29?) at Cotts, is the most prominent feature on a discontinuous line of moraine thought to mark the limit of the last advance of Irish Sea ice in the last cold period.

The kame consists of stratified shelly sands and gravels, (dipping to the north-east) and contains some very large boulders of Carnsore Granite. The ice advance is supposed to have come from the north-east or east, but the dip of the sands and the fact that Carnsore Granite only outcrops to the south-east, suggests that this is not the actual limit of the advance.

The dip could be explained if a remnant of ice was left to the south-west of Cotts, that deposited this kame as it melted. This would require a limit of glaciation considerably further S.W.

Shortalstown. (5 miles south of Wexford).

Here at about 80ft. O.D. a recent drainage scheme revealed marine interglacial and freshwater late glacial deposits.

The marine deposit is a silt containing molluscs, foraminifers, ostracods, seeds and pollen which date it as an Ipswichian interglacial site. The thin bed of silt has been much disturbed and may have been pushed a considerable distance, by ice of the Cotts advance. It is incorporated, with what could be beach, deposits, in till of Cotts age. Nearby, a hollow in the top of the Till contains a late glacial sequence of clays and muds belonging to zones I & II. In brown open-water mud of the latter zone, bones of Cervus giganteus (C. megaceros), including a skull and antlers, were found, which led to the reporting of the site.

Curaghcloe. (5 miles north of Wexford).

In this area is a huge, tumultuous moraine (up to 300ft) named Curraghcloe Moraine, that either represents a halt in the retreat of the Cotts advance, or the limit of a readvance. The topography is very characteristic and includes many kettle-holes some with, deep lakes.

On the coast nearby the moraine can be seen in section in cliffs of considerable height. The extensive modern beach here provides ample specimens of modern shells.

Comparison with East Anglia.

Although both areas were subjected to the same periodic environ-mental charges of climate and sea-level, the differing preglacial topography and geology has led to noticeable differences in the glacial deposits. Firstly the presence of mountain regions in Ireland, though not very high, gave rise to local advances of ice in differing directions, each with a characteristic till content ,compared with East Anglia, where topography played little part in directing the ice sheets.

The presence of steep slopes and hard rocks together produced much more evidence of solifluction in the form of head, than is present in East Anglia.

The harder rocks cf Ireland also made possible the cutting of shore-platforms that record steady sea-levels.

One interesting parallel between the two regions (although not correlated in time) is the presence of water-lain shelly sand (Garryvoe Outwash) between two advances of the second glacial period in Ireland; and a very similar deposit, namely the Corton beds, between two advances of the first glaciation in East Anglia.

P. Grainger.

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[(# = only certain volumes and parts of Proc. Linn. Soc. have been seen, via vols. 148-154 (all parts), 155 (parts i and iii), 156 (i-iii), 157 (i)> 160 and 161 (all parts), 162 (i), 163 (l and iii), 164 (ii), 172 i), I73 (i and ii), 174 (i).].

[authors and page numbers of the above articles were not taken at the time of extraction (some years ago)].

Extracted by R.M.

NOTES ON THE HIPPOPOTAMUS IN ENGLAND

HISTORICAL INTRODUCTION

The occurrence of hippotamus in England has been known for many years, teeth from Walton, Essex, being described in 1811 and bones from Brentford in 1813. The earliest record from a British cave is that from the Kirkdlale Cave, Yorkshire in 1822; a fine mandible from the Forest Bed at Cromer was figured in 1846. Many finds have been recorded since, by far the finest series being that from Barrington near Cambridge, in 1878.

RECORDS OF HIPPOPOTAMUS

S. H. Reynolds gave over sixty localities for hippopotamus in his 1922 memoir; those for Suffolk and adjoining counties are given below:

Barnwell, Cambridge.
Barrington, Cambridge.
Bacton, Norfolk.
Bungay, Suffolk.
Cambridge Botanical Gardens, Cambridge.
Chelmsford, Essex.
Cromer, Norfolk.
Gt. Yarmouth (dredged off)
Grays, Essex.
Happisburgh, Norfolk.
Ilford, Essex.
Lavenham, Suffolk.
Lexden (nr Colchester), Essex.
Newmarket, Suffolk.
Walton-on- the-Naze, Essex.

Several new localities may be added to Reynolds list, many being of recent finding- SuffoIk, Essex, NorfoIk.
Records from Norwich Crag of Easton Bavents, and "Hippopotamus?" from Red Crag seem to need checking.
Additional records for the Cromer Forest Bed Series are noted later.
Also, East Mersea, Essex (Ipswich Museum).
Worlington, Suffolk (Ipswich Museum).
Beetley, Norfolk (Norwich Castle Museum).
Other recent finds;-
Eastern Torrs Quarry Cove, Yealmpton, near Plymouth.
Joint Mitnor Cave, Buckfastleigh, Devon.
Selsey Bill, Sussex.
Trafalgar square.
Honiton, Devon.
Waterhall Farm Gravel Pit, near Hertford.
Gravel pit near Stockton-on-Tees, Durham, - a tooth from this locality, replaces Overton near York as the most northerly record of Hippopotamus.
Extra information may be given about two earlier records;-
Piltdown (Sussex) hippo.- this is fraudulent.
Kent's Cavern (Torquay) hippo jaw - "the origin of this was questioned last century. That it formed part of the excavators collection when dispersed was the only reason for supposing it came from the cave. Modern testing by fluorine and nitrogen analysis shows it not to agree with Kent's Cavern specimens, but to be similar to certain deposits on the continent.
Finally the word “Valdame” was found to be pencilled faintly on the jaw. (Valdame is a well-known Italian locality for hippopotamus.)

DATING AND DISTRIBUTION

Hippopotami are warm climate animals and are characteristic of interglacial conditions; their wide distribution and, at many localities, great abundance, shows them to have been successful animals at those times.

During the Cromerian (s.l.) Interglacial, there are records from the Norfolk Forest Bed of East Runton, Cromer, Overstrand, Sidestrand, Trimingham, Mundesley, Bacton and Happisburgh and from Kessingland, SuffoIk.

Hoxnian Interglacial- there seem to be few if any records of hippopotamus in the Hoxnian (apparently one record on the continent but nothing definite in England); some seem to need checking.

Last (Ipswichian) Interracial – A. J. Sutcliffe has suggested that nearly all the hippopotamus remains found in Britain are of this age. It was widely distributed; the majority of records are from the Thames Valley, S.E.England and East Anglia; also found in Devonshire, the Midlands, S. & N.Wales, Yorkshire and Durham.

NOMENCLATURE.

The fossil hippopotamus of England is generally referred to the living species Hippopotamus amphibius Linne., but the names H. major Owen, and H. antiquus Desmarest have been used to distinguish it

The European form differed from the African one mainly by its larger size.

H. amphibius normally has four incisors in the lower jaw (tetraprotodont), whereas fossil Asiatic species commonly have six (hexaprotodont). P.E.P. Deraniyagala has noted that some specimens of the Barrington hippo, contained extra incisors, thereby approaching the hexaprotodont form.

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R. Markham.

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The editor wishes to thank those people who have given practical help with "bulletin production, and Ipswich Museum for facilities granted; stencils by editor, and M. Sullivan (pp. 2, 4-9, 10 [top], 11, 12[top]).

The late appearance of this bulletin is regretted; the number of pages has been reduced for easier production.

The article by J. S. H. Collins previously appeared in the 'Freelance Geological Association Journal', vol.2, no.3, March-December 1964.

The article by M. Leeder was received in time for Bulletin 4, but held over until this issue. Comment and Notes on 1967-1968 will appear in the next bulletin.