

**50 S.W. MEMOIRS OF THE GEOLOGICAL
SURVEY. ENGLAND AND WALES. THE
GEOLOGY OF THE NEIGHBOURHOOD OF
STOWMARKET. (EXPLANATION OF
QUARTER-SHEET 50 S.W.)**

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THE

GEOLOGY OF THE NEIGHBOURHOOD
OF STOWMARKET.

(EXPLANATION OF QUARTER-SHEET 50 S.W.)

BY

W. WHITAKER, B.A., F.G.S.,

F. J. BENNETT, F.G.S.,

AND

J. H. BLAKE, F.G.S., ASSOC.M.INST.C.E.

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NOTICE.

Quarter-sheet 50 S.W., of which this memoir is an explanation, was surveyed geologically by Messrs. F. J. Bennett and J. H. Blake, under the superintendence of Mr. W. Whitaker.

Mr. Blake, whose share is by far the largest, mapped the northern and central areas, Mr. Bennett the south-western and most of the southern parts, and Mr. Whitaker the south-eastern corner of the map.

This explanation has been prepared by the above officers from notes taken in the field, and supplemented by some published information, which is almost wholly derived from two sources—a number of well sections (some unfortunately of doubtful value), from a paper by the late Rev. W. B. Clarke, and notes of pits from a paper by Mr. J. B. Phear (now Sir J. B. Phear).

Mr. Whitaker has arranged and edited the whole.

H. W. BRISTOW,

Geological Survey Office,
28, Jermyn Street, London, S.W.

Senior Director.

INTRODUCTION.

AREA, RIVERS, &C.

THE tract to be described, 205 square miles, or more, in extent, is in the central part of Suffolk, includes the towns of Bildeston, Lavenham, Mendlesham, Needham Market, and Stowmarket, and is crossed by the following rivers or streams.

1. *Streams flowing Southward.*

The stream (an arm of the Brett) starting from the drainage of the Boulder Clay round Cockfield, flowing south by Lavenham, then more eastward, and joining the other arm of the Brett above Monks' Eleigh (48, N.W.).

The *Brett*, starting from the Boulder Clay tract round Thorpe Morieux, with a tributary from N. of Bildeston. This river flows southward into the Stour.

The *Gipping*, which rises near Wetherden, and has a longer tributary from the Boulder Clay country round Gedding, &c., with several feeders. The two streams meet below Stowmarket, and the combined stream flows south-eastward. There are other tributaries: on the right from Barking (2) and Great Bricett; and on the left from near Gipping, the Stonhams, and Coddtenham (N. & E. of the village). It is worthy of remark, that the valley from the Stonhams is at right angles to the main valley, as also is that of the tributary immediately opposite, on the right; whilst the Coddtenham valley runs at a very obtuse angle to the main one, an exceptional thing, as tributaries generally run at an acute angle to the main stream. The Gipping (or Orwell, as it is called below Ipswich) is 35 miles long, and its drainage-area is 257 square miles.

Near Mickfield, at the eastern edge of the map, the head of the *Deben*.

2. *Streams flowing Northward.*

Near the Bradfields the head waters of the *Lark*.

Between Bradfield St. Clare and Bradfield St. George, (with a tributary from Woolpit,) the head waters of the stream that joins the Little Ouse below Euston (50, N.W.), and which is itself joined near Ixworth (50, N.W.) by the stream rising near Beighton and Rougham.

At Mendlesham the head of the stream that flows into the Waveney at Thorndon (50, N.W.)

FORMATIONS.

The various beds shown by colour on the map may be seen from the right-hand column of the following list.

Whilst on an ordinary geological map, in which the Drift is ignored, the whole area would be coloured as Chalk, with the exception of the thin strips of alluvium and two mere spots of Reading Beds in the S.E. corner, as a matter of fact the Boulder Clay occurs over nearly the whole district, the once continuous sheet of this clay having been cut through by denudation along the valleys, and in a few spots on higher ground, and it is in these parts only, therefore, that the beds below are exposed.

It follows from this that the geology of the district is practically confined to the valleys, and chiefly indeed to that of the Gipping.

	Recent.	Alluvium.
Pleistocene.	Post Glacial Drift.	Brickearth.
		Gravel and Sand.
	Glacial Drift.	Boulder Clay.
		Brickearth.
		Gravel and Sand, with occasional Boulder Clay.
Pliocene - - -		Red Crag.
Eocene - - -		Reading Beds, with trace of Thanet Beds.
Cretaceous - - -		Chalk.

Besides these, in a well at Combs (*see* p. 19), the Chalk has been pierced, and found to be underlain by Upper Greensand, 10 feet thick, with Gault beneath.

CRETACEOUS AND TERTIARY BEDS.

CHALK.

Although the Chalk is the basement-rock of the district, yet it comes to the surface over very small areas only, owing to the thick mantle of Drift being so rarely cut through by denudation. These small areas may be grouped according to the valleys in which they occur.

1. *Valley of the Lark.*

A small strip has been mapped along the stream below Little Welnetham, at the western edge of the map. W. W.

In the larger outcrop along the other branch of the Lark, N.E. of Rushbrooke, there is a pit on the hill-slope W. of Malting-house Farm, showing about 15 feet of marly chalk, much broken up, with rust-coloured stains in many places, and with many irregular-shaped flints, both scattered and in irregular bands. There is another pit N. of North-hill Cover.

2. *Stream through Thurston.*

A chalk-pit in the low ground E. of Rougham Hall was much grown over at the time the survey was made. There is another pit W. of the road, about 10 chains N. of Thurston Railway Station.

There are also pits about half a mile N.E. of the Thurston Station, and about a quarter of a mile S. of the church.

In the railway-cutting north of Rougham Heath, part of the ballast of the permanent way rests on chalk.

In a pit at Swinham Cottages, N.E. of Great Barton, there is a patch of sand and gravel on the chalk. The patch of the last coloured here is an artificial exposure. J. H. B.

3. Valley of the Gipping.

Right Bank.

Chalk comes to the surface up the side-valley towards Barking, along the main valley from Gallows Hill southward, with a narrow outcrop until below Great Blakenham, when the outcrop broadens, and in places up the side valley to Offton. W. W.

Chalk has been worked about half a mile E. of Barking Church, in Chalk-pit Cover, where there is a little gravel at the top of the pit, in a hollow in the Chalk.

Barking Chalk-pit, S. of Needham Market, is a large quarry. There are hardly any flints to be seen in the Chalk here. I collected the few species of fossils named in the list on p. 4. J. H. B.

The large chalk-pit, which, as well as the three next to be noted, is marked on the Ordnance Map, about half a mile S.E. of Offton Church, shows about 50 feet of marly blocky chalk, rather soft, with few flints, and dipping slightly north-eastward, covered by about 15 feet of sand (Glacial Drift).

Another pit occurs N.W. of Little Blakenham Church, and N.E. of that church is a very large pit, about 50 feet deep, in soft marly and rubbly chalk, with a few flints. F. J. B.

The pit half a mile E.S.E. of the church shows some 20 feet of chalk, with few flints, but with much yellow-staining. The lines of bedding and of jointing are very generally open, for short spaces, to a depth of an inch or more. At the eastern end there are two very small inaccessible hollows in the top of the Chalk, filled either with a trace of the grey base-bed of the Thanet Sand, or with Drift loam, or with both. By the road there is some very pale greenish-grey chalky earth, with a little sand, and with small chalk-pebbles (? a sort of Boulder Clay).

There are other pits in the Chalk, which will be noticed in the description of the beds above (see p. 7).

Left Bank.

There is an outcrop of Chalk up the Coddendam Valley to above Choppings Hill Farm and to Hemington, continuous, except near the vicarage, along the right (northern) side, but more irregular on the other side. From this side-valley southwards there is an outcrop along the flank of the main valley, which is continuous except for a patch of Boulder Clay, &c., that sweeps over the Chalk W. of Barham Church (see p. 15), and for a smaller patch of Boulder Clay in a like position at Mockbeggars Hall. There is also an outcrop up the side-valley to Akenham. W. W.

Very marly chalk has been dug in a pit a little N. W. of West Creting Hall, close to a clay-pit.

About a quarter of a mile N.E. of Needham Market Railway Station, a pit showed chalky Boulder Clay over the Chalk.

There are two pits a little N. of Bosmere Hall, and on the western side of the high road, about half a mile E., is another pit. Chalk has also been got close to the river, a little S.E. of Bosmere Mill, and it may be seen in the road-cutting W. of Beacon Hill. J. H. B.

Coddendam Chalk-pits, a mile N.N.W. of the church, give fine sections, and Mr. BLAKE got a few fossils here; see the list on p. 4.

In Shrublands Park there are old pits along the edge of the sand, which caps the Chalk on the flank of the hill, some of which show the junction of the two (see p. 9).

The pits at the Sorrel Horse and at the southern end of Claydon are also described further on (pp. 9, 10, 15), and there are others that call for no special notice.

In the old chalk-pit, marked on the Ordnance Map (at its southern edge), about half a mile W.S.W. of Akenham Church, a black smut (irregularly diffused through a thickness of up to 1½ feet of the chalk half-way down the section) was shown along the open (western) side, a length of about 40 yards.

4. List of Fossils from the Chalk.

From specimens collected by Mr. J. H. BLAKE and named by Mr. R. ETHERIDGE.

	Barking Chalk Pit. (Needham Market.)	Coddenham.
<i>Belemnitella quadrata</i> , <i>Blainv.</i>	x	...
<i>Avicula</i>	...	x
<i>Inoceramus mytiloides</i> , <i>Mant.</i>	x	...
" larger species (fragments)	x	...
<i>Ostrea acutirostris</i> , <i>Nilla.</i>	x	?
" <i>Normaniana</i> , <i>D'Orb.</i>	...	x
" <i>scimplana</i> , <i>Mant.</i>	...	x
<i>Terebratula semiglobosa</i> , <i>Sby.?</i>	...	x
<i>Retepora?</i>	x	...

LOWER EOCENE BEDS.

The main mass of the Lower London Tertiaries, the set of beds coming between the London Clay and the Chalk, just runs into our district, at its S.E. corner; but the outcrop is a mere streak, the Drift hiding the older beds, and indeed having almost cut them off.

The greenish-grey clayey sand that next overlies the Chalk, and which is probably the base of the Thanet Sand, may be seen along the edge of the wood west of Mockbeggars Hall, and the boundary-line may be followed round the hill, by that fine old house, to a little east, where the base-bed was again noted.

The boundary then passes into the sheet to the south (48, N.W.), but seems to come on again on the other side of the little valley, though almost wholly hidden by Drift.

In the little wood W.S.W. of Rise Hall, Akenham, I saw, in a small old pit, a little brown and black clay with sand beneath. These seem to belong to the Reading Beds, and chalk is touched just below in a ditch on the west, with some green-coated flints.

The next sign of the old Tertiary beds is three quarters of a mile off, in the great chalk-pit at Claydon (*see p. 10*). Between these two points their boundary is probably much the same as that of the Glacial Drift, which latter entirely masks them.

At the top of the by-lane just S.W. of Barham Church the grey clay and green sand of the base-bed (of the Thanet Series?) occur, with chalk just below.

The springy and boggy ground in the two hollows (Slade and Hop-Yard) S.S.E., is probably caused by the occurrence of this clayey base-bed beneath the sand and gravel of the hill.

"There seems to be a trace of the Thanet Sand at Somersham, due west of the Church and a little off the road leading to it. A little sand, with greenish grains was seen in a ditch there."* At the large chalk-pit on the southern side of the road eastward of Little Blakenham, there is a trace of the clayey greensand.

There may, of course, be outlying patches of the Eocene Beds under the thick covering of Glacial Drift, but any such could only be known from well-sections.

* From Mr. BENNETT's notes.

CRAG.

No evidence of the occurrence of Crag in our district has yet been found, except the presence of phosphatic nodules in the gravelly bed at the base of the sand that overlies the Chalk in the lower part of the Gipping valley. It is possible, however, that some of this sand may belong to the Crag rather than to the Drift.

Mr. S. V. WOOD says, "at Hawks Mill, Needham Market, I found a section of highly micaceous laminated clay passing up into micaceous sand,"* which he is inclined to regard as Chillesford Clay. I am in doubt, however, as to this, and think that the clay belongs to the Glacial brick-earth, an opinion in which Mr. BLAKE agrees.

GLACIAL DRIFT.

Almost the whole surface of our district is formed of Glacial Drift, and of this, moreover, nearly the whole by one division, the Boulder Clay, which occurs as an all but continuous sheet.

Speaking generally, the Glacial Drift may here be divided into two members, the Boulder Clay (the Upper Glacial of Mr. S. V. WOOD) and an underlying series (Middle Glacial of WOOD), consisting of gravel and sand, sometimes with masses of brickearth at top, and sometimes containing a layer of Boulder Clay.

It will be convenient to describe each division that has been coloured separately on the map.

GRAVEL AND SAND.

This set of beds varies in composition, in some places consisting chiefly of gravel, sometimes coarse, and in others being almost wholly sand. The stones of the gravel are generally of great variety, though chiefly of that very indestructible material flint. There is sometimes a bed of Boulder Clay in this set of deposits.

As these beds crop out chiefly along the bottoms and sides of the valleys, they can best be described under the heading of those valleys.

1. *Valley of the Brett.*

Along the western branch from Cockfield to Brent Eleigh several isolated patches have been mapped by Mr. BENNETT, in great part, however, with doubtful boundary-lines.

Along the central branch there is a narrow, but almost continuous, outcrop from Lower Farm, north of Preston, which joins that of the eastern branch along the southern edge of the map.

In that eastern branch the outcrop extends from Hitcham southwards.

W. W.

A pit a quarter of a mile north of Lavenham Railway Station, and west of the road by the windmills, gave the following section:—

- Boulder Clay, about 2 feet.
- Sandy loam, pinkish at bottom, about 1½ feet.
- Rather coarse gravel, about 2½ feet.
- Thin layer of rather coarse buff sand, showing small faults.
- Very coarse gravel, with large flints, 7 feet.

* *Quart. Journ. Geol. Soc.*, vol. xxxvi., p. 460 (1880).