

*On the POST-TERTIARY DIATOMACEOUS SAND of GLENSHIRA.*  
 Part II. *Containing an account of a number of additional undescribed species.* By WILLIAM GREGORY, M.D., F.R.S.E., M.R.I.A., &c.; Professor of Chemistry in the University of Edinburgh. Illustrated by numerous figures drawn from Nature, by R. K. GREVILLE, LL.D., F.R.S.E., &c., and engraved by TUFFEN WEST, Esq. (Plate I.)

*Continued from No. XVI, p. 48.*

(Read March 26th, 1856.)

T.M.S. 1857 (1857) r.v. Plate I.

24. *Pleurosigma* (?), n. sp. This peculiar form, which is very scarce in the deposit, I have not ventured to name, although it cannot be referred to any of the species in Smith's Synopsis, vol. i.

Form very slightly sigmoid; extremities obtuse. The median line, as may be seen in vol. V, Pl. I, fig. 24, is central at one end, while at the other it seems to approach the margin for a short space just before the apex. This appearance is probably due to the circumstance that the valve does not in this case lie quite flat. There is an elongated oval expansion round the nodule, but imperfect; and I am not sure that this appearance may not depend on some injury to the valve. Length about 0.0053". I have not been able to resolve the striation as yet, and I conclude that it is of the finest; but until I can examine several good specimens, the description must be imperfect. (281.)

25. *Cocconeis distans*, n. sp. This species was described in my former paper, but a form of *C. Scutellum* was by mistake figured for it; I therefore give a figure of it in fig. 25. Some, judging from the former erroneous figure, have supposed it to be only a form of *C. Scutellum*, but its whole aspect is so peculiar, that those who see the form, which is not very rare in certain densities, are at once struck with it as peculiar. Professor Kelland, without knowing of it at all, at once noticed it in some of the deposit which I prepared for him.

Form always a broad and pure oval. Length from 0.0008" to 0.0018". The transverse rows of dots are not above one half of the number of those in the largest and coarsest forms of *C. scutellum*, which abounds here in all its forms, and can be easily compared with *C. distans*. These lines, about 9 in 0.001", are also formed of much fewer and larger dots, and these dots are all of equal size, except only that those at the margin are sometimes smaller. They are so distant, and the lines of them so few, that the form ceases to have a striated

aspect, and appears sparsely dotted. In *C. Scutellum*, of the same size, and of the coarsest variety, there are twice or thrice as many lines, and in each line three or four times as many dots as in *C. distans*. Moreover in *C. Scutellum*, which has the striated aspect in all its forms, the dots are of very unequal size, being smaller in the middle, and increasing in size towards the margin. Again in *C. Scutellum*, the form of this valve is very often, indeed generally, more or less angular, both in the middle and at the apices. In *C. distans*, the dots are quite round, and have a peculiar lustre, so that in a certain focus they appear white and translucent. I have seen this form in recent marine gatherings, but it is scarce. (218.)\*

(Since the above was written I have observed another well-marked character in this species. The granules or dots are placed on faint white transverse bars, which, in some positions, or in some lights, are easily seen. I have also lately found *C. distans*, in considerable abundance, in a recent marine gathering, of which I hope to lay an account before the Society next season. In this gathering I have found two remarkable forms, which may perhaps both be varieties of *C. distans*, but one of which, though allied to it, is probably a distinct species. One of these has the faint white bars above described, and, on the whole, my observations tend to show that *C. distans* is not related to *C. Scutellum*.)

I may here mention that *C. costata*, to be presently described, also occurs in the new recent gathering, and that this form also is entirely distinct from *C. Scutellum*, although Professor Smith, in his second volume, has conjectured it to be a form of that species.)

26. *Cocconeis radiata*, n. sp. This very beautiful form is rare in the deposit, compared with most of the others. It is represented in fig. 26.

Form oval. Length about 0.00075". It has strong, distant rays, proceeding from a small, oval central spot, and, so far as I know, it is the only oval form which is radiated. The rays appear to increase in width as they approach the margin, and are crossed by a series of concentric elliptical lines, from the margin to the centre, giving to the valve a singularly rich appearance. Rays about 18; concentric ellipses about 7 or 8. This form has occurred as yet only in this sand. Fig. 26\* represents an abnormal form of it. (282.)

27. *Cocconeis costata*, n. sp. This pretty species was described in my former paper, but the specimen there figured was an inferior one. I give a better in fig. 27. It is not rare in the lighter densities.

\* So numbered in Part I.

Form a broadish oval. Length, 0.0005" to 0.001". Median line strong; no nodule. The transverse lines are strong entire costæ, which I formerly described as double lines. This is only apparent, something on the form of the costæ causing their margins to come out strongly. The space between each pair of costæ is striated at right angles to the costæ, a character only seen on close inspection, and which I have observed since my former paper. This is a perfectly characterised species, which I have found pretty frequent in the recent gathering above mentioned. (219.)\*

28. *Cocconeis* (?) *lamprosticta*, n. sp. This form is somewhat scarce in the deposit, and I have considerable doubts as to its belonging to this genus. For the present, however, I place it there, as I have not yet been able to see any other view than the one figured, of which I have found a considerable number.

Form between elliptic and obtuse rhombic, inclining rather more to rhombic. The central nodule is not strongly marked, but the median lines terminate in two small expansions, between which is a considerable space. Length from 0.0028" to 0.0033". Striæ about 12 in 0.001", very conspicuous, formed of dots, somewhat like those in *C. distans*, and as widely apart. There is a narrow blank space on each side of the median line. The dots have the same shining aspect as in *C. distans*, but the form is much thicker and more strongly marked.

The resemblance of this form, which is represented in fig. 28, to *C. distans* in several characters, led me to refer it to the same genus. But in some specimens, apparently of the same form, the median line is a mere blank or raphe, and the dots are rather square than round. These specimens, as Dr. Greville pointed out to me, seem rather allied to *Biddulphia* or *Zygoceros*, genera which possibly ought to be united, and which, at all events, are very imperfectly known. If the present form, fig. 28, belong to *Biddulphia*, it ought to exhibit the characteristic and peculiar front view of that genus; but for this I have sought in vain. It is possible that there may be two forms; one a *Cocconeis*, or possibly a *Navicula*, the other a *Biddulphia* or *Zygoceros*. I figure the most frequent, and leave the question to continued observation. (282.)

Before quitting this genus, I may mention, that in this deposit both *Cocconeis Scutellum* and *C. Placentula* are among the most abundant forms, and that both of them exhibit a remarkable extent of variation. According to many, the form I figured in my first paper as *C. speciosa* is a form of *C. Scu-*

\* So numbered in Part I.

*tellum*, but I have considerable doubts on this point. The form figured by Roper as *C. concentrica* is referred in like manner to *C. Placentula*, but this also is doubtful. In the Glenshira Sand both of these are frequent; and there is another form, allied to *C. concentrica*, but differing still more from *C. Placentula*. This form is a curious one, but I have not yet been able to study it properly.

29. *Amphora* (?) *rectangularis*, n. sp. This is a pretty little form, which I refer to *Amphora* on account of the crossbar in the middle of each valve; otherwise I should have referred it to *Amphiprora*. Represented in fig. 29.

Form of the entire frustule nearly rectangular, narrow, with the corners somewhat rounded. The middle space is widest at the ends, and in the centre; narrower between these points. The striated portions are crossed by a straight bar, opposite to which the outline is slightly constricted. Length from 0.0025" to 0.0045". Striæ fine, transverse, about 40 in 0.001". Besides the central constriction, the external margin is very slightly undulated towards the ends. (283.)

30. *Amphora elegans*, n. sp. This form is frequent, as is also the preceding; but it seldom occurs entire, and the figure, fig. 30, is that of the detached valve.

Form of the entire valve oval, elongated, with truncate extremities. Length from 0.001" to 0.0025". The two halves are separated by a rectangular space. The curve line in each valve is peculiarly gentle and beautiful. Each valve is crossed by a line or bar in the middle. Aspect hyaline; striæ very fine, transverse, inconspicuous.

(I have lately found it entire in the recent gathering above mentioned.)

31. *Amphora plicata*, n. sp. This is another hyaline species. Fig. 31 shows the entire frustule, which is frequent; but its parts are often shifted or displaced.

Form nearly rectangular; broad, corners rounded, ends truncate, the middle part of the outline being slightly convex or elliptical. In some it is quite straight. The curve line in each valve very deeply curved, the curve coalescing with the margin near the ends, and projecting much towards the nodules in the middle. The part of the valve external to this line is very faintly marked with transverse striæ, difficult to be seen, from the hyaline character of the form. The median space is marked by strong vertical, or rather concentric, slightly curved lines, which appear as folds, like those of paper plaited and then partly opened out. I have named it from this character. It is a beautiful and striking form, but apt to be overlooked from its transparency. (284.)

32. *Amphora biseriata*, n. sp. This is another remarkable species of the genus, which is not at all rare in the deposit. It is represented in fig. 32.

Form of the entire frustule nearly rectangular, the corners being rounded. Sometimes it is a little elliptical in the middle, at others it is a little incurved there. It is often rather narrow. Length 0.003" to 0.0045". The two valves are connected by a narrow rectangular space. The curve line in each valve is not conspicuous, from its projecting so very little from the margin in the middle part, and running very near the margin all the way to the ends. The striation is coarse, transverse; striæ about 18 in 0.001". In each valve the striæ are traversed by faint white vertical lines, which are only seen when the focus is adjusted to them, and then appear to divide the striæ into vertical bands of short transverse bars. Sometimes two such lines are seen on each side. I have named it from this peculiarity; but it is well characterised by its form and peculiar striation.

I do not feel quite sure that I have rightly referred this form to *Amphora*; but the curve lines certainly exist, and there is no other known genus to which it can be referred. (285.)

33. *Amphora lineata*, n. sp. This form, which is represented in fig. 33, varies a good deal, and occurs sometimes much longer and narrower, without the recurved ends, and with more and stronger vertical lines in the median space. I have not had time to obtain figures of the other forms, and this one is not so characteristic as others.

Form oval, sometimes broad, at other times long and narrow, nearly linear. Ends recurved, but in some this is very slight indeed. Lateral parts distinctly cross striated. Median space marked with fine but distinct vertical, or rather concentric lines. The form here figured approaches to *A. salina*, Sm., but there are others which have no resemblance to that form, and in which the vertical lines are stronger, and cover the whole valve, so that no lateral transversely striated part can be seen. It is possible that the latter are the true *A. lineata*, and that the form figured may be a form of *A. salina*. Length from 0.0015" to 0.0025".

I am inclined to believe that the form I consider as the typical *A. lineata*, not here figured, is the same with a lineate *Amphora* which Dr. Greville has found in the sand from Trinidad already mentioned. (286.)

(In the recent gathering above referred to, I find the form which I call *A. lineata* frequent. I shall give a better figure of it on an early occasion.)

34. *Amphora obtusa*, n. sp. This is one of the most striking forms in the deposit, in which the detached valve, as seen in fig. 34\*, is by no means rare; while the entire frustule, fig. 34, is very scarce. The detached valve has also occurred to Dr. Greville in the Trinidad sand above alluded to.

Form of the entire frustule nearly rectangular, broad, the ends very broadly rounded. The outline of the detached valve is generally a little convex on the outer margin, occasionally it is very slightly incurved there, as in fig. 34\*. The ends of the valve are generally very obtuse, but, as in fig. 34\*, sometimes produced to a sort of beak. The inner margin of the valve is gently undulated, so that it was not easy to suppose two of them in opposition till the entire frustule, fig. 34, occurred, in which the margin appears more nearly straight. The two valves are in close opposition, except at the centre and just at the ends; but I have also seen them separated by a narrow rectangular space. The curve lines are strongly marked and strongly curved, projecting in the middle nearly to the centre, and near the ends almost coalescing with the outer margin. There is a nodule at the middle point of each curve line, and also near each end of the valve; but here the outer margin seems to bend inward in a curl and form the nodule, which is apparently on a different plane from the rest of the inner curve line. Length about 0.0037" to 0.004". The valve is transversely striated. Striæ very fine, about 70 in 0.001". They cannot be seen on all parts of the valve at the same time, because the valve is very thick, and the parts on opposite sides of the curve line are in different planes. (287.)

35. *Amphora crassa*, n. sp. This and the two following species possess a most remarkable and peculiar structure, which makes me very doubtful whether they belong to this genus. If they do, they will form a well-marked sub-genus. It is, however, possible that it may be found necessary to form a new genus for their reception. The first of them, *A. crassa*, is represented in fig. 35.

Form nearly rectangular, rather narrow; corners rounded, ends truncate. Length from 0.002" to 0.0032". The whole visible surface of the valve is divided into about eight vertical bars, which seem to converge on the ends. The curve lines project half way across each valve in the middle, but retreat rather suddenly to very near the outer margin, and run along it, almost coalescing with it. The vertical bars are transversely striated, and the striæ are coarse and broad, about the same width as those of *Pinnularia borealis*, Ehr. (*P. latestriata*, W. G.) There is no appearance of separation between the

two valves, nor have I seen the detached valves of this form. As its structure much resembles that of the next species, I shall not here dwell on it. (288.)

(In the recent deposit so often alluded to, I find *A. crassa* not unfrequent, and I have there seen the detached segments, which are very remarkable—so much, that I at first took them for an entirely new form.)

36. *Amphora Grevilliana*, n. sp. This form, of which the entire frustule is represented in fig. 36, and the detached valve, or rather segment, in fig. 36\*, is the most remarkable of all the forms here described, as *Synedra undulata* was of those figured in the former Paper.

Form of the entire frustule varies from rectangular, to somewhat elliptical, or rather broad elliptical, with broadly truncate ends, the ends being convex. Length from 0.003" to 0.0045". Like the preceding, the whole surface of the frustule is made up of vertical, or rather concentric bars, the middle one appearing straight, the others slightly curved, and converging on the ends. There are blank lines or narrow spaces between these bars, of which there are seven or eight, not so closely set as in the last species. As in the last, the lateral curve lines project half way across each valve in the middle, but curve back rapidly to the outer margin, along which they run to the ends. The bars are transversely striated. Striæ conspicuous, but much finer than in *A. crassa*. The frustule has very much the appearance of a cask or barrel, but appears to be four-sided or prismatic, as seems also to be the case in *A. crassa*. Colour dark brown.

The detached segment, as seen in fig. 36\*, is arcuate; the dorsal margin convex, and in some long specimens straight, bending forward at the ends to a kind of projecting beak. The inner margin, which is faint, is nearly straight, but between the central nodule and each end it is slightly incurved. Within it is a much more strongly marked and more incurved line, the two halves of which meet in a strong nodule. Beyond this again, is another line forming one curve, convex towards the inner margin in the middle, and concave at the ends. Beyond this is a still stronger line, which in the middle is concave towards the inner margin, and towards the ends is concave in that direction. The whole is marked with strong, conspicuous, moniliform, transverse striæ.

For a long time I did not connect the two forms, fig. 36 and fig. 36\*. The latter I took for a form of *A. Arcus*, figured in my former Paper. But at last, when Dr. Greville pointed out some of the differences, I returned to the study of it, and soon found specimens of the entire form, fig. 36, in which

the markings of fig. 36\* could be seen through them, as well as others, fallen in part asunder, which demonstrated the connection. I then named it in compliment to Dr. Greville, who had thus led me to trace the relation between the two forms.

But although it is certain that the form fig. 36\* is a part of the entire frustule, fig. 36, it does not appear to be the half of that frustule, nor such a part or single valve as usually occurs in *Amphora*; for if we suppose two such parts in apposition, as we may see in *A. ovalis*, or in several of the *Amphora* I have here described, such as *A. obtusa*, the result would not be, as in *A. obtusa* or *A. ovalis*, the entire form, but something quite different. I have seen two segments thus in apposition, but too late to be figured. The effect is exactly that of a section through the middle of the supposed frustule, and resembles what is seen when an orange is cut in half. On the other hand, the entire frustule, as we see it in fig. 36, which, after all, may be but half of the entire form, appears as if it were formed of parts like fig. 36\*, which are thicker on the convex margin than on the concave one, placed next each other in the same way as the parts or segments of a melon. Of such segments we see the backs of seven or eight in the view seen in fig. 36. But as the frustule is not cylindrical, though convex for a large part of its periphery, but rather prismatic, it is probable that there are two sides, like that seen in the figure, opposite to each other, and two others at right angles to these, also opposite to each other, and perhaps narrower. The former, the broader sides, are convex, like the sides of a barrel; the others probably flat. The latter most likely represent the rectangular median spaces in the common forms of *Amphora*, and the line of junction of the two half-barrels, as we may call them, will pass through these narrower sides. If this be correct, then the view, fig. 36, may be either that of the entire frustule or barrel, or that of the half-barrel seen from the convex side. I think I have seen specimens of all these views, namely, of the entire frustule, which is darker in colour, of the half seen from the convex side, and of the half seen from the flat side, or looking on the plane of a section through the middle of the narrower sides of the frustule. But I have not yet seen any specimen lying on the narrower side, and thus showing the line of junction. This is probably because the convex side is so much broader.

It will be seen that the bars, which are the thick backs of the segments, converge like those of an orange or melon, to a point on the terminal surface, which is therefore also con-

vex. I have not been able to see this surface as if looking directly down on it, although the form is not rare in the coarser densities; but I have no doubt that the frustules may be picked out and examined in water or some other fluid in which they can be turned round so as to show all the faces.

The above description applies, *mutatis mutandis*, to *A. crassa*, and, as I believe, also to *A. Arcus*; and although these forms all exhibit some points of agreement with *Amphora*, as hitherto known, yet the peculiarly complex structure of each half of the frustule seems to be a character so marked, as to require a new genus for those forms in which it is found. I do not, however, venture to establish such a genus, but am satisfied to direct the attention of observers to the existence of this remarkable structure, (which appears also to occur in *A. costata*, figured in the 'Synopsis,' vol. i,) in the hope that it may be more thoroughly investigated and more satisfactorily cleared up than I have been able to do it. I should here add, that possibly *A. biseriata*, the structure of which is both obscure and peculiar, may belong to this group, and that even *A. plicata* may be found to be related to it. (289.)

(*A. Grevilliana*, as well as the next species, occurs in the recent gathering already alluded to.)

37. *Amphora Arcus*, n. sp. Of this species, individual segments were figured in my former Paper. I had not then seen it entire; but since then I have found that one of the complex, barrel-shaped forms in the deposit belongs to it, and is either the entire frustule or half of it. Like *A. Grevilliana*, it varies considerably in length, but the entire or half frustules I have seen have been shorter than many of the detached segments. The general structure and form resemble those of the preceding species; but the segments are simply arcuate, having the form of a strung bow. The entire frustule has the form of a barrel with ribs and bars, and all parts are easily distinguished from *A. Grevilliana* by their coarser striation, and by the coarsely moniliform character of the striation. As the segments were formerly well figured, I give here a figure of what is not the entire form, but is more probably only one half of the barrel. This is represented in fig. 37. (213.)\*

38. *Amphiprora minor*, n. sp. This species, represented in fig. 38, is not very rare in the deposit.

Form elliptical, long, and rather narrow, the central part slightly constricted. The inner margin of the lateral parts is concave towards the middle, leaving a long, narrow, truncate,

\* So numbered in Part I.

elliptical median space. The lateral parts are marked with somewhat coarse transverse striae. Length about 0.0025". (290.)

39. *Amphiprora lepidoptera*, n. sp. This beautiful form is also not unfrequent in the deposit. It is in some degree allied to *A. alata*, but not only is it much longer, it has also a totally different aspect, not being hyaline as *A. alata* is, but conspicuous, from the absence of this peculiarity. It has also a brown colour. It is frequent in some densities, and very uniform in its characters.

Form nearly rectangular, with rounded ends, rather narrow, strongly and sharply constricted in the middle. The median space is broader than the lateral parts or alae. There are well-marked nodules on each side where these parts meet and join the transverse terminal margins. The alae are finely, but distinctly marked with transverse parallel striae. Length from 0.004" to 0.006". Colour a clear brown, especially on the alae. This is a very elegant form, but being thin, it is often met with fractured. It is shown, of a good deal less than the average length, in fig. 39. (291.)

(While this sheet was going through the press, I have ascertained that the form figured in the first part of this communication as *Apr. vitrea*  $\beta$ ?, is the S. V. of *Apr. lepidoptera*. Professor Smith, in his second volume, refers it to *Apr. elegans*, from which, however, it is at once distinguished by the acute and apiculate extremities, as well as by its general aspect and finer striation.)

40. *Amphiprora recta*, n. sp. This is a smaller species, still more nearly rectangular than the two preceding. It is frequent in the lighter densities. An individual, a good deal broader than the form usually is, is shown in fig. 40.

Form nearly rectangular, very slightly constricted, or rather incurvate in the middle; the corners rounded, the ends flat. Median space wider at the ends than in the middle. Lateral parts transversely striated; striae fine, but distinct. Length from 0.002" to 0.0045"; breadth variable, the longest being always narrow. There is an appearance of a central nodule in each valve, besides the two terminal nodules; and the valve on the S. V. must look like a *Navicula* or *Pinnularia*. But I have not been able, though the form is very frequent, to see any S. V. which I could refer to it. At first I took the frustule for the F. V. of a *Navicula* or *Pinnularia*; but the halves are united as in *Amphiprora*; the striation extends over the greater part of the F. V.; and lastly, the valves, even when separated, do not lie on the S. V., as is almost invariably the case with those genera. I have therefore referred it to *Amphiprora*. (292.)

41. *Campylodiscus simulans*, n. sp. This is a fine form, and frequent in the coarser densities, though, like nearly all the forms described in this Paper, it has not yet occurred elsewhere.

(I find it in the recent gathering above referred to, and I am informed by M. de Brébisson that it is the same as his *A. Thuretii*. But as I had found and named it, and even communicated it to M. de Brébisson long before his Paper appeared, I retain my own specific name. M. de Brébisson's figure is not characteristic, or I should sooner have recognised the identity of the two forms.)

Form frequently orbicular, and also frequently exhibiting the peculiar flattening at one side, and pointed projection opposite, with the saddle-like flexure of the valve so characteristic of the genus. But the orbicular individuals often do not seem to possess this last character.

From two points, near to each other at the circumference, two lines proceed, diverging gradually to the middle, and converging again to two points opposite the first. These lines bound the median space which occupies, in the middle, about one fourth of the diameter. It is marked with coarse transverse striae, divided in the middle by a blank line or raphe. From the margins of this space proceed, on each side, about twelve diverging lines, which, for rather more than a third of the distance to the circumference, are strong and black. Each line then splits into three, the two outer diverging a little, and near the margin meeting in a semicircular termination, and thus forming, on each of the short black lines, as a stalk, a lotus flower; the semicircular ends of these flowers meet all round, forming an ornamented inner margin. Beyond this lies a circular outer margin, and the short space between is transversely striated. At the points where the stalks of the lotus flowers divide, the third or middle line proceeds straight on from the stalk, and terminates abruptly just where the flower begins to expand into the head. Diameter from 0.003" to 0.004".

I have thus minutely described the markings of this form, which is well figured in fig. 41, because in my former Paper I figured another form, of a different genus, the markings of which are almost, if not quite identical with those of the form here described. That was figured as a large variety of *Surirella fastuosa*; and although I had not then studied the structure so minutely as I have since done, and the figure is not perhaps exactly as I would now make it, yet it will be seen that even that figure shows the resemblance. R.F.M.S.  
1855 p. 40  
f. 12.

The only difference, except that of form, which I can perceive is, that in the *Surirella*, the median space is narrower,

and not divided by a raphe. But it varies in breadth, even in the *Surirella*, and is probably only narrower there because the form is oval: and as to the form, the *Surirella* occurs frequently of so broad an oval as to be all but orbicular. Then, as we have seen, the *Campylodiscus* is most frequently orbicular, and not saddle-shaped. Indeed, as the *Surirella* varies much in form, being often panduriform, I think it quite possible that it may also occur orbicular, or as nearly so as the *Campylodiscus* I have figured.

The question here arises—Is it possible that these two forms should belong to the same species? And I am not prepared to answer this question in the negative. It is true that at present they are in different genera; but I would remind the student of these forms, that not long ago, nay, perhaps even now, *Campylodiscus spiralis*, as we call it, figures in Continental works as *Surirella flexuosa*. There is, therefore, a natural affinity between the genera, if really different; and in that case, *C. spiralis* and the form here described may be forms exhibiting the transition from one genus to another; it seems, however, more probable, that there may be no essential distinction between these genera. I have omitted to state that both forms, the *Surirella* and *Campylodiscus*, are equally frequent in the Glenshira Sand. (293.)

42. *Campylodiscus bicruciatius*, n. sp. This beautiful form is by no means so frequent in the deposit as the preceding. Fig. 42 represents it.

Form nearly orbicular. Median space square, marked with two sets of coarse lines, at right angles to each other, giving to this part a fenestrate appearance.\* From each side of this square proceed two triangular or conical prongs, or prolongations to the inner margin, which their points touch. These prongs are strongly striated, each pair transversely to its course. From the corners of the square proceed, from each corner four lines to the inner margin, which, as in the preceding species, is formed of small semicircles, convex outward, and joining the points of the sixteen lines and those of the

\* I have some reason, from recent observations, to suspect that the fenestrate aspect may depend on the fact, that the two valves are so placed, that the lines in one are at right angles to those in the other. If so, this is probably the normal position, for I have not seen any example of the valves lying obliquely. Of course, in the supposed case, the single valves will exhibit only four prongs; and this I think I have seen. But, if this be the case, it is not easy to see how, if the cross bars are seen through the upper valve, the open spaces should come out as clear as if the two valves lay with the bars coincident. Mr. West informs me that he has seen this form in an exotic marine gathering.

eight prongs, forming spaces, which differ in shape from the different origin of the boundary lines. Between the inner margin and the outer one, the narrow space is transversely striated. Diameter of disc about 0.027". (294.)

43. *Tryblionella apiculata*, n. sp. In my former paper I figured *T. constricta*, which name I find has been adopted by Professor Smith. I had also observed this one, but had not then satisfied myself that it was distinct. Having since then found it in recent gatherings, alone, that is, without the shorter *T. solaeiformis* or *constricta*, I am inclined to regard it as distinct, especially as I understand that Professor Smith thinks that I had included two forms under *T. constricta*. I may here add that Dr. Greville has found in the Trinidad sand, a short, broad, slightly constricted and apiculate form, which seems to be a *Tryblionella*, allied to these. This last I have also since observed in the Glenshira Sand, though perhaps a little smaller. It is possible that all three may be forms of one species. Fig. 43 represents *T. apiculata*.

Form linear, narrow, slightly constricted in the middle; extremities apiculate. Keel strongly marked in many specimens, striæ fine but distinct, about 45 in 0.001". Length 0.0015" to 0.0017". The striation is peculiar, for in many specimens it is easy to see not only transverse, but also oblique striæ. This character was first observed by Dr. Greville in the Trinidad form, so far as I know, but I have since observed it in all the forms, though not in every individual. These forms require a more full investigation than I have been able to give to them. That here figured, or one apparently the same, occurs in a recent gathering from the Cumbræ Isles in the Clyde, with only fresh-water forms, but so near the sea, that the *Tryblionella* may possibly be marine. In Dr. Greville's Trinidad sand, both marine and fresh-water forms occur. (295.)

44. *Nitzschia distans*, n. sp. This form is frequent in the deposit; want of space, however, has prevented its being given on this plate.

Form of the *F. V.* rectangular, the corners rounded. In some specimens I observe a small expansion, analogous to that in *N. spathulata*, but smaller, on each side near the extremities. This is not seen in the figure, having probably been absent from the individual figured, or not seen by the artist from its transparency. The markings are unusually distant, hence the name. They appear to be almost moniliform, and, under a high power, appear as if constricted in the middle, so as to be nearly divided, while faint longitudinal lines appear to pass from one bead to that opposite to it in the next transverse

line. S. V. nearly rhombic, narrow; but the angle in the middle is, as it were, rounded off, and not well marked as in *N. angularis*. Extremities very acute. Keel central, prominent, with the same distant markings as appear on the F. V., only here they are seen as puncta. Length about 0.003". (296.)

45. *Nitzschia socialis*, n. sp. This pretty species is remarkable from its occurring, in the prepared material, after boiling with acids, in groups of six, eight, ten, twelve, or more, without any apparent connection between them. One of these is represented in fig. 45.

Form of the S. V. linear lanceolate, narrow; extremities acute. Keel central. Puncta closely set. Valve finely but very distinctly marked with transverse parallel striæ; striæ 30 to 36 in 0.001". F. V. rectangular. Colour yellowish-brown. Length about 0.0032". The valves also occur detached; but the groups are very frequent. This form may possibly be a Homæocladia, but it seems quite distinct from any of those figured by Professor Smith. (297.)

46. *Nitzschia insignis*, n. sp. This fine species is not very rare in the deposit, though often fractured, and the F. V. is very seldom seen. The F. V. is shown in fig. 46, the S. V. in fig. 46\*.

Form of the F. V. linear, rectangular, with obtusely rounded ends. Puncta distant. Lateral parts transversely striated. Striæ conspicuous, especially on the S. V., where they traverse the whole valve. Length from 0.007" to 0.015". Puncta about 6 in 0.001". Striæ about 30 in 0.001". Keel on the S. V. not quite central. S. V. slightly bent at the ends, opposite ways, in some individuals; in others perfectly straight.

This species, in length, and also in form, resembles the straighter forms of *N. sigmoidea*, from which the conspicuous striation at once separates it. From *N. Brébissonii* it is distinguished by the aspect of the F. V., which in *N. insignis* is much longer and narrower, and quite straight, besides having a long blank rectangular space in the middle. In *N. Brébissonii* the F. V. is striated across the whole valve, except a narrow raphe, and the valve is sigmoid on this view. It cannot be confounded with *N. scalaris*, having much finer markings, and being a much slenderer form than that species. It evidently belongs, however, to the same group. It is further distinguished from *N. scalaris* by the absence of the rounded swellings out near the ends of the F. V. (298.)

I have not yet found this, or either of the two other species of *Nitzschia* here described, in any recent gathering. They are probably all of marine origin.

(All three species occur in the recent gathering above named.)

47. *Eupodiscus sparsus*, n. sp. In my former paper I figured, under the name of *Eupodiscus Ralfsii*  $\beta$ , but doubtfully, a fine disc, which is frequent in the coarser densities of the Glenshira Sand. I pointed out that, although in some points agreeing with *E. Ralfsii*, as I had seen it, (for no description of that species had yet appeared,) it yet differed from it in the absence of the peculiar elongated angular blank spaces, which in *E. Ralfsii* are scattered over the surface. Since then, I have examined many fine specimens of both, as both are frequent in the coarser densities, and I find that *E. Ralfsii* appears almost invariably blue or purple when seen with a low power, such as the two thirds, or even the half, and sometimes even with the quarter or one fifth. These blue discs of *E. Ralfsii* always showed the angular blank spaces. On the other hand, *E. sparsus*, as I call, provisionally, the new disc, is never blue, but always buff-coloured, or brown, or occasionally colourless, even under the low powers. In many specimens, no blanks whatever occur; in some, occasional blanks appear, but look like the effects of injury.

The figure in my former paper gives a very good idea of the general aspect of *E. sparsus*, but I must add, that in that individual, the granules of which the rays are composed are set much closer than is often the case. In this particular a good deal of variation is observed.

On a close inspection of the more sparsely grained discs, I observed a very curious and beautiful structure, which I have found, in great perfection, in the rather small disc represented in fig. 47, which is most accurate.

In this disc, the diameter of which is 0.0019", there are twelve principal and equidistant rays formed of round dots, not at all closely set. Of such rays, in the common size of the discs, diameter 0.003" to 0.0035", there are usually eighteen. Between the twelve principal rays, which meet in the circumference of a small circle, formed round the centre by the terminal dots of these rays, are twelve shorter rays, which stop short, as far from the circumference of the central small circle, as that is from the centre. On each side of these shorter secondary rays are three similarly dotted lines (in the larger discs four such lines), which are not rays, but are strictly parallel to the secondary rays on each side of which they lie, and of course, in each of the twelve primary segments, parallel also to each other.

In consequence of this very peculiar arrangement, it is obvious that the lines, parallel to the secondary rays, cannot reach the centre, if produced, nor can they meet the secondary rays, but in that case would meet the primary rays at a very



acute angle. They stop short, however, of the length of the secondary rays, as these do of the primary, and to about the same extent, each line, as we go from the secondary towards the primary rays, becoming shorter than the preceding one, till the third and last on each side is reduced to four or five dots, and there are often seen, in the larger discs, after the fourth of these parallel lines, one or two dots, indicating the presence of a fifth, for the extension of which no room has been left.

It is evident that so remarkable a structure must amount to a specific, at least, if not to a generic distinction. It will be observed that the successive shortening of the lines, from the centre towards the circumference, produces a good many blank spaces, which, however, are so symmetrical, as not to catch the eye as blanks, as the blanks in *E. Ralfsii* do, which, besides being irregular as to position, are smaller and more numerous. Nevertheless, although I have not yet had time to examine *E. Ralfsii* minutely, I rather think that its structure is, essentially, like that of *E. sparsus*, although in *E. Ralfsii* the dots are both larger and more closely set. Whether this be the only cause of the blue colour I cannot say; but I find that individuals of *E. sparsus*, in which, as already stated, the rays and dots are very close, still retain their brown colour, only darker. It is possible that the blanks in *E. Ralfsii* may prove, when closely examined, to be the result of the structure above described, when the rays and dots are close; yet this does not explain how *E. sparsus* should often occur, both when sparsely and closely marked, without any of the peculiar blanks of *E. Ralfsii*. The individual here figured, probably from its smaller size, and especially from the sparseness of the markings, is colourless; while, as I have stated, *E. sparsus* is usually of a paler or darker brown.

I presume we shall have a description of *E. Ralfsii*, and probably of its varieties, in vol. ii of the 'Synopsis.' In the meantime I venture to direct the attention of observers, both to the very remarkable structure so well seen in fig. 47, and to the differences in colour and other points between *E. sparsus*, and what is generally believed to be *E. Ralfsii*, although I am inclined to believe that both forms possess the same general structure, and the same arrangement of the markings. (299.)\*

\* On comparing again several discs of both kinds, I find that the arrangement is the same in both, but that in those of *E. Ralfsii*, which appear blue, as most do, the dots are always large and very close, while in *E. sparsus* they are small and further apart. In one specimen, which I have not had time to figure, the dots are very small indeed.

(In the recent gathering above referred to, *E. Ralfsii* is frequent, and I have found its colour, under the  $\frac{3}{4}$ , to vary from purple to dark blue, bright

48. *Synedra Baculus*, n. sp. This form is not at all rare in the deposit, and I cannot refer it to any of the *Synedra* in the 'Synopsis,' vol. i. It is certainly not *S. superba*.

Form linear, rather narrow, very nearly of equal width throughout on the S. V.; ends obtuse; F. V. rectangular. The valve is transversely striated. Striae rather conspicuous, and traversed by faint longitudinal lines. Length from 0.01" to 0.018" or even 0.02". It is represented in fig. 54 (300.)

I have now to mention a few forms, which I do not venture to name, partly from not having yet been able to study them fully, and partly because I have not been able to refer to all the works I wish to consult. One or two of them may probably prove not to be *Diatomacea*.

49. *Orthosira* or *Coscinodiscus*? This disc, represented in fig. 48, is frequent in the deposit, and I have not been able to trace any view but that which is figured, or consequently to ascertain whether it be an *Orthosira*, which it may be, or a disc of some other genus, or finally a discoid diaphragm or dissepiment, belonging to an *Orthosira* or some similar form.

Diameter from 0.001" to 0.0025". Margin transversely striated. General surface marked with very fine short lines, apparently devoid of any regularity of arrangement. These are very difficult to resolve; but it is easy to see, all over the surface, small distant puncta, scattered sparsely, without arrangement or symmetry. The disc is convex. (301.)

50. *Coscinodiscus* or *Actinocyclus*? This disc is not very rare, but less frequent than the last. The same general remarks apply to it. It will be figured in connection with our communication on the Clyde forms, want of space having compelled its omission here.

Diameter, as in the preceding case, from 0.001" to 0.0025", but often as much as 0.003". Colour brown. The whole

blue, pale blue, greenish blue, green, and yellowish green; and, in a few cases brown, passing from brown to purple. I have also seen one or two individuals of a buff colour, exhibiting the angular blanks which characterise the blue ones. On the other hand, *E. sparsus* is always brown, buff-coloured or colourless. When the two forms occur together, *E. sparsus* is seen to be in general much larger and much flatter, and it does not exhibit the angular blanks, which, as I suspected, are the results of the arrangement I have described, in *E. Ralfsii*, where the rays and granules are both closely set, and the granules larger. The largest examples of *E. sparsus* are in general the least coloured, probably because the granules are even less closely set than in the smaller discs, and the angular blanks are entirely absent. Whether these differences, producing so great a difference of aspect, be specific or not, I must leave to others to decide. At present, I am at a loss to account for the fact, that two discs may occur, of the same size, and both buff-coloured, one of which shows the angular blanks, while the other exhibits no blanks whatever.)

surface is marked with very fine granulations, among which may be observed faint rays, especially towards the margin, which is transversely striated, indicating a regular symmetrical structure. I have not been able to determine the genus; but as it seems to be cellular, I think it likely to be a *Coscinodiscus*. There are also two or three other discs which I am unable to name; but I have not had time to obtain figures of them. (302.)

51. *Campylodiscus*. (?) This form, represented in fig. 50, has occurred to me several times. At first I took it for a *Coscinodiscus*, but on closer inspection it is found not to be truly orbicular, and rather to resemble a *Campylodiscus*. It does not agree with any of the species in Smith's 'Synopsis;' but as it may be an immature form, I leave it for further investigation.

Form quasi-orbicular, flattened a little at one side, and projecting a little at the opposite part. The markings consist of large sparse dots, arranged in a way which is partly radiate, partly in parallel lines, somewhat like *Eupodiscus sparsus* above described. There is some appearance among these lines of a broad rectangular cross, but not distinctly brought out. No central space, the dotted lines meeting in the centre. It is possible that it may, after all, be a *Coscinodiscus*. (303.)

(This form occurs, not unfrequently, in the recent gathering of which I have spoken above. It is sometimes, as in the figure, not exactly round, but it also occurs perfectly orbicular. I hope to be able to study it more fully. It has some resemblance to *Eupodiscus tenellus*, Bréb., but I cannot see in it the characteristic protuberance of *Eupodiscus*.)

52. *Amphiprora*. (?) This little form is frequent in the deposit, and I have conjectured it to be an *Amphiprora* from its resemblance in form and general structure to that which I have above described as *A. recta*. It is represented in fig. 51.

Form nearly rectangular, narrow; the ends rounded, obtuse. Frustule slightly constricted in the middle. The whole surface, except a narrow space in the middle, widening a little at the ends, is marked by transverse striæ, which are conspicuous, radiate, and inclined, about 25 to 0.001". There is, as in *A. recta*, an appearance of a central nodule visible on each valve, round which the striæ seem to radiate. Length from 0.0015" to 0.003".

At first sight this form, as well as *A. recta*, might be supposed to be the F. V. of a *Navicula* or *Pinnularia*. But among all the forms of these genera in the deposit, there is not one which agrees with this in its characters. Besides,

the striation nearly covers the whole frustule on the F. V., which we never find in *Navicula* or *Pinnularia*. Moreover, although the form is frequent, the S. V. which, as in *A. vitrea*, would much resemble a *Navicula*, does not occur, or at least I have not been able to find it, although I can trace both the F. V. and the S. V. in all the species of *Navicula* and *Pinnularia* which I have been able to distinguish. For these reasons I suspect it to be of a different genus, probably an *Amphiprora*; but as this is doubtful, I figure it as a form to be further examined. (304.)

53. *Disc*. This form, represented in fig. 52, is in all probability not *Diatomaceous*, but one of the *Polycystineæ*. It is a very beautiful object, and is made up of large hexagonal cells, the disc having a raised border or margin of considerable breadth, crossed by what appear like rings projecting on the circumference. Diameter about 0.002". Many of the cells, which otherwise resemble those of *Eupodiscus Argus*, or of *Triceratium Favus*, have a punctum in their centre.

Not being familiar with the *Polycystineæ*, I figure this disc in the hope that some one who is familiar with them will be able to say whether it be one or not. It is at all events a fine object, and is very scarce indeed in the deposit. I observe a few very similar discs in an earth sent to me by Professor Bailey, marked, Bermuda tripoli, locality doubtful. (305.)

54. *Oval form*, fig. 53. When I observed this curious form with a low power, it seemed to resemble an *Amphora*; but on closer examination this resemblance disappeared, and I found myself unable to refer it to any genus known to me. Indeed, I have considerable doubts whether it be *Diatomaceous*, and suspect that it may prove, like the preceding, to belong to the family of the *Polycystineæ*. The specimen is unique, up to this time, in the deposit.

General form oval. The upper end seems to show an acute interior point, from which the external covering has been broken away, so as to expose it. At the lower end it appears to terminate in a cylindrical neck, which is truncated near to the body. The surface is marked by concentric lines of large and somewhat distant dots, these lines being arranged in pairs, the two of each pair rather close, but the interval between two pairs much wider. Of these pairs of lines, four are visible. Length about 0.001". On the whole, it seems to be more like one of the *Polycystineæ* than a Diatom. (306.)

Such is a brief account of the forms I have found in the Glenshira Sand, in addition to those formerly described, and

so far as I have been able to complete the examination of them. But several forms still remain, which must be reserved for more full examination.

It will be seen that, including the additional list of previously described forms, and those now first described, the number of species already found in this remarkable deposit, which in my former Paper extended to 234, now amounts to 304; a number, so far as I am aware, very far surpassing anything elsewhere observed, and nearly three times as great as that of the species in the estuarial mud of the Thames, as described by Mr. Roper, which is almost the only deposit, rich both in fresh-water and marine forms, hitherto fully described. The deposits and gatherings described by Ehrenberg have generally been either marine or fresh-water alone. I have shown the probable cause of the mixture of marine and fresh-water forms, but I cannot suggest any satisfactory explanation of the unusual accumulation of species, and can only conjecture that the deposit was formed during a very long period, in the course of which waters from different quarters may have at different times been carried to the spot.

But the Glenshira sand or mud is even more remarkable for the large proportion of new or undescribed forms, than for the aggregate number of species. In this and the former part of this communication, I have described and figured upwards of sixty forms, all undescribed before, so far as my knowledge extended. This is exclusive of several, which are probably varieties of known forms, as well as of eight or ten which I have elsewhere figured as fresh-water species, found by me in recent gatherings, and either new to science or new as British forms, which also occur in this sand, and several of which I first observed in it. It is also exclusive of a good many new forms observed also elsewhere by other naturalists.

Of the sixty forms just alluded to as new, only a very small number have as yet occurred elsewhere, although most of them are frequent in our deposit. From this I conclude that a large number of unknown forms will still repay the observer who looks for them, especially among marine species. (This conclusion is confirmed by the recent gathering above mentioned, in which I find, not only about 40 of the new Glenshira forms, but a number of species entirely new, of which I gave a short preliminary notice to the Botanical Section at Cheltenham.) A very extensive acquaintance with our fresh-water Diatoms, of which I have minutely searched gatherings from not less—probably many more—than 500 British localities, enables me to say that new forms now occur

but seldom. This is strongly in contrast to the results here described, where one deposit, in great part of marine origin, has yielded more than sixty new forms, the great majority of which have not yet been found elsewhere.

This leads me to observe, that while some dislike the labour of searching for forms in such complex mixtures as the deposit before us, I cannot help thinking that it is worth while to undergo this labour. Had we waited until the most curious of these forms should have occurred in a comparatively unmixed or pure state, many years must have passed before they became known. And although we cannot, for example, make sure of finding in every slide specimens of such remarkable forms as *Amphora obtusa* or *Amphora Grevilliana*, and the others of that singular group, yet, to obtain a knowledge of such a group, we ought not to grudge the trouble of mounting a few extra slides. The Glenshira Sand, even when purified as much as possible, and sorted into densities, is indeed loaded with mica in the coarser, and a very complex mixture of forms and mica in the finer densities. But the results speak for themselves, and I am very far from regretting the time and labour I have devoted to the investigation.

In conclusion, I would mention that the Glenshira Sand will supply observers not only with the new forms, except, perhaps, two or three that are very scarce, but with fine specimens of many known forms which are not always easily procured elsewhere. Of these I may name *Amphitetras antediluviana*, the strongly emarginate variety being frequent, the square one less so; *Stauroneis pulchella*, of the largest size, extending to 0.01" or more, and varying much in form; (this is *Stauroptera aspera* of Ehrenberg;) *Coscinodiscus radiatus*, fine, varying much in the size and aspect of the cells, and possibly including more than one species. *Coscinodiscus concinnus*, mentioned in the 'Synopsis,' vol. ii; *Navicula convexa*, very fine and large; *N. Jenneri*, extending to 0.008" or more in length; *Pinnularia megaloptera*, Ehr., of which *P. lata*, Sm., is most probably a short variety. This form occurs so long as 0.006, but more generally 0.004 to 0.005. It is, however, rather scarce. *Epithemia Hyndmanni*, very fine and large; *Coscinodiscus excentricus*; *Eupodiscus crassus*; *Campylodiscus Hodgsonii*, this is rather scarce; *Suriella fastuosa*, large and fine, sometimes very large and constricted in the middle, in which case it much resembles *S. lata*, and, it is possible, may pass into that form. *Synedra superba*; *Nitzschia bilobata*, rather scarce. *Amphiprorora vitrea*, very fine; *Amphiprorora elegans*, sometimes very large. Na-

*vicula Smithii* (olim *elliptica*, Sm.), very fine. *Himantidium majus*, large. All these occur, with some commoner forms, in the coarser densities, along with the larger of the new forms.

I shall be glad to supply observers with the Glenshira Sand in its natural state; and would recommend them, after it has been boiled in acid, to separate it into densities in the way described by Mr. Okeden. The coarsest portions in which any forms occur, contain so few as to be worthless. The next densities contain the forms above enumerated, as well as the larger among the new forms, with others; and the finer densities contain all the middle-sized and small forms. When well prepared, the entire *Amphora Grevilliana*, for example, is by no means rare in the coarser density, where it is accompanied by *A. Arcus*, *Campylodiscus simulans*, *Navicula maxima*, *N. formosa*, *N. latissima*, *Eupodiscus sparsus*, *E. Ralfsii*, &c., &c.

P.S.—I find I have omitted to mention two species, which are admitted in vol. ii of the 'Synopsis,' as British forms, and which occur in this deposit. These are *Navicula Lyra*, Ehr., and *N. retusa*, Bréb., both marine forms.

I must take this opportunity of expressing my obligations to Mr. West for the great pains he has bestowed on the engraving of the numerous figures above described.

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A MICROMETER OBJECT-FINDER. By R. J. FARRANTS, Esq.

(Read April 30th, 1856.)

A SURE and ready method of determining the position of a microscopic object on the glass slide which contains it, so that it may be registered, and the object be brought into the field of view of the microscope, at any time and with any instrument, is still a desideratum with microscopic observers. Ingenious suggestions have indeed been offered, from time to time, with a view to supply this want; but that none of them have fulfilled the requirements may be inferred from the fact that no one of them has obtained general acceptance. I do not doubt that an object may be found, if its place on the glass slide has been accurately registered, with any of the "Finders" at present before the public; still, though the result may be sure, with none of them is the method of determining the position of the object, in the first instance, of ready application.

The plan of Mr. E. G. Wright, of Hereford, published in the 'Quart. Journ. of Micr. Science,' vol. i, p. 301, consists in fixing to or engraving upon the stage of the microscope two scales at right angles to each other, and reading off from

## DESCRIPTION OF PLATE I,

Illustrating Professor Gregory's paper on the *Diatomaceæ* of the  
Glenshira Sand.

- Fig.  
24.—*Pleurosigma*, not named, sp.?  
25.—*Cocconeis distans*, n. sp.  $\times 600$ .  
26.—*Cocconeis radiata*, n. sp.  $\times 800$ .  
26\*.— " " " Abnormal form of the same.  
27.—*Cocconeis costata*, n. sp.  $\times 800$ . This is a small specimen.  
28.—*Cocconeis lamprosticta*, n. sp.  
29.—*Amphora rectangularis*, n. sp.  
30.—*Amphora elegans*, n. sp. A detached valve.  $\times 600$ .  
31.—*Amphora plicata*, n. sp.  
32.—*Amphora biseriata*, n. sp.  $\times 600$ .  
33.—*Amphora lineata*? n. sp.?  $\times 600$ .  
34.—*Amphora obtusa*, n. sp.  
34\*.— " " A detached valve.  
35.—*Amphora crassa*, n. sp.  $\times 600$ .  
36.—*Amphora Grevilliana*, n. sp.  $\times 600$ .  
36\*.— " " A detached segment.  
37.—*Amphora Arcus*, n. sp., showing many segments in apposition. The detached segments are figured in my first paper on the Glenshira Sand. See 'Quarterly Journal of Microscopical Science,' vol. iv, Pl. IV, fig. 4.  
38.—*Amphiprora minor*, n. sp.  $\times 600$ .  
39.—*Amphiprora lepidoptera*, n. sp. The front view. (The side view is figured in the plate above referred to (under fig. 37) as *Amphiprora vitrea*,  $\beta$ ?) This specimen is from  $\frac{1}{3}$  to  $\frac{1}{2}$  shorter than what I now find to be the average length of this fine species.  
40.—*Amphiprora*? *recta*, n. sp. The second figure, mentioned in the text, is omitted for want of room.  
41.—*Campylodiscus simulans*, n. sp.  
42.—*Campylodiscus bicruciatu*s, n. sp.  $\times 800$ .  
43.—*Tryblionella apiculata*, n. sp.?  $\times 800$ .  
45.—*Nitzschia*? *socialis*, n. sp.  $\times 600$ .  
46.—*Nitzschia insignis*, F. V., n. sp.  
46\*.— " " S. V., "  
47.—*Eupodiscus sparsus*, n. sp.?  $\times 600$ .  
48.—Disc, not named, n. sp.?  
50.—Disc, not named, n. sp.  $\times 600$ .  
51.—*Amphiprora*? not named, n. sp.?  $\times 600$ .  
52.—Disc, probably one of the *Polycystineæ*.  $\times 600$ .  
53.—Oval form. Diatomaceous? or one of the *Polycystineæ*?  $\times 600$ .  
54.—*Synedra Baculus*, n. sp.

Figs. 44, *Nitzschia distans*, and 49, a disc, not named, have been omitted for want of space, but will be given on a future occasion.

Although many of the above figures are magnified to 600, and some to 800 diameters, yet they all vary in size to such an extent that specimens might have been selected which, magnified 400 diameters, would have been of the same length as the figures.—W. G.

The figures to which no mark of the magnifying power is attached are drawn to a scale of 400 diameters.

