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ORIGINAL ARTICLES.

I.—GEOLOGY OF THE LONDON EXTENSION OF THE MANCHESTER,
SHEFFIELD, AND LINCOLNSHIRE RAILWAY. PART I: ANNESLEY
TO RUGBY.

By C. FOX-STRANGWAYS, F.G.S.

(Communicated by permission of the Director-General of the Geological Survey.)

THIS portion of the new trunk line to London covers a distance of about fifty miles, and runs nearly due south, crossing the towns of Nottingham, Loughborough, Leicester, Lutterworth, and Rugby. Throughout the greater part of this distance the railway is on the Trias, except the northern portion, which is on the Permian, and the southern, which is on the Lias. There are also great thicknesses of Drift met with near Leicester and between that town and Rugby, but very little in the northern part on either side of Nottingham.

Commencing at Annesley, the first section, which is just east of the Midland station, shows the lower sandstones of the Trias overlain by a little sand and gravel. This sandstone is not here of any great thickness, as in the shallow depressions on either side the Permian Marls crop out and may be followed along the next cutting to the south. At the south end of this cutting a fault is crossed which brings in the Magnesian Limestone. The railway is continued over this formation for some distance beyond Linby, but being carried on a high embankment the rock is only exposed here and there in the ditch along the side. The sections, however, show that there is not much superficial covering over this comparatively flat ground.

As we approach Hucknall Torkard there is a marl cutting, but the limestone soon rises up from below. This latter is much disturbed by a fault or sharp roll near the bridges at the north end of the town, some of the beds being quite vertical. The same disturbance was noted in the culvert over the brook a little to the south. A drawing of this was made by Mr. Allen, the resident engineer of this portion of the line.¹

¹ I am greatly indebted to Mr. Edward Parry and the resident engineers of the different sections of the line for much information as to the nature and thickness of the strata met with in the excavations for bridges and other structures, which were covered up before the time of my visit.

In the large cutting west of Hucknall Torkard the marls repose on the Magnesian Limestone, the whole being surmounted by about six feet of pebbly clay; but the section was not cut to its full depth at the time of my visit. At the south end the limestone is again much disturbed, and dips to the south-east at an angle of 15° , passing under the marls. There is no doubt that the stratification here is much more broken up than shown on the old geological map, and that a good deal more marl crops out than is represented there.

FIG. 1.—Section in culvert north of Lambert Hill, Hucknall Torkard.
Copied from a drawing by Mr. Allen.

Several cuttings in marl were observed between this spot and the Leen valley, where the Permian beds pass beneath the Trias. Over this ground there also appears to be a certain amount of pebbly gravel; but, from the railway-section alone, it is not clear of how much importance these deposits are.

At Bulwell the line crosses the Leen valley by a lofty viaduct, the excavations for the piers of which exposed sections in marl and limestone on the west side of the Midland Railway, and in sandstone on the east side.

The line now enters the Trias, the sandstones of the Pebble Beds being exposed in several fine cuttings between here and Nottingham, beneath which town it is carried in a series of tunnels that were easily excavated in these soft false-bedded sandstones.

On the south side of Nottingham the piers for the bridge over the Trent were sunk through from 10 to 12 feet of river gravel on to the Bunter Sandstone, and showed that the latter was more eroded on the southern side than on the northern, the solid rock being reached at 57 feet above ordnance datum on the northern side, while it was 52·5 feet at the south abutment.

After crossing the broad expanse of the Trent Alluvium at Wilford the line enters a deep cutting in the marls of the Keuper series, and there is a good section of the band of sandstone that is shown on the old geological map dipping at 2° to the south-east. Towards the southern end of this cutting the marl is overlain by about 8 feet of sand and gravel, which appear to be banked along the foot of the hill.

At Ruddington the line crosses a depression in the marl filled with sand under about 3 feet of dark peaty soil which extends past the station. This hollow has evidently been an old swamp similar to the larger one at Gotham alluded to below. At the side of the railway here is the boring which has been recently carried to a depth of 1873 feet; this boring beneath 684 feet of Trias penetrated over 400 feet of strata, supposed to represent the lower portion of

the Derbyshire Coal-measures. These were found resting on coarse grits and sandstones, probably the equivalent of the Millstone Grit.¹ South of Ruddington station there is a cutting showing from 3 to 12 feet of sand and chalky gravel, with pockets or pipes of clay overlying the marl. Beyond this the line crosses Gotham Moor, where numerous small excavations show about a foot of peaty soil over sand and gravel. It is evident that this extensive flat, which stretches from Gotham to Bunny, a distance of about three miles, was formerly a swamp or possibly a shallow lake. On the south side the ground rises in the long ridge formed by the Rhætic beds and the lowest part of the Lias; but the line passing in the hollow between the outlier of these beds and the main mass, there is no section in them, and only some whitish-grey or tea-green marls are seen reposing on Red Keuper Marl.

Opposite East Leake there is a deep cutting showing tea-green marl beneath Drift deposits, the latter consisting of sand and gravel beneath a Boulder-clay, in which there are many well-rounded pebbles of quartz and fragments of Keuper Sandstone, but very few boulders of any size. With the exception of the doubtful gravels at Ruddington, it will be observed that this is the first really glacial section that we have come to; but to the south of Loughborough they become more common and are of greater importance.

South of Leake the railway cuts through the narrow ridge of Lias and Rhætic forming Normanton Hills, and a very interesting section is exhibited in these beds. The summit of the ridge is crossed by a short tunnel, on the north side of which is a deep cut in grey or tea-green marls surmounted by about 20 feet of dark, finely laminated shales. At the junction of these there is a yellow band about 6 inches thick, but there is no bone-bed, or if there is it must be in a very fragmentary condition.² The beds dip at 6° to the south, and are let down against the Red Marl to the north by a fault which is seen within a few yards of the end of the cutting. South of the tunnel the lower part of the Lias comes on rather rapidly with a dip increasing from 2° to 6°. The beds, which constitute the *Planorbis*-zone, consist of the usual alternations of shales and bands of limestone with a thick bed of shale at the bottom resting on a band of nodules.

SECTION AT NORMANTON HILLS.

		ft. in.
Thin band of limestone	...	} About 2 or 3 feet, but much broken up and weathered.
Shale	...	
Thin band of limestone	...	
Shale	...	
Band of limestone	...	0 8
Shale	...	2 0
Band of limestone	...	8 0

¹ G. E. Coke: Trans. Fed. Inst. Mining Eng. 1896; Proc. Geol. Assoc., vol. xiv, p. 430.

² Mr. Montagu Browne gives a short but detailed account of this section - Report of the Brit. Assoc. for 1895.

	ft.	in.
Shale	3	0
Band of limestone	0	4
Shale	1	0
Sandy shale	0	10
Limestone full of <i>Ostrea</i>	0	7
Sandy limestone and shale	1	6
Shale	0	6
Band of limestone	0	8
Shale	0	8
Band of limestone	0	10
Shale	13	0
Band of nodular limestone	0	10

Towards the southern end these beds turn up rapidly at an angle increasing from 10° to 25° , until at 140 yards from the centre of the road over the tunnel the great east-and-west fault is crossed which brings in the red marls of the Keuper. The Diagram gives the general appearance of this section (Fig. 2).

From this point the line continues on red marl as far as the River Soar opposite Loughborough, passing through a deep cutting in marl with a band of sandstone 3 feet thick dipping to the north at the low angle of from 1° to 2° . The northern end of this cutting is formed of Boulder-clay resting on sands and gravel. The former contains quartzite pebbles and fragments of sandstone and Lias, some of which are of considerable size and generally striated. The gravel is composed mostly of quartzite pebbles, and occurs in pockets or irregular patches in the sand. This drift comes about to the bottom of the cutting on the north side, but thins out near the summit of the hill; showing that it does not cap the hill in the usual manner, but is deposited against its northern and western flank, as we shall show is the case in some of the sections further south.

In crossing the valley of the Soar the alluvium was found to vary from about 15 to 19 feet in thickness, and consisted of the following subdivisions¹:—

	ft.	in.
Soil	2	6
Loam and clay	6	0
River gravel	7 to 10	0

The thickest gravels were met with at the north end of the viaduct, and near the centre; which spots probably mark the position of old bends in the river. At the Nottingham Road, at the Midland Railway, and at the Canal the marl was reached at 8, 14, and 12 feet respectively.

At Loughborough the line crosses a terrace of chalk gravel, which extends for some miles on this side of the Soar valley, as will be shown in the new edition of the Geological Survey Map. This terrace is about twenty feet above the modern alluvium of the river: the gravel, which has an average thickness of ten feet or more, is composed mainly of chalk flints and quartzite pebbles; it is

¹ From information supplied by the resident engineer, Mr. F. D. Sharp.

probably derived from the Chalky Boulder-clay further up the valley. This gravel is continued along the railway with some intermissions as far as Quorn Lodge, where it gets thinner and becomes mingled with Boulder-clay and earlier gravels, so that the sections are rather obscure. In fact, the cuttings about here show how difficult it is to separate gravels which are of late Glacial age from those which are Post-Glacial. One section showed contorted beds of clay and sand, but its relation to the gravel was not clear. From the general aspect of these sections I am inclined to think that the terraces must have been begun to be laid down immediately after the later Glacial beds, and while a little ice was still lingering in these valleys.

After crossing the little valley west of Quorndon, the railway continues in Keuper Marl until we reach the hill west of the new reservoir at Rusheyfields Lane. Here there was a deep section in Boulder-clay, but the greater part had been sloped down before I saw it. The north end of the cutting, however, was exposed, and showed about six feet of sand, loamy in part, with a little pebbly gravel at the bottom resting on Boulder-clay, with many large Lias fragments, and a few granite and Carboniferous Limestone blocks, many of the boulders, especially the Lias fragments, being striated. No chalk fragments were observed here, although they are plentiful on the opposite side of the valley at the foot of Buddon Wood and in the branch line which is being taken to Mountsorrel quarries. In this branch line there is a good section of the Chalky Boulder-clay, which at the northern end near Hawcliff Hill is seen reposing on Boulder-clay without any chalk, there being at places a little sand between the two. Nearer Nunckley Hill the Chalky Boulder-clay rests directly on the Keuper Marl, the Lower Boulder-clay having thinned out in this direction. The Chalky Boulder-clay here contains many Lias and granite boulders.

At Nunckley Hill the branch railway cuts through a boss of granite, the junction with the overlying beds being, as usual, very steep. On the eastern side the Boulder-clay rests on

the granite; but on the western side the Red Marl is seen abutting against the granite, large blocks of the latter being included in the marl as if they had fallen from a cliff during its deposition. The main railway also just touches the granite of Brazil Wood, but there is no section of the rock;¹ the piers of the viaduct, however, are sunk in Keuper Marl, showing again how steep the junction is between these two formations.

After crossing the road to Swithland, the line enters some thick beds of gravel and sand, which underlie the great spread of Chalky Boulder-clay forming Rothley Plain. This sand, which is stratified, contains numerous isolated boulders of granite, many of which are of considerable size, but there do not appear to be any other stones in the main mass of the sand, nor any clay. The appearance of these great boulders sticking out in the sand is most remarkable, and how they got there is a curious problem. Possibly they are evidence of a granite cliff in the immediate neighbourhood; the absence of any clay seems to preclude them from being due to glacial action. At the summit of the hill these sands pass beneath a thin covering of Boulder-clay, and at the bridge under the road to Rothley terminate very abruptly against a bank of Keuper Marl, another instance showing how these drifts seem to be banked against the northern sides of the hills.²

On the opposite side of the Rothley valley the line passes through a deep cutting in Boulder-clay, which is mainly composed of Lias with quartzite pebbles and some chalk fragments. It also contains irregular patches of sand and gravel, but no beds of any thickness. This same Boulder-clay, which, however, becomes more chalky, continues for about two miles to the neighbourhood of Birstall. Here at the back of Cliff Lodge the Boulder-clay contains masses of very coarse gravel composed mostly of Lias and Oolite, which has been pushed into a series of undulations between masses of Boulder-clay, evidently showing some disturbing force subsequent to its deposition. At Birstall Hill Park a thick bed of sand and gravel comes out from beneath the Boulder-clay, and, rising to the south, soon occupies the whole of the cutting, forming one of the finest sections of false-bedded sands and gravel to be seen along this part of the railway. There is not much doubt that this sand is part of the bed which occurs at the base of the Boulder-clay in this country, and which has been traced almost uninterruptedly along this side of the Soar valley; but its position here is rather abnormal, being considerably above the usual level of these sands. Before the cutting was made there was very little evidence at the surface of so large a deposit of sand and gravel.³

¹ A short account of the rocks near here is given by Mr. W. W. Watts: *Trans. Leicester Lit. and Phil. Soc.*, vol. iv, p. 12, 1895; and *Proc. Geol. Assoc.*, vol. xiv, p. 432.

² At this spot some supposed British remains have been found by Mr. W. T. Tucker, who gives a beautifully illustrated account of them in the *Trans. Leicester Lit. and Phil. Soc.*, vol. iv, p. 212, 1896.

³ Mr. Montagu Browne, F.G.S., has some fine photographs of these gravels.

At the southern end of this cutting just above the Belgrave Cemetery there is an opening in the usual Lower Boulder-clay of the district composed of Lias and other local rocks without any chalk fragments.

The railway crosses the Mowmacre Road on a lofty embankment, the foundations of the bridge showing a very steep boundary to the Keuper Marl at the side of the valley, the south abutment being against the marl, while the northern one was sunk 16 feet in loamy sand without reaching the bottom of it.

In the next cutting the lower non-chalky Boulder-clay was found in the foundations of the bridge over the path to Stocking Farm. A little further on there is a section in the clays and gravels above, which is interesting from the close similarity of one of the bands to certain beds in the Coal-measures; leading one to the idea that, although these beds were formed under very different circumstances, some of the conditions may have been somewhat similar. The clay, which was somewhat of the nature of "clunch," that is, a firm marly clay without much stratification, contains lines of incipient concretions, which appear to be in process of formation. The following sketch will show the relations of the beds more clearly:—

FIG. 3.—CUTTING S.E. OF STOCKING FARM, NEAR LEICESTER.

(a) 4 ft. Weathered Boulder-clay with scattered chalk flints. (b) 6 ft. Irregular, lumpy, soft, marly beds, and clay with incipient concretions. Has very much the appearance of unconsolidated Coal-measure clay. (c) 3 ft. Stiff dark clay. (d) 3 ft. 6 in. Loamy sand. (e) 5 ft. Sand and loam with marly partings containing race. Passes into dark brickearth and drab clay towards the north. (f) 2 ft. Chalky gravel. (g) 3 ft. Gravelly, chalky Boulder-clay.

The sand and gravel at the base crops out on the side of the hill, and is continuous with the general outcrop of these beds throughout the district.

After crossing the little valley leading up to Beaumont Leys, which is on Keuper Marl, the line traverses the extensive plateau of gravel on which Leicester Abbey stands, and which fringes the river Soar at this point. In crossing the river the Red Marl was found at a depth of a little over 10 feet, but further on, between the river and canal at Slater Street, the depth was over 18 feet, showing that the old course of the river must have formerly been further south at this point.

Through the courtesy of Mr. Chalcraft, the resident engineer of

this portion of the line, we have obtained a large number of sections in the town of Leicester. These seem to show that the rise of the ground to the south of Soar Lane, although based upon marl, is mainly caused by the great accumulation of made ground which occupies the site of the old Roman city. This deposit is in many cases fully equal to the rise of the ground; in Bath Lane it appears to sink below the level of the river, showing that the contour of the ground and probably the position of the stream have altered considerably since Roman times.

After again crossing the river at West Bridge the railway continues for some distance over the alluvium, which was found to be of varying depth up to 20 feet at St. Augustine Street. On the west side of the Bede House Meadow the foundations of the viaduct showed that this alluvium rests abruptly against a steep bank of Red Marl. Entering a cutting of Red Marl we find at its southern end an equally abrupt termination, a terrace of sand and chalk gravel being banked against the marl. This same gravel is seen again under the Burton branch of the Midland Railway, where it is also banked against marls to the south; but is partially overlain by dirty gravel and sand, which evidently belong to the Glacial beds. The section appears to show that the drift gravel is more recent than the banked terrace below, but this is probably not the case, and as the gravel does not extend far it may have slipped over the edge of the terrace. Further on in this cutting, just beyond St. Mary's Mills, there is a thick deposit of cemented gravel, which has aroused a good deal of local interest and speculation as to the source of the cement, although such gravels are really not at all uncommon. They are excessively hard, and have given the contractor a good deal of trouble to excavate.

The line now for the fourth time crosses the Soar valley, the alluvium of which was found to be from 6 to 12 feet thick. South of Aylestone there are cuttings showing from 8 to 20 feet of local drift composed chiefly of Lias and Keuper fragments with pebbles and a few granite boulders. This is surmounted by chalky clay in the deeper cuttings, but there is evidently a good deal of the non-chalky clay about here.

In sinking for the piers of the viaduct across the valley at Whetstone, there was found to be 10 feet of alluvium. Beyond this the railway is carried on a lofty embankment past the villages of Whetstone and Cosby, a distance of over two miles, before there are sections of any note. In crossing the Midland Railway at Cosby, which runs in a deepish cutting, the Boulder-clay was found to extend to the base of the foundations some depth below the rails, so that it is evident the drift must be of considerable thickness about here. This also is shown by the series of deep cuttings that are continued for some distance to the south, and in none of which the solid rock was reached.

In the cutting under the Lutterworth Road the Boulder-clay rests on sand; which, rising to the south, forms a considerable outcrop, but along the railway is soon succeeded by stiff, chalky, and local

Boulder-clay. About a mile further south this Boulder-clay is seen to be roughly interstratified with beds of sand and warpy clay which run down towards the north.

On approaching Dunton Basset we come to one of the deepest cuttings in this part of the line, but from the sloping down of the banks as the work was being carried on it was not easy to see the exact relationship of the beds. At the northern end, however, near the road to Ashby Magna, there is an extensive outcrop of sand, which is banked against or rests on the Boulder-clay further south. This Boulder-clay is of the usual chalky character, but is remarkable from its containing a large mass of Middle Lias limestone crammed full of *Rhynchonella*, which measured 12 feet across, and of which 12 feet were exposed above the rails; how far it may have extended in the other directions could not be seen. At the tunnel under the road there is a fine section showing about 35 feet of yellowish Boulder-clay resting on 13 feet of sand and gravel. This gravel, which dips to the north, is better exposed on the south side of the tunnel, where it crops out and is seen to be succeeded by a band of clay and then more sands and gravels. These gravels are very irregularly stratified, and are composed mostly of chalk flints and pebbles. They must have a considerable thickness just here; and, including the band of clay, cannot be less than 50 feet or more.

At Cotes de Val 19 feet of a very hard chalky Boulder-clay were proved in the foundations of the bridge, and at the next bridge crossing the road to Gilmorton there were 17 feet of gravel, showing that there are many variations in the beds, but the cuttings do not throw any light on their relation. This chalky clay, which contains a great quantity of Lias and sandstone boulders, as well as a few Carboniferous limestones, extends all the way to Lutterworth, where we reach another great deposit of stratified sand and gravel. These gravels have been proved to a depth of 40 feet; they contain bands of chalky clay, and appear to abut against the Boulder-clay on the west in a somewhat abrupt manner.

The foundations of the bridge over the stream at Lutterworth are sunk through 10 feet of alluvium into beds of grey shaly Lias limestone. I could find no fossils in this limestone, so am unable to say what horizon has been struck here; but the section is interesting, as this is the only point at which the underlying rocks have been met with between the Soar valley at Whetstone and the Avon at Rugby.

At the road just south of this bridge 2 feet 6 inches of "Red Marl" was found over 15 feet of sand. I did not see this section, but Mr. Collinson, the resident engineer, states that it was exactly like Keuper Marl; if so, it must have been a drifted mass. Above this comes a Boulder-clay with seams of sand, and at the top of the hill about 15 feet of gravel and loam with many chalk fragments, and a few large Jurassic boulders. South of Lutterworth there are shallow cuttings in Chalky Boulder-clay with a little sand and gravel here and there for a distance of two miles, but no sections of any importance. At Shawell the cutting shows stiff blue

Boulder-clay, with Lias and Chalk fragments resting on sands and coarse gravels, which crop out to the south, but run down under the Boulder-clay towards the north. The junction between the two is very irregular, the sand forming arches beneath the clay.

After crossing the Watling Street the line enters a thick deposit of chalky gravel and sand, which is partly cemented into a hard conglomerate similar to that mentioned above near Aylestone. This conglomerate must be fairly extensive about here, as it has been met with in a series of trial borings on the other side of the valley near the Watling Street. In the deeper part of the cutting near Newton this gravel is overlain by about 20 feet of grey Liassic Boulder-clay, which appears to turn into coarse gravel at the southern end. The outcrop of the gravel is very clear about here, and there is a sharp junction with an underlying Boulder-clay. In the cutting due east of Newton House another large boulder has been touched; it consists of a mass of yellow Oolitic limestone 15 yards in length.¹ The Boulder-clay also contains a curious ball of sand, which is concentrically stained and looks very similar to a concretion in harder rocks. Between this point and Rugby the line keeps on Chalky Boulder-clay, but there are no sections of any importance.

In crossing the valley of the Avon opposite Rugby station the blue Lias clay was found at a depth varying from 5 to 17 feet below the surface of the alluvium, and showing three or four depressions where the old streams have hollowed out channels in the solid formation. The deepest part of the old valley appears to correspond with the present course of the River Avon; but there is another deep channel 530 yards to the south of this, and 250 yards south of the present Clifton Brook.² The alluvium consists mainly of clay and loam, except towards the southern side, where there is a considerable amount of gravel, 15 feet 6 inches in one of the excavations.

On the south side of this valley the line cuts into the great plateau of gravel and sand upon which Rugby stands, and which has a maximum thickness of 22 feet, but in some places is not more than 3 feet thick. These gravels are of a fairly uniform character; they extend to the brow of the hill just beyond the Dunchurch and Hilmorton Road, where they form a sharp bank overlooking the Lias valley beyond. They appear to rest directly on the Lias shales below throughout the greater part of the cutting; but whether a Boulder-clay intervenes in some places was not clear, as a great part of the ground had been sloped down. From these shales the following species, which have been determined by Mr. E. T. Newton, were obtained: *Ammonites obsoletus*, Simp., *Am. bifer*, Quenst., *Am. trivialis*, Simp., *Am. curvicornis*? Schlön., *Belemnites breviformis*, Voltz., and *Nautilus*.

¹ This is only about a mile from Brownsover, where something of the same character was met with by Mr. J. M. Wilson.—Quart. Journ. Geol. Soc., vol. xxxi, p. 355.

² From information supplied by Mr. A. W. H. Carson, the resident engineer.

These seem to show that the beds here belong to the *Oxynotus* or *Armatus* zones.

South of this great cutting the line runs on an embankment for some distance, and there are no exposures till we get to Willoughby; from which point southwards the sections have been examined by Mr. H. B. Woodward, and will be described by him in the second part of this paper.

II.—ON THE AGE OF THE MORTE SLATE FOSSILS.

By J. W. GREGORY, D.Sc., F.G.S.

AS the discussion at the Geological Society on Dr. Hicks' paper "On the Morte Slates and Associated Beds in North Devon and West Somerset" (Quart. Journ. Geol. Soc., vol. lii, pp. 254–272, pls. x, xi) showed that the case for the Silurian age of those beds rested mainly on the palæontological evidence, I examined the more important fossils somewhat carefully at the close of the meeting. I had a perfectly open mind as to the age of the fauna, for a couple of visits to North Devon and West Somerset had given me the impression that pre-Devonian beds might be hidden in the eastern part of the area. As a paper recently read to the Geological Society of Cornwall assumes the Silurian age of the Morte Slates to be so well established that it may be accepted as the basis for future work, I have been led to re-examine the evidence by a comparison of Dr. Hicks' descriptions and Mr. Michael's figures of the fossils and my notes about them.

The palæontological section of Dr. Hicks' paper enumerates eight species, while another name is added in the explanation of the plates. Of the nine species four are described as new, and five are identified as Silurian species; but in three cases the identification is queried, leaving only two species certainly claimed as Silurian.

The evidence of six of the nine species does not seem to me to be worth much. Two of the new species belong to genera having so wide a range as *Lingula* and *Spirifera*, and thus their evidence as to the age of the rock in which they occur is not very weighty. The occurrence of *Cardiola interrupta*, Sow., in the Morte Slates rests apparently on a few shell fragments, which unquestionably came from some bivalved animal, and probably from a lamellibranch. But the ornamentation shown in the specimen figured (Hicks, op. cit., pl. xi, fig. 19) agrees so closely with that of some Devonian species of *Pterinopecten* and *Aviculopecten*, that the material is quite insufficient to determine the family to which the fragments belong. In the case of the specimens figured as *Rhynchonella Lewisi*?, Sow., *Rhynchonella Stricklandi*?, Sow., and *Orthis rustica*, Sow., the specimens figured have a resemblance to the species named; but they are also very similar to Devonian species, and Dr. Hicks' queries after the names of the two first show that no great stress can be laid upon them. The identification of *Orthis rustica* is apparently based on the ornamentation; but the plan of ribbing quoted as "one of the chief characteristics of *Orthis rustica*" occurs also in the Devonian *Orthis interlineata* and in other species.