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The Quaternary Deposits at Hoxne, Suffolk: Appendix 2. Glacial Erratics from the Upper Glacial Bed at Hoxne

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F	440–460 cm	C. Grey clay-mud with shells.
	460–469 cm	C. Light grey marl with shells.
	469–470 cm	NC. Brown sandy laminated drift mud with wood fragments.
G	470–480 cm	C. Grey-blue sandy clay with chalk pebbles and flints.

101. Height 37·10 m. G.R. 740653. Borehole and section.

A1	0–20	NC. Soil, then grey fine sand with a few small flints.
A2	20–90 cm	NC. Red-brown coarse sand with many rounded and angular stones up to 15 cm across.
A2?	90–290 cm	NC. Red-brown sand with a few stones.
	290–300 cm	NC. Red-grey sand with red streaks.
B?	300–430 cm	NC. Red-brown sand becoming more clayey at base, with laminated sandy grey clay from 330 to 350 cm.
	430–450 cm	NC. Red-brown clayey sand with a few flints at base.
	450–510 cm	NC. Grey-brown sandy clay.
	510–520 cm	C. Grey-brown sandy clay with chalk pebbles.
C	520–580 cm	C. Brecciated clay-mud, becoming more organic at base.
D	580–590 cm	NC. Brown medium fine detritus mud.
E	590–625 cm	C. Brown-green clay-mud.

105. Height 32·62 m. G.R. 744662. Section.

A2	0–70 cm	NC. Brown-grey sandy clay.
B	70–200 cm	NC. Roughly stratified grey sand and red sandy clay.
	200–220 cm	C. Similar, but with chalk pebbles.

Appendix 2. Glacial erratics from the upper glacial bed at Hoxne

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The erratics collected by Dr R. West from the glacial gravel which overlies the interglacial beds at Hoxne have been sent to me for examination, and are identified as shown in the following list. Earlier finds of erratics by Mr R. Moir and by me are included in the list, so that the record may be complete to date. The help of Dr J. V. Harrison and Dr W. S. Kerrow in identifying some of these rocks is gratefully acknowledged.

Cretaceous

Black flint (from the local Chalk).
Glauconitic sandstone (? from Greensand).
Brown chert (? from Greensand of Thames basin).

Trias

Bunter quartzites.

Carboniferous

Red sandstone (? Upper Carboniferous of north England).
Felspathic grits (probably Millstone Grit).
White sandstone (? Carboniferous of Northern Britain).
Fossiliferous Carboniferous sandstone with *Camarophoria*.

Unknown age

Micaceous felspathic sandstone with ferruginous patches.
Grey sandstone full of tourmaline grains.

Igneous

Fine-grained grey granitic dyke rock.
Coarse grey syenite (possibly from Norway).
Purple biotite-quartz-porphyry.
Purple porphyrite (probably from the Cheviot).
Amygdaloidal purple porphyrite (probably from the Cheviot).
Olivine-basalt, Porphyritic basalt } (probably north-east England or south Scottish).
Lump of orthoclase felspar (?Norwegian).

Metamorphic

Schistose grits (Scottish Highlands or Norwegian).
Augen gneiss (Scottish Highlands or Norwegian).

Notes on the erratics

Most of these erratics are in the Department of Geology and Mineralogy at Oxford, but a few are at the Municipal Museum at Ipswich.

The fresh chalk flints are relatively common in this gravel; other weathered and angular flints also occur. The brown chert is either Jurassic, as from Scarborough Castle, or from the Greensand of Surrey or Sussex. It more closely resembles the Greensand Chert, and is very like specimens found by me in the gravel at Fordham, between Newmarket and Soham. The fossiliferous sandstone contains casts of *Camarophoria*, a productid and crinoid ossicles. It is certainly Palaeozoic and probably Carboniferous. The grey tourmaline sandstone is specially interesting, but has not yet been traced to its source; two pebbles of this rock were found at Hoxne, and a third has been found in the gravels of the Clacton Channel (interglacial).

Among the igneous rocks, the grey syenite is conspicuous with its large anorthoclase crystals and may be Norwegian. The quartz-porphyry has not yet been identified with any particular source. The purple porphyrites are of Old Red Sandstone types, and these and the basalts could come from the Cheviot or elsewhere in south-east Scotland.

Direction of transportation

Apart from the brown chert, which may have come by some means from the Thames basin and be derivative in this Hoxne gravel, the evidence of this most interesting assemblage points to derivation from northern Britain. When the first erratics from this gravel were identified for Mr Moir (in Moir 1935), it was already realized that some of the erratics came from northern Britain, and those which have been found since that date have confirmed this opinion (Baden-Powell 1948, 1951*a*). Ice carrying Scottish and Norwegian material is known to have deposited till only a few miles west of Hoxne, and the assemblage in this gravel agrees perfectly with what has been found in that till in west Norfolk and Suffolk.

Geological age of the gravel at Hoxne

The Lowestoft Till which underlies the interglacial beds has a different assemblage of erratics from the gravel, and includes many Jurassic rocks and fossils. On the other hand, it is the ice-sheet responsible for the Gipping Till which laid down in Suffolk deposits which came from the north and contain material from Scotland, Lincolnshire and derived

Norwegian rocks. The erratics from the upper glacial gravel at Hoxne therefore belong to the Gipping phase, and the interglacial deposits here are confirmed as occurring between the Lowestoft and Gipping glacial phases, in spite of the fact that the position of Hoxne lay in an area just outside the margin of the Gipping ice-sheet.

Appendix 3. The non-marine Mollusca of the Hoxne Interglacial

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Unlike many other interglacial deposits the lake beds at Hoxne have never yielded a large fauna of Mollusca, although several collections have been made. In addition some confusion concerning the horizons of the faunas has arisen both from apparent misinterpretations of the stratigraphy and from lumping the shells from several horizons into one list.

The first collection was made by Prestwich (1860) from his bed *d*, that is from strata B or C of the present account, which have been shown in the main part of this paper to be solifluxion deposits containing much derived material. Thus the fauna is probably largely derived. The shells found by Prestwich are the following (the names have been changed in accordance with the latest British list (Ellis 1951)):

Valvata piscinalis (Müller)
Bithynia tentaculata (Linné)
? *Lymnaea* (*Galba*) *truncatula* (Müller)
L. (*Stagnicola*) *palustris* (Müller)
Planorbis (*Anisus*) *leucostoma* Millet
? *P.* (*Gyraulus*) *albus* Müller
Succinea (*Succinea*) *putris* (Linné)
? *Hygromia* (*Trichia*) *hispida* (Linné)
? *Retinella* (*Aegopinella*) *nitidula* (Draparnaud)
? *Sphaerium corneum* (Linné)
Pisidium amnicum (Müller)
Unio sp.

Nearly forty years later Reid (1896) discovered small faunas at several horizons, but, through an apparent misinterpretation of the stratigraphy of the deposit, he listed shells from what appears to be our stratum F twice, as his beds A and E. The following species were found at this level, at which the pollen evidence suggests a somewhat bleak climate:

Valvata piscinalis (Müller)
Bithynia tentaculata (Linné)
B. leachi (Sheppard)
Lymnaea (*Radix*) *peregra* (Müller)
L. (*Myxas*) *glutinosa* (Müller)
Planorbis (*Anisus*) *leucostoma* Millet
P. (*Gyraulus*) *albus* Müller
P. (*Armiger*) *crista* (Linné)
Segmentina (*Hippeutis*) *complanata* (Linné)
Sphaerium corneum (Linné)
Pisidium personatum Malm
P. pulchellum Jenyns
Unio or *Anodonta* sp.

From stratum D, which was deposited after the climatic optimum of the interglacial period, Reid obtained only the following two species:

Valvata piscinalis (Müller)
Pisidium sp.

From stratum C Reid listed the following species:

Valvata cristata Müller
V. piscinalis (Müller)
Bithynia tentaculata (Linné)
Lymnaea sp.
Sphaerium corneum (Linné)
Pisidium personatum Malm