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Walker & Chase
Some new &
rare diatoms.





SOME NEW AND RARE DIATOMS.

— BY —

WALKER & CHASE.

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NOTES

On Some New and Rare Diatoms,

BY

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AND

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Dimeregramma Baldjickii, Ralfs; (Brightwell.) A good view is given of this much-named Diatom. Brightwell was the first to figure and describe it: we give the synonymy:

Odontidium Baldjickii, Brightwell, M. J. 1859, p. 180, Pl. 9, Fig. 9.

Dimeregramma B., Ralfs, Pritchard's Infusoria, p. 791, 1861.

Rhaphoneis B., Grunow, Austrian Diats., p. 379, 1862.

Achnanthes B., Grunow, Arctische Diat., p. 21, 1880.

No satisfactory reason for this latest change is given; from an examination of a large number of specimens we are inclined strongly to place it back in the Genus *Dimeregramma*, Ralfs, *l. c.*

The essential characteristics of *Achnanthes* preclude the entrance of this Diatom, as we have no record of a frustule having different valves, one of which possessed median and terminal nodules; *Rhaphoneis* is characterized by moniliform striae: *Dimeregramma Baldjickii* is costate, the costae being 10 in .001 inch; the valves are very uniform in size, being .003 inch in length, by .0015 inch wide.—Habitat, Baldjick, Turkey. Plate 1, Fig. 3.

Biddulphia Imperialis, N. Sp., W. C. Walker. Large; 10-angled; angles acute, with prominent horn-like processes; distance between angles .00229 inch; diameter of valve .0076 inch; sides deeply concave; valve surface divided into two portions, the inner circular portion

occupying three-fifths the diameter of the valve, coarsely areolated with hexagonal cells; outer part coarse and irregular in areolation; entire surface punctate, puncta arranged in radiant lines. Habitat, Sandwich Islands; W. C. Walker. Plate I, Fig. 1.

This exceedingly beautiful species of *Biddulphia* is well figured in our illustration, and is very large: it belongs to the subdivision of which *B. fava* is the type, as is evidenced by the corrugated border and radiant punctation; the central circular portion, which is much depressed from the surface-level of the remainder of the valve, suffices to at once place it as an entirely new species: several examples having been observed by Mr. Walker.

Biddulphia formosa*, var. *pentagonalis, Witt. Valve large, 5-angled, angles slightly rounded: processes smooth, prominent: cellulation radiant, being that of *B. formosa* (*Triceratium*) except that near the margin the cellules suddenly grow smaller; processes smooth. Diameter between angles .0037 inch. Habitat, Pacific Soundings. Plate 2, Fig. 9.

This species is figured in Schmidt's Atlas, plate 79, f. 4; the figure in our plate is from a valve in our possession; as several valves have been noticed, we think the variety is one that will be sustained.

Biddulphia crenulata, N. Sp., W. C. Walker. Valve large, circular; margin crenated and striate; from 4 to 8 prominent mesicircular processes, which are intra-marginal and smooth: surface of valve finely punctate, puncta in radiant rows. Diameter of valve .004 inch. Habitat, Challenger Sounding, No. 237, Pacific Ocean. W. C. Walker. Plate 2, Fig. 7.

Quite a number of valves of this interesting and beautiful species have been found by Mr. Walker, in one of the Challenger Soundings: in accordance with the views of the most advanced students we place this as a *Biddulphia*, to which Genus the vast majority, if not all of the members of the Genus *Triceratium* will be relegated; the new genera "*Lampriscus*" and "*Odontella-Lampriscus*" of Grunow, must be condemned.

Amphiprora cornuta, N. Sp., H. H. Chase. Valve large, .0063 inch in length, by .0033 inch wide: deeply constricted at centre; extremities round, bearing a large, round, smooth, prominent process; striation very fine, extending two-thirds the distance to the centre, leaving an oval, smooth space in the middle of each lobe; margin strongly banded. Habitat, Tuscarora Sounding, 2,240 fathoms, Pacific Ocean. H. H. Chase. Plate I, Fig. 6.

A very peculiar Diatom, and one very difficult to classify, but the twisted keels seem to determine that it should be placed in the *Amphiprora*; the oculi at the extremities are quite similar to those of *Auliscus*; the striation is very fine, being 55 in .001 inch.

Amphipleura maxima, N. Sp., H. L. Smith. Structure and general characteristics those of *Amphipleura*; length of valve .0145 inch; striae 80 in .001 inch. Habitat, Fossil deposit, Klakamas, Oregon. Plate 2, Fig. 5.

A very interesting species of this noted Genus; its enormous size, which is quite uniform in several individuals, and the coarse striation at once place this as a different species from any yet observed; the ends of the median line have a slight elongation: there is also visible in the median line the distinct rudiment of a central nodule; the figure in our plate lacks these points, but otherwise is reliable.

Aulacodiscus Kinkerianus, N. Sp., E. S. Nott. Disc large, .009 inch in diameter: lurid; 5 to 7 rounded marginal processes; furrows conspicuous, extending but half way to the centre; umbilicus smooth and circular; granules minute, arranged in masses, which are radiant on the outer half of the valve, but irregularly disposed on remainder. Plate 1, Fig. 9. Habitat, Moravian Earth; Mr. Edw. S. Nott.

One of the most striking members of a Genus full of curious and instructive forms: the valve, when the under surface is in focus, bearing a remarkable resemblance to *Eupodiscus Argus*, and when the other surface is in focus having an entirely different appearance. Mr. Nott furnished us with samples of this species early in the spring of 1885, and has requested us to call it after his friend, Mr. Kinker, of Amsterdam, who furnished him with the material, which is a fossil deposit from Eastern Austria.

Aulacodiscus grandis, N. Sp., W. C. Walker. Disc pale, distinctly bullate beneath the 5 to 7 very prominent submarginal processes; granules small, distinct, arranged in radiant rows over entire surface of valve; furrows distinct, and placed on elevated ridges extending to centre of disc; umbilicus smooth and irregular; margin coarsely striated. Width, .0103 inch. Plate 1, Fig. 8. Habitat, Cambridge Estate, Barbadoes; W. C. Walker.

This beautiful species possesses several interesting points: the central part of the valve is elevated to an equal degree with the furrows, and when in focus the remainder is so far without as to cause the whole to present the appearance of a five-rayed star; the very close arrangement of the beautiful pearly granules, and its large size, all combine to make this one of the finest of its kind.

Aulacodiscus Stoschii, *Janisch*. Disc clear, with 6 or 8 minute, submarginal processes, situated on prominent thimble-shaped elevations; central half of disc elevated; granules arranged in radiant lines on the entire surface; rounded and distant on elevated portion of valve, but compressed and irregular in outline on remainder of surface; umbilicus circular and irregularly granular; margin finely striated; width .0088 inch. Gazelle Expedition, C. Janisch; Cambridge Estate, Barbadoes. W. C. Walker. Plate 1, Fig. 2.

This species of a genus that has furnished the Diatomist with so many beautiful forms, is figured by Herr Janisch in Fig. 11, Plate 34, of Schmidt's Atlas. It presents several distinctive characteristics: the thimble-shaped elevations; the deeply-depressed spaces between the processes,

and the altering appearance of the radiant lines of cellules. The illustration gives an excellent idea of the general appearance of this form.

Aulacodiscus mammosus, *Grev.*, in Transactions Mic. Society, 1863, p. 70. Plate 4, Fig. 13. We give a sketch of this unique species, in our Plate 2, Fig. 11, and herewith append Dr. Greville's notes thereon:

"Disc very prominently bullate beneath the processes, the bullations close to the margin and forming elevated cones; processes long, cylindrical; furrows open, composed of two parallel rows of granules reaching the umbilical blank space. Diameter .0038 inch; elevation of bullation and process above surface of disc, .0012 inch."

Aulacodiscus decorus, *Grev.*

"Large, colored; disc with numerous submarginal processes; furrows open, well defined by parallel lines of granules, terminating in very small blank spaces surrounding the processes; granules minute, irregularly disposed in the centre, soon passing into closely moniliform slender lines with intermediate shorter ones." Plate 2, Fig. 10. Habitat, Barbadoes. Width of valve, .0078 inch.

Auliscus cælatus, Bailey, var. *gigas*, Ehr. An enormous variety of the above Diatom, from Island of Iquique, South America; valve slightly oval; diameters .005 inch \times .0057 inch. Well shown in Plate 2, Fig. 12.

Auliscus stellatus, N. Sp., H. L. Smith. Valve small, rhomboid-oval; .0022 \times .0030 inch; umbilicus small, smooth, circular; rays radiant from center in four directions, oculi large, compressed from centre; surface of valve studded with pearly granules. -Habitat, Island of Iquique, S. A. H. L. Smith. Plate 2, Fig. 4.

These two species occur in the same gathering from Iquique, (not Guano.)

Synedra ulna, var. *Chaseana*, B. W. Thomas. Valve slender, .0214 to .0296 in length; striae 17 in .001 inch, extending across the valve; no blank space in centre; extremities constricted and rounded. Plate 2, Fig. 3. Habitat, Lake Michigan; Mr. B. W. Thomas.

This *Synedra* is notable for its very great length, some specimens in our possession being one-thirty-second of an inch long, and none less than one-fiftieth; the striae are 28 in .001 inch; a good idea of its appearance is given in the figure.

Synedra affinis, var. *Baileyana*, H. H. Chase. Valves small, from .00114 to .0034 inch in length; striation that of *S. affinis*, 33 in .001 inch; valves variously bent and constricted. Habitat, Brazilian Coast. Plate 2, Fig. 1, *a-d*.

A very remarkable appearing species, quite common in a marine gathering from Maranheim, South America; the normal form is given in Fig. 1; a few of the many variations shown in *a-d*.

Triceratium Febigeri, N. Sp., W. C. Walker. Valve triangular: distance between angles .006 inch; margins straight, interrupted midway by a convexity; angles rounded; surface of valve coarsely granular; granules small and irregular at centre and angles, but larger and arranged in rows on remainder of surface. Habitat, Barbadoes: W. C. Walker. Plate 2, Fig. 6.

This is one of the most curious and interesting species yet given up by that apparently exhaustless wonder-land, the Barbadoes fossil deposits. The peculiar appearance can be better understood from a study of the illustration in our plate, which is a faithful representation of it.

Podosira ^{argus, var} **Pacifica**, N. Sp., H. H. Chase. Large, measuring .0039 inch in diameter; finely striated over entire surface, striae radiant from center; margin wide and coarsely striated; middle third of valve with from 18 to 30 large, circular openings, giving a coarse, sieve-like appearance. Habitat, Pacific Ocean soundings; H. H. Chase. Plate 1, Fig. 5, illustrates this beautiful and peculiar species, but does not show the radiant striation on surface of valve, which, however, is similar to that on other species of *Podosira*.

Solium exculptum, Heiberg, var. **pentagonalis**, Kitton. The normal Diatom is described by Heiberg, in his *Conspectus*, p. 52, Plate 4, Fig. 10; the variety with five angles is mentioned by Kitton, in his remarks on the Diatomaceous deposits of Jutland, in the *Quekett Club Journal* for 1870, pp. 100, 102. Plate 1, Fig. 10.

The Genus *Solium*, with *Trinacria* and *Hemiaulus* are placed by Heiberg in his *Danish Conspectus* (1863) among the "*Hemiaulide genuine*;" the diagnosis of *Solium* is here given: "Outline of valve regularly quadrate or rhomboid; frustule in front view with horn-like processes at the corners, terminating with the spines." The diameter of the five-angled variety, as shown in our figure, is .0012 inch, and the distance between the processes is .0008 inch. Habitat, Island of Fuur, Denmark.

Stictodiscus Grevilleanus, N. Sp., W. C. Walker. Valve large, slightly triangular; sides very convex; entire surface granulose, granules disposed irregularly on inner two-thirds of valvular surface; arranged in close radiant rows on outer third; distance between angles .0048 inch. Plate 1, Fig. 4. Habitat, Barbadoes. W. C. Walker.

This very elegant and interesting Diatom is well delineated in the figure; its structure is most decidedly that of *Stictodiscus*, and could be referred to the Genus *Pseudo-Stictodiscus*, instituted by Grunow for the reception of the following forms:

Pseudo-Stictodiscus angulatus, (*Stictodiscus*);

Ps.—*St. Eulensteinii* (*Triceratium*);

Stictodiscus Eulensteinii, (Grunow.) H. H. Chase. A representation of this species is given in our Plate 1, Fig. 7; diameter of valves from .0055 inch to .0070 inch.

This Diatom is figured in Schmidt's Atlas, Plate 75, Fig. 6, 7; also in Van H. Synopsis; from being at first denominated *Triceratium*, it has been transferred to the Genus *Pseudo-Stictodiscus*, created for its reception, together with another, noted in the description of St. Grevilleanus; it is undoubtedly a *Stictodiscus*, and as such we will so call it.

This splitting of well established genera to accommodate one or two species that happen to vary slightly in size, locality or outline, is to be seriously deprecated, and can but result in confusing students and in bringing certain discredit upon those who make it their business to create new genera and species from insufficient material. In the present case the proper place for these three species is in the Genus *Stictodiscus*.

Actinoptychus undulatus, var. **verrucosa**. H. H. Chase. Valves small; .0017 to .0030 inch in diameter; divided into 6 compartments; strongly undulate; umbilicus smooth, hexagonal; outer plate (surface) finely reticulate; the inner surface presenting strong, heavy, meshed markings that are well expressed by "verrucose," and whose character are shown in Fig. 8, Plate 2. Habitat, West coast of the U. S. H. H. Chase.

Navicula Sillimanorum, Ehr. In our plate 2, Fig. 2, is given a figure of this Diatom, which, from being quite rare, has recently been found in rather large numbers, in a deposit from Crane Pond, Mass.; first figured by Ehrenberg in his *Microgeologie*, Plate 2, II, f. 13, it was afterward noted by Lewis, in *White Mountain Diatoms*, page 11, plate 2, fig. 8. Length .0062 inch; striae 20 in .001 in.

EXPLANATION OF PLATES.

All Figures, unless Otherwise Noted, are $\times 400$ Diameters.

SERIES I.

PLATE 1.

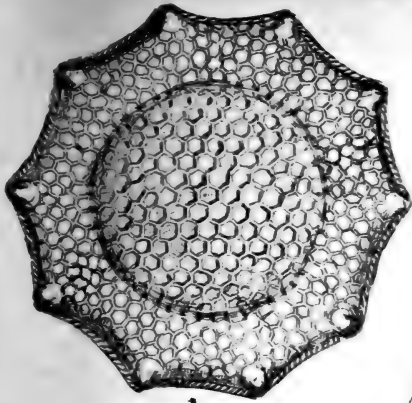
- FIG. 1. 1a. *Biddulphia imperialis*, n. sp.; W. C. Walker.
" 2. *Aulacodiscus Stoschii*, Janisch.
" 3. *Dimeregramma Baldjickii*, Brightwell; Ralfs.
" 4. *Stictodiscus Grevilleanus*, n. sp.; W. C. Walker.
" 5. *Podosira*^{argue} *Pacifica*, n. sp.; H. H. Chase.
" 6. *Amphiprora cornuta*, n. sp.; H. H. Chase.
" 7. *Stictodiscus Eulensteinii*, (Grunow;) H. H. Chase.
" 8. *Aulacodiscus grandis*, n. sp.; W. C. Walker.
" 9. *Aulacodiscus Kinkerianus*, n. sp.; E. S. Nott.
" 10. *Solium Exculptum*, var.; Kitton.

PLATE 2.

- FIG. 1. *Synedra affinis*, var. *Baileyana*; H. H. Chase.
" 2. *Navicula Sillimanorum*; Ehr.
" 3. *Synedra ulna*, var. *Chaseana*; B. W. Thomas.
" 4. *Auliscus stellatus*, n. sp.; H. L. Smith.
" 5. *Amphipleura maxima*, n. sp.; H. L. Smith.
" 6. *Triceratium Febigeri*, n. sp.; W. C. Walker.
" 7. *Biddulphia crenulata*, n. sp.; W. C. Walker.
" 8. *Actinoptychus undulatus*, var. *verrucosa*; H. H. Chase.
" 9. *Biddulphia formosa*, var. *pentagonalis*; Witt.
" 10. *Aulacodiscus decorus*, Greville.
" 11. *Aulacodiscus mammosus*, Grev.
" 12. *Auliscus cœlatus*, var. *gigas*; Ehr.



PLATE 1



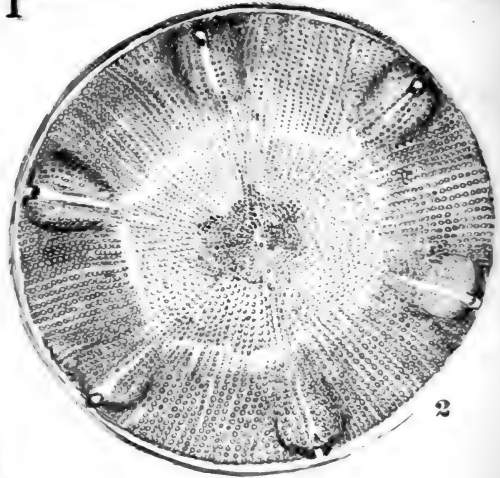
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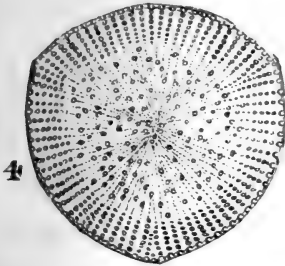
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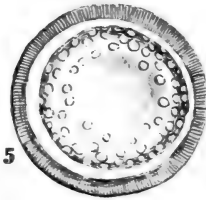
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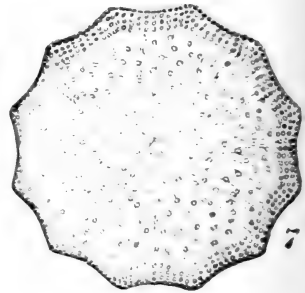
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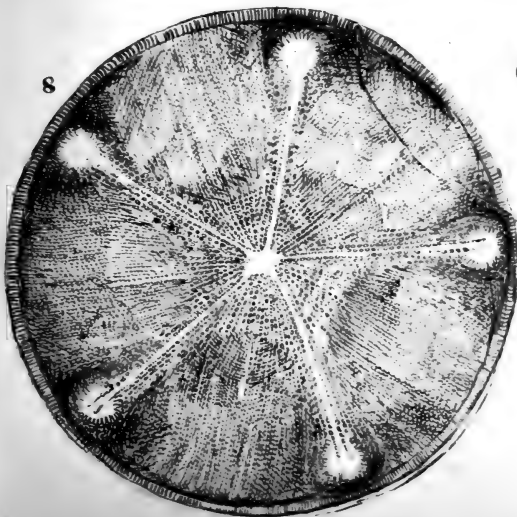
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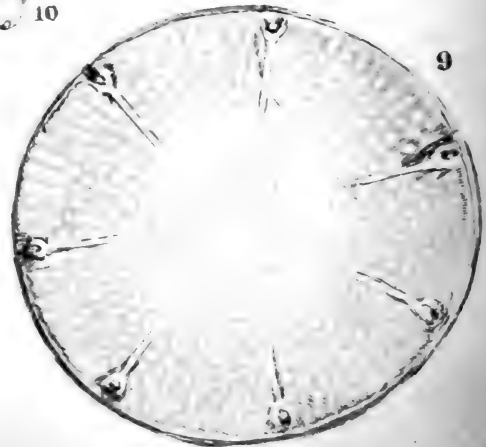
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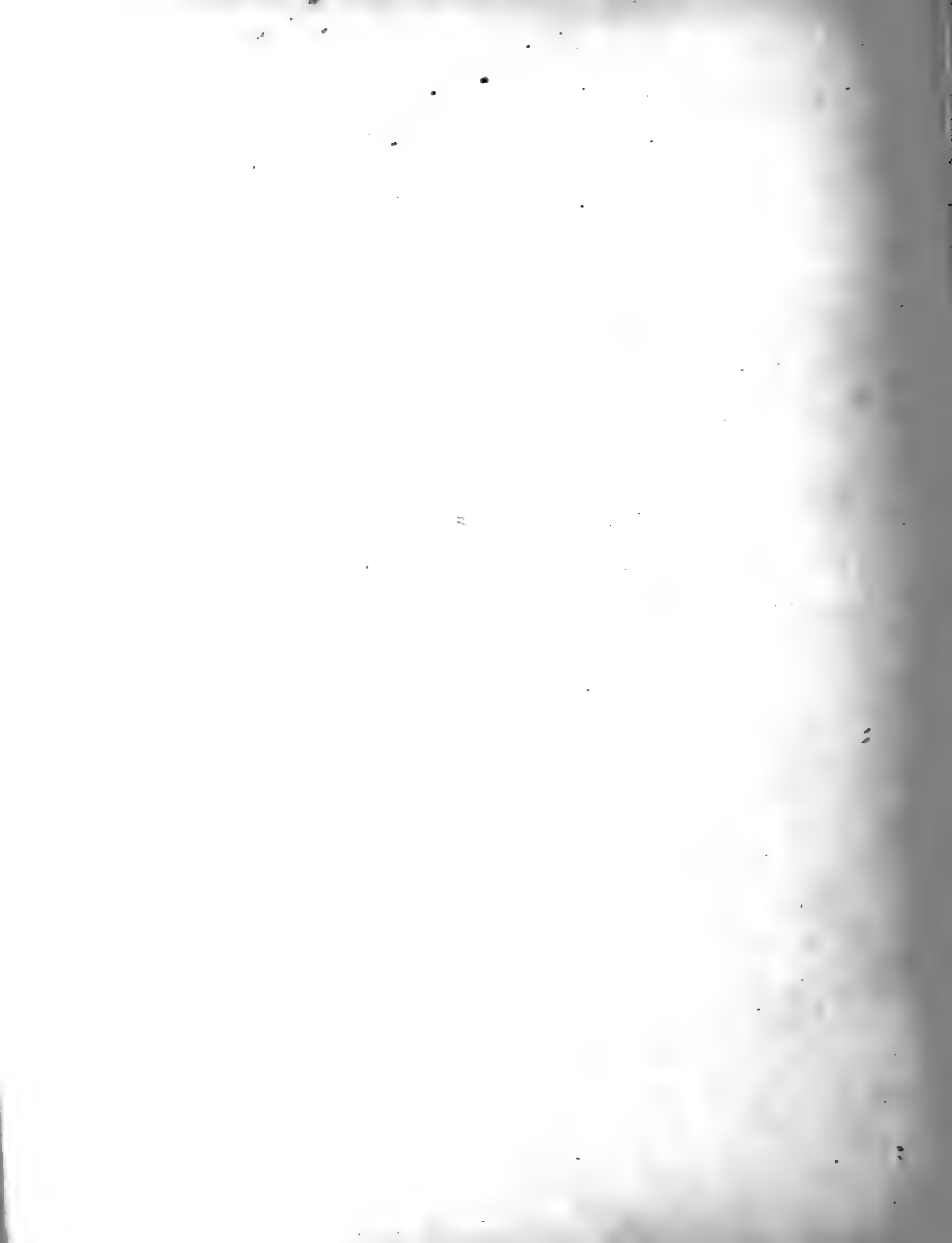
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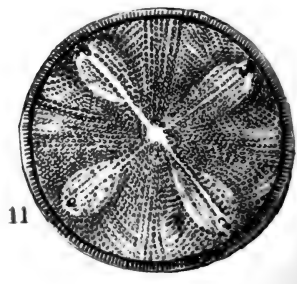
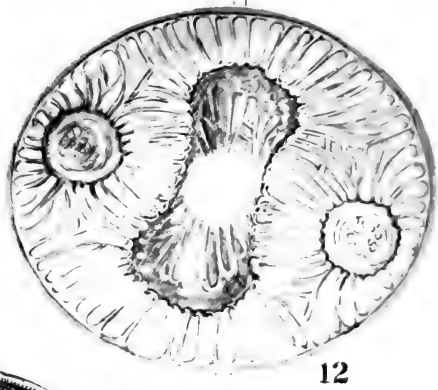
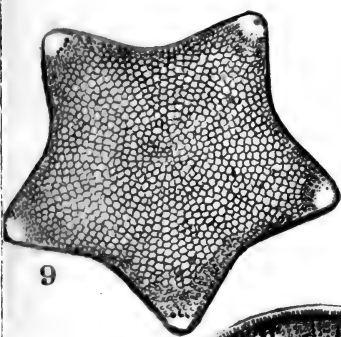
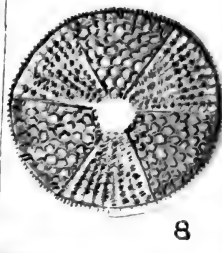
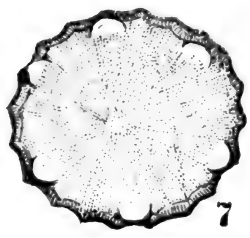
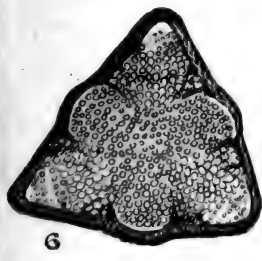
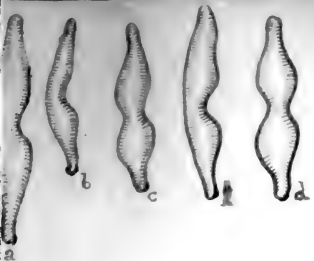


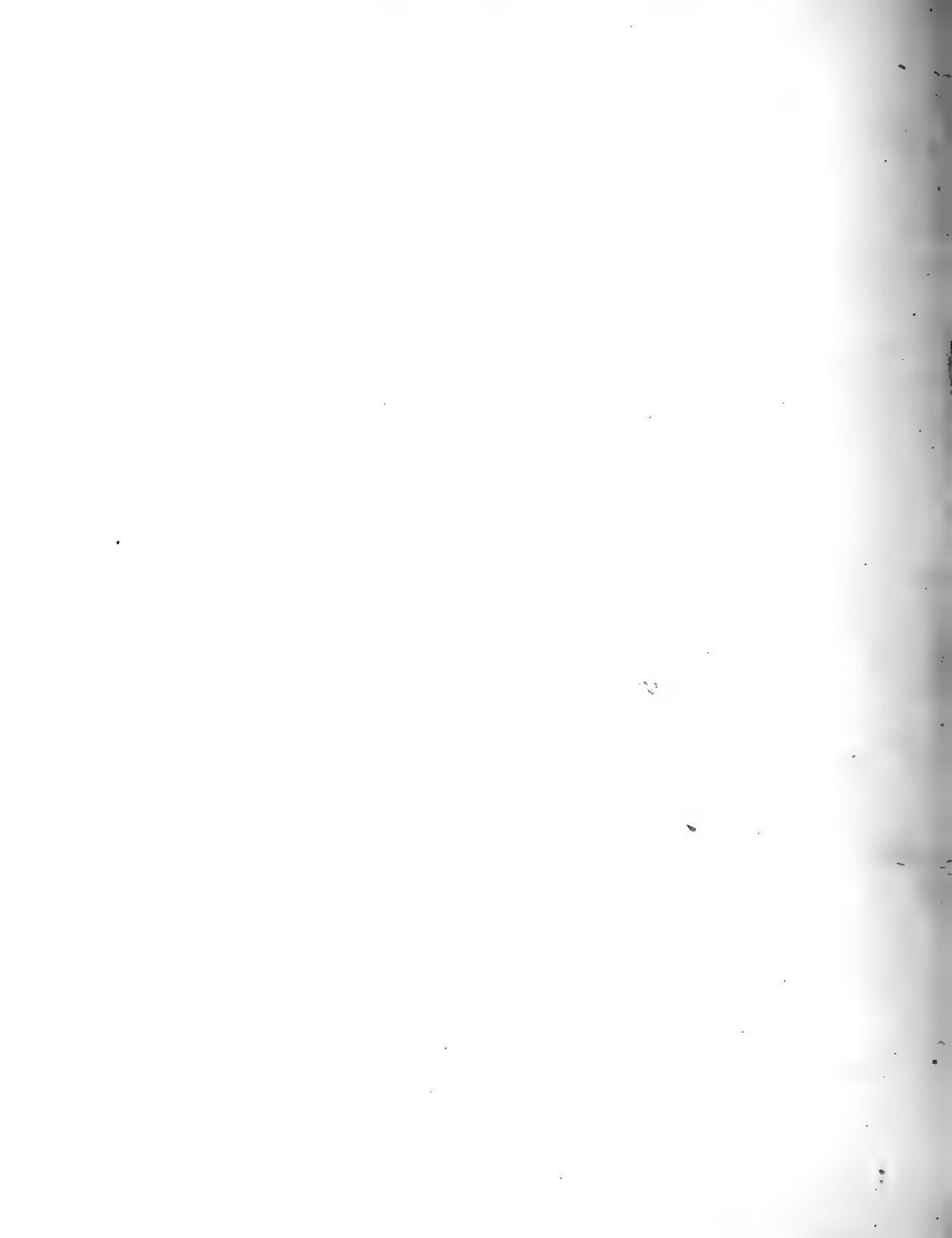
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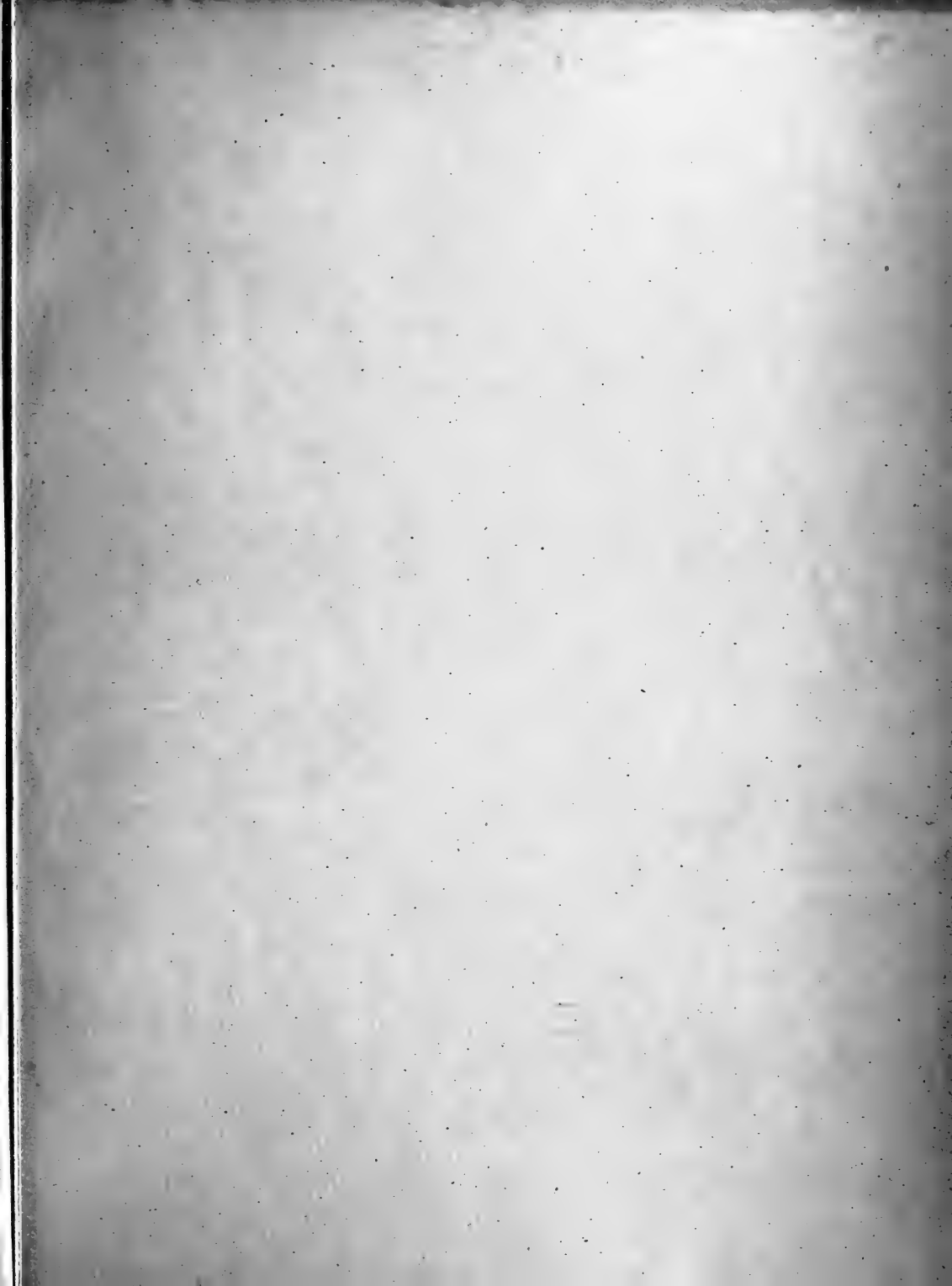


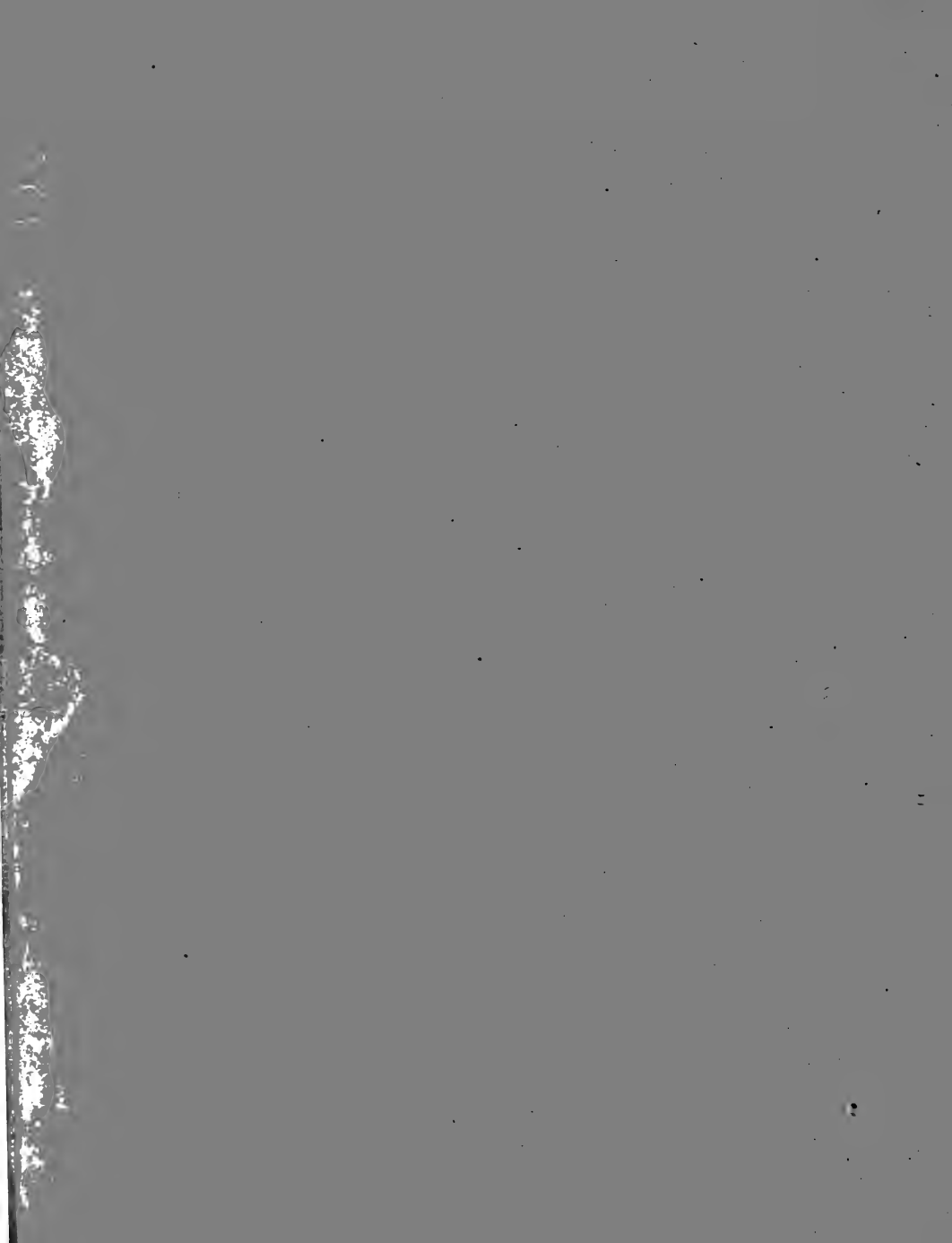
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NOTES

— On Some New and Rare Diatoms; —

— BY —

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SERIES II, III.

— JANUARY, 1887. —

Coscinodiscus excavatus, Grev. M. S.; Pritchard's Infusoria, 1861, p. 829 Pl. VIII f. 26; Schmidt's Atlas, Pl. 65. f. 1; Franz Joseph Diatoms, p. 21: Three depressions with three alternating elevations, and found in Piscataway, Naparima and Barbadoes deposits; diameter, .01 inch.

Var. *quadriocellata*, Grunow, Franz Jos. Diat., p. 21: (=C. Febigeri): two depressions with two alternating elevations; centre with several large cellules arranged round a central one; cellulation radiant and eccentric, diameter .006 inch. Newcastle state, Barbadoes. Plate V. Fig 11.

Var. *biocellata*, Grun., Franz J. Diats, p. 21: with one depression and one elevation; characteristics those of the preceding variety; same locality; diameter .003 inch. Plate V. Fig 12.

In the genuine, the cellules diminish in size toward the centre; in the varieties they so decrease slightly near the margin; in all, the cellulation is radiant and eccentric.

Brightwellia Johnsoni, *Ralfs, M. S.*, Greville in Trans. Mic. Soc., 1886, p. 4 Pl. 1 f. 11; "Valve with border composed of radiating lines of cellules, diminishing in size from coronal circle to margin, and of ridge-like ribs at sub-regular intervals cellules of coronal circle quite large; central cellules arranged spirally." Diameter of disc, .0025 to .0035 inch. Springfield Estate, Barbadoes. Plate V. Fig. 10.

Rylandsia biradiata, *Grev.*, Trans. M. S., 1861, p. 63 Pl. 8, f. 1. "Valve small, disciform, cellulose; cells quite large in the centre, decreasing gradually in size as they radiate outward; two smooth rays, dilated at their base, not reaching the centre, tubular, this structure being continued through the middle of the dilated bases; no hyaline area nor umbilical centre." Diameter, .0014 to .0025 inch. Cambridge Estate, Barbadoes. Plate V, Fig. 13.

Euodia Barbadoensis, *Grev.* Trans. M. S. 1861 p. 2, Pl. 8 f. 6, 7: "Frustrules semilunate; ends slightly produced; lower margin straight; surface coarsely cellulose, with a small, irregular, central blank space; color yellowish; convex border slightly conical. Distance between ends .0017 to .0024 inch. Springfield Estate, Barbadoes. Plate IV, Fig. 14.

Triceratium castellatum, *West*, Trans. M. S. 1860 p. 147 Pl. 7 f. 3: Pritch. Inf. p. 854, Pl. 8 f. 29; Schm. At. 78 f. 2; *variety* 83 f. 16: "Valve small; sides deeply concave; angles broadly rounded, forming segments of circles, separated by silicious lines from central portion, and much elevated above general surface; entire surface uniformly punctate." Distance between angles, .0018 inch. Springfield Estate, Barbadoes. Plate III, Fig. 10.

Porodiscus splendidus, *Grev.* Trans. M. S. 1865, p. 46 Pl. 5 f. 5; *var.* Schm. At. 66 f. 6,—*Craspedodiscus ovalis*, Grun. "Disc circular, occasionally broadly oval, very convex; a large, circular, umbilical pseudo-opening; structure a radiating, reticulate cellulation." Diameter, .0024 inch. Springfield Estate, Barbadoes. Plate V. Fig. 5.

Porodiscus oblongus, *Grev.* Trans. M. S. 1862, p. 65, Pl. 4 f. 5; Schm. At. 66 f. 7, 8, 9.—*Craspedodiscus oblongus*, Grun. "Dis-elliptical-oblong; pseudo opening large, circular." The radiating lines of granules are not crowded, but the granules themselves are very large. Diameters generally .0015 by .0025 inch. Cambridge Estate, Barbadoes. Plate V. Fig. 6.

The "pseudo openings" of Dr. Greville, in the *Porodisci*, are very deep, sharply defined, circular depressions, punctate at the bottom, as on the remaining surface of

the valve. The present members of the genus may perhaps be referred to *Craspedodiscus*, in which transfer Herr Grunow has taken the initial step. All the species are very convex; some of them conical, some armed with spines.

Triceratium coniferum, *Brightwell*, Trans. M. S. 1856, p. 274 Pl. 17 f. 6; Pritch. Inf. p. 853; Sch. At. 96 f. 27-31. Valve with radiant lines of cellules covering the surface; centre of valve convex, with straight margins and furnished, with from three to nine spines; angles much produced, their margins forming a concavity with those of the central portion; very variable in size, density of punctuation, length of angles and number of spines; nodules prominent. Distance between angles, .0025 to .0045 inch. Springfield Estate, Barbadoes. Plate III, Fig. 17.

Herr Grunow is inclined to place this species in the Genus *Trinacria*, in which conclusion we concur.

Triceratium Weissflogii, *n. sp.*, *W. and C.* Large, sides straight, occasionally slightly concave; angles rounded, somewhat acute; margins marked by a row of cellules, giving it the appearance of being beaded by minute projections; angles with a small space filled with minute granules; surface of valve covered with irregular, fracture-like lines, forming in the central portion a large hexagon, whose sides extend nearly to the margin, and also separate the angles from the central space; a moderately fine, radiant punctuation filling all the large inter spaces. Distance between angles, .0048 inch. Springfield Estate, Barbadoes. Plate III, Fig. 2, 3.

Triceratium Hardmanianum, *Grev.*, Trans. M. S. 1865 p. 55 Pl. 6 f. 25. "Large; valve with straight sides and subacute angles; central space filled with a somewhat hexagonal figure, extending to the margin and furnished with radiating puncta and imperfect radiating costæ: within this, a triangular figure, having a large spine in the centre surrounded by a circle of smaller ones; angles within furnished with puncta and vein-like lines and indistinct pseudo-nodules." Distance between angles, .0044 inch. Springfield Estate, Barbadoes. Plate IV, Figs. 1, 2.

We are able to present in Fig. 2, a variety of this species, with the internal figure formed by the costæ having circular outlines instead of triangular.

Triceratium Westianum, *Grev.*, Trans. M. S. 1861 p. 43 Pl. 4 f. 11; Schm. At 77 f. 30-32; *var. quadrata*, 94 f. 10. "Sides of valve deeply and sharply concave; angles forming segments of circles, separated from the centre by transverse lines, margins

of angles with very short radiating lines; surface strongly punctate." Distance between angles, .0014 to .0018 inch. Cambridge Estate, Barbadoes. Plate III, Fig. 9.

Triceratium fractum, *N. Sp., W., and C.* Large; angles broadly rounded forming s-micircles; sides deeply concave; margin marked by a row of prominent cellules; a small, blank space at centre; surface of valve covered with radiating lines of fine granules; central portion depressed below surface of the angles, and bordered by an undulating, circular line, having the appearance of a fracture. On each angle there is a semilunar, nodular elevation, very finely granulated. Distance between angles, .0042 inch. Springfield Estate, Barbadoes. Plate III, Fig. 8.

Actinopterychus Wittii, *Janisch*, Schm. At. 100 f. 12; Jeremie Deposit, Hayti.

Var. *scutiformis*; *nov. var., W. and C.* The areolation in the figure in the atlas, is very coarse. In our variety, there is a round hyaline space at the centre; the angles are alternately acute and broadly rounded; processes three, prominent, quite elevated above the general surface of the valve, situated on the acute angles, projecting to edge of margin, extending inward half way to centre. Newcastle Estate, Barbadoes. Diameter, .005 inch. Plate V, Figs. 1, 2.

The areolation in this variety is very fine.

Coscinodiscus oblongus, *Grev.*, Trans. M. S. 1866 p. 4 Pl. 1 f. 9, 10; Schm. At. 66 f. 10, 11. "Disc more or less oblong, having the centre depressed; an umbilicus containing a number of subremote granules; surface filled up with radiating lines of granules, diminishing in size next the umbilicus and toward the margin, where they resemble minute puncta." Size variable, often .005 long by .0025 inch wide. Springfield Estate, Barbadoes. Plate V, Fig. 4.

Triceratium radiatum, *Bright*. M. S. 1856 p. 275 Pl. 17 f. 14; Trans. M. S. 1869 Pl. 7 f. 4; Prit. Inf. p. 854; Van Heurek's Syn. Pl. 112 f. 8: (*Biddulphia?* Grun.) Valve with straight sides; angles very slightly produced; a small circular blank space at centre, from which a dark line extends to the middle of the margin of each side; 15 to 20 heavy lines extending from each margin one-third the distance to centre; surface of valve covered with radiant rows of very fine puncta. Distance between angles, .0024 inch. Springfield Est., Barbadoes. Plate IV, Fig. 6.

Triceratium crenatum, *Kilton*; Prit. Inf. p. 939;

(*Discoplea undulata*, E. M. Pl. 33-xviii f. 3);=

Tric. (Ditylum) Ehrenbergii, (E.) Grun., Van H. Syn. 115 f. 7, 8. Valve small, suborbicular; sides convex, undulate; angles acute; margins marked by a row of large cellules; surface covered with radiant rows of faint, minute puncta, diminishing in size toward the centre; a straight, strong spine projecting from the centre. Distance between the angles, .0023 inch. Springfield Estate, Barbadoes. Plate IV, Fig. 12.

Tric. Harrisonianum, Norm. and Grce., Trans. M. S. 1861 p. 76 pl. 9 f. 7; Sch. At. 75 f. 14-16; 81 f. 17; *forma minuta*, 81 f. 8, 9. Large; Valve with convex sides and slightly produced, rounded angles; pearly granules forming a marginal band of radiating rows and scattered thinly over the ample central space, in which is a conspicuous network of large, elongated radiating cellules, each cellule containing a bright granule, and sending down lines between the rows to the margin; rows 4 to 6 in .001 inch. Variable in size, distance between angles from .004 to .008 inch. Springfield Estate, Barbadoes. Plate IV, Figs. 4, 5.

Var. Solida, W. and C. Valve much smaller, sides straight; angles rounded; central area faintly reticulate, irregularly cellulate; the cellulation more dense than in the genuine; border cellulation same as in the large form; rows of cellules 8 in .001 inch; distance between angles, .0021 inch. Springfield Estate, Barbadoes, Plate III, Fig. 12.

Isthmia minima, Bailey and Harvey, Wilkes' Exped., Vol. XVII, p. 176 pl. 9 f. 11; Prit. Inf. p. 851; H. L. S. Spec. Typ. No. 205. Small, .006 in. long by .002 in. wide. Cellulation arranged regularly diagonally, similar to that of *I. nervosa*; much coarser on the end-pieces than on the central band; frustules trapezoidal, one end rounded, the other considerably produced, the process constricted and finely granulate. Springfield Est., Barbadoes. Plate V, Fig. 9.

Triceratium venosum, Brightwell, M. J. 1856 p. 274 pl. 17 f. 5; Trans. M. S. 1860 p. 147 pl. 7 f. 2; Prit. Inf. p. 854; Schm. At. 88 f. 11, 12; Journal N. Y. M. S. 1886 p. 110 pl. 5 f. 4. Large; angles slightly elevated above general surface, truncate, not produced, but rounded; sides concave; surface with three radiant canaliculi extending from the centre two thirds the distance to the apices; shorter parallel canaliculi extending from these to margin of valve; between each pair are two rows of quite large cellular openings, which are also continued transversely on angles of valve nearly to their full extent. Nodular surface on angles very finely granulated. Distance between angles, .0052 inch. Cambridge Estate, Barbadoes. Plate IV, Fig. 11.

Forma parva, Weissflog, Schm. At. 94 f. 12. Characteristics much the same

as in the larger form, except the three radiant canaliculi are zigzag. Distance between angles .0024 inch. Springfield Estate, Barbadoes. Plate IV, Fig. 10.

Sydetocystis Grevilleanss, (*Ralfs M. S.*) Grev. *in litt.* 1864. “— the queerest diatom I have ever had to deal with, a new Genus from the Barbadoes Deposit, which Mr. Ralfs describes and which he calls *Sydetocycliss*. I have seen five frustules in a chain. The side view is a disc with radiating granules or cellules, and from the center projects a strong process which is locked into that of the adjoining disc, like a piece of machinery, so that the two frustules can be pulied asunder to the extent of the length of the processes, but no further. It seems to be a special provision to prevent separation.” Cambridge Estate, Barbadoes. A faithful copy of Dr. Greville’s drawing of this most strange diatom is given in Plate IV, Fig. 13.

Entogonia Abercrombieana, *Grev.*, *Mic. J.* 1863 p. 9; *Sch. At.* 85 f. 7= *Triceratium Abercrombieanum*, *Grev. Trans. M. S.* 1861 p. 83 pl. 10 f. 7-9. “Valve with nearly straight sides; obtuse angles; striated margin; centre a blank, triangular space; border divided by transverse costæ into punctated compartments; a short line from each internal angle terminating in a wide fork with incurved apices; a faint incurved line passing through the middle of each border. Pseudo-nodule single, punctate: number of marginal costæ variable.” Distance between angles, .0025 inch. Cambridge Estate, Barbadoes. Plate III, Fig. 6.

Triceratium insigne, *Grev.*, *Trans. M. S.* 1861 p. 75 pl. 9 f. 5; *Schm. At.* 78 f. 3. “Valve with concave sides; broadly rounded angles furnished with minutely punctate pseudo-nodules; surface filled with radiating lines of minute granules, except a small, circular, central, blank space; margin with short, broad striæ, 9 in .001 inch. The appearance of a line separating the angles from the centre is caused by the radiating lines of granules curving up the angles, and being viewed in perspective: these radiant lines of granules do not quite reach the margin. Distance between angles, .0024 to .0035 inch. Cambridge Estate, Barbadoes. Plate III, Fig. 7.

Entogonia marginata, (*Brightwell*), *Grev.* *Trans. M. S.* 1863 p. 10; *Schm. At.* 88 f. 6; *Jour. N. Y. M. S.* 1886 p. 110 pl. 4 f. 2: = *Tric. marginatum*, *Brightwell*, *M. J.* 1856 p. 275 pl. 17 f. 13; *Trans. M. S.* 1760 p. 148 pl. 7 f. 4; 1861 p. 4 pl. 10 f. 5; *Prit. Inf.* p. 854. Valve with convex sides; rounded angles; double pseudo-nodules: inner triangle with three radiant lines extending from centre to apices, from which lines a number of radiant, nodulose, capitate costæ proceed to the margin; border of valve

divided by transverse lines into punctated compartments. Diameter between angles, .0027 inch. Cambridge Estate, Barbadoes. Plate III, Fig. 1.

Asterolampra marginata, (Br.) Grev. Trans. M. S. 1862 p. 50 pl. 8 f. 39; — *Craspedodiscus marginatus*, Brightwell, M. J. 1860 p. 95 pl. 5 f. 7; Prit. Inf. pp. 832, 839. "Two-thirds of the radius of the valve occupied with radiating lines of fine puncta; umbilical lines very short; segments forming a narrow, punctate border; narrow portion of rays obsolete." Diameter of disc, .0045 inch. Number of rays from 14 to 22. Plate V, Fig. 7.

Var. minor, W. and C. Much smaller, .0025 inch in diameter; puncta occupying one-half the surface of the valve, and increasing in size toward the centre; umbilical lines proportionately longer, and fewer in number. Both from Springfield Estate, Barbadoes. Plate V, Fig. 8.

Entogonia amabilis, Grev., M. J. 1863 p. 10 pl. 10 f. 21; Schm. At. 88 f. 5. "Valve with slightly convex sides, and obtuse angles; border compartments punctated, pseudo-nodule circular, very prominent; central triangle with slender, radiating costæ; the angles penetrating a circular pseudo-nodular space." Distance between angles, .004 in. Cambridge Estate, Barbadoes. Plate III, Fig. 5; *Var.*, Fig. 4.

The genus *Entogonia* was instituted by Dr. Greville in 1863, for the reception of several species of previously described *Triceratia*, and is distinguished by the following generic characteristics; "Frustules with the lateral view triangular, containing a central triangular figure; having a broad border divided by transverse costæ into punctate or cellulate compartments." The Genus is divided into two sections; those with a blank central triangle, and those in which it is filled with various markings. He has described 14 species, to which none have been added. They constitute a distinct and prominent genus, notable for beauty and rarity.

Triceratium Jensenianum, Grun., Hedwigia, Vol. V. p. 145; Schm. At. 77 f. 15, 16. Large; sides concave; angles slightly produced, rounded; nodules smooth; valve coarsely and irregularly cellulose; cellules extending over the margin, producing a heavy, roughened appearance; a small number of heavy dark lines extending from margin a short distance inward upon the valvular surface. Distance between angles, .0035 inch. Newcastle Estate, Barbadoes. Plate III, Fig. 15.

Tric. repletum, Grev., Trans. M. S. 1866 p. 83 pl. 9 f. 18; *var. Balearica*,

Grun., Van H. Syn 110 f. 7; (Biddulphia?). Valve small, with striated margins; nearly straight sides; angles obtuse; large, ovate, minutely punctate, conspicuous processes; surface completely filled with radiant lines of small, round granules. Distance between angles, .0035 inch. Cambridge Estate, Barbadoes. Plate IV, Fig. 7.

Stephanopyxis putcher, *N. Sp., W. and C.* Small; valve highly convex; the border composed of a single row of elongated cellules, and occupying two-fifths the diameter of the disc; areolation as in other species of the Genus, 8 in .001 inch. Newcastle Estate, Barbadoes. Diameter of disc, .0021 inch. Plate V, Fig. 3

Tric. areolatum, *Grev.* Trans. M. S. 1864 p. 71 pl. 9 f. 13; (*var. venosa*, Schm. At. 77 f. 14). "Valve with slightly concave sides and acute angles; surface covered with rather large areolæ, while very short vein like lines project from the sides of the valve." Distance between the angles, .0027 inch. Cambridge Estate, Barbadoes. Plate III, Fig. 13.

Tric. granulatum, *N. Sp., W. and C.* Small; sides straight, occasionally one or more concave; entire margin marked by a row of large granules; angles acute; surface marked by coarse, pearly, embossed granules, thinly and irregularly scattered; a circular blank space in the centre. Springfield Estate, Barbadoes. Plate IV, Fig. 9.

Tric. cellulorum, *Grev.*, Trans. M. S. 1861 p. 44 pl. 4 f. 14; Sch. At. 95 f. 28-32; (*Var. Simbirskiana*, Witt Archangel Diats., p. 32 pl. 11 f. 8-10; Schm. At. 111 f. 30-33; 112 f. 4. Sides of valve straight, sometimes slightly incurved; angles with pseudo-nodules, obtuse, separated from the centre by transverse lines, which appear as linear spaces unoccupied by cellules; coarsely cellulose; cellules of central portion more or less ovate or oval and disposed in a radiating direction, though not in lines; those of the angles somewhat quadrate, giving them a cancellated aspect, and arranged in rows parallel with the separating line. Distance between angles, .003 to .004 inch. Cambridge Est., Barbadoes. Plate IV, Fig. 8.

Var. major, *W. and C.* Characteristics in general those of *T. cellulorum*, but larger, the distance between the angles being .006 inch; sides slightly concave; the granulation also somewhat denser; same locality as the genuine. Plate IV, Fig. 3.

Triceraticum Caribæum, *N. Sp. W. and C.*—Small; sides straight; angles slightly rounded; entire surface of valve covered by large granules, arranged in radiating lines; no nodules at angles. Diameter between angles, .0025 to .0035 inch. Cambridge Estate, Barbadoes. Not uncommon. Plate III, Fig. 11.

Tric. cancellatum, **var. minor**, W. and C.—Small ; sides straight, angles acute and slightly produced, with a small, blank nodular space ; surface covered with large areolæ, irregularly disposed in the centre, but arranged in parallel rows in the wide border, extending to the margin ; the areolæ irregular or quadrangular in outline. Distance between angles, .0024 inch. Cambridge Estate, Barbadoes. Plate III, Fig. 16.

Grunow mentions a small variety of *T. cancellatum*, Grev., in his "Novara Algen," but likens it to *Tric. obtusum*, Ehr. As there is no point of similarity between these two species, except in their triangular outline, our variety takes its name.

Tric. minutum, N. Sp., W. and C. Small ; sides straight ; angles obtuse ; surface sparsely cellulose ; margins smooth ; no nodule at angles ; distance between angles, .0010 inch. Springfield Estate, Barbadoes. Plate IV, Fig. 15.

Cestodiscus Superbus, Hardman, Cole's studies, 1886, p. 49, cum Photo.—Valves of frustule dissimilar in areolation, but alike in marginal border ; in one, the central area is concave, with brilliant, scattered, hemispherical beads becoming fewer toward the center, which is sometimes a blank space ; the other valve is convex, with closely set rows of large, somewhat angular granules radiating from a minute central bead. Some of the frustules are concavo-convex, some bi concave some bi-convex. The fine striation of the margin is diagonal in character, as well as radiant, and simulating, upon a coarser scale, the peculiar "engine turning" markings of *Hyalodiscus subtilis*. Diameter of disc, from .0027 to .0045 inch. Newcastle Estate, Barbadoes. Plate V, Fig 14, 15. Both the figures here given present the convex valve, and show the variation in areolation ; the cellulation of the opposite valve is always of the character above described, and we will in our next series give a figure of the concave valve.

The Diatomaceæ described in the foregoing pages are from a collection of the Barbadoes fossil marine deposits that come into our possession some three years since.

EXPLANATION OF FIGURES.

PLATE III.

- FIG. 1.—*Entogonia marginata*, (Br.) *Grev.*
“ 2.—*Triceratium Weissflogii*, N. Sp., *W. & C.*
“ 3 — do. do.
“ 4 — *Entogonia amabilis*, *Var.*
“ 5.—*Ent. amabilis*, *Grev.*
“ 6.—*Entogonia Abercrombieana*, *Grev.*
“ 7.—*Tric. insigne*, *Grev.*
“ 8.—*Tric. fractum*, N. Sp., *W. & C.*
“ 9 — *Tric. Westianum*, *Grev.*
“ 10. — *Tric. castellatum*, *West.*
“ 11.—*Tric. Caribæum*, N. Sp., *W. & C.*
“ 12.—*Tric. Harrisonianum*, *var. solida*, *N. Var.*, *W. & C.*
“ 13.—*Tric. areolatum*, *Grev.*
“ 15.— *Tric. Jensenianum*, *Grun.*
“ 16.— *Tric. cancellatum*, *var. minor*, *N. Var.*, *W. & C.*
“ 17.— *Tric. coniferum*, *Brightwell.*

PLATE IV.

- FIG. 1.—*Tric. Hardmanianum*, *Grev.*
 “ 2.— do do
 “ 3.—*Tric. cellulosum*, *var. major*, *N. Var., W & C.*
 “ 4.—*Tric. Harrisonianum*, *Norman & Grev.*
 “ 5.— do do
 “ 6.—*Tric. radiatum*, *Bright.*
 “ 7.—*Tric. repletum*, *Grev.*
 “ 8.—*Tric. cellulosum*, *Grev.*
 “ 9.—*Tric. granulatum*, *N. Sp., W. & C.*
 “ 10.—*Tric. venosum*, *forma parva*, *Weissflog.*
 “ 11.—*Tric. venosum*, *Brighwell.*
 “ 12.—*Ditylum Ehrenbergii*, *(E.) Grun.*
 “ 13.—*Syndetocystis Grevilleanus*, *Ralfs.*
 “ 14.—*Euodia Barbadosis*, *Grev.*
 “ 15.—*Tric. minutum*, *N. Sp., W. & C.*

PLATE V.

- FIG. 1.—*Actinoptychus Wittii*, *var. Scutiformis*, *N. Var., W. & C.*
 “ 2.— do do do
 “ 3.—*Stephanopyxis pulchra*, *N. Sp., W. & C.*
 “ 4.—*Coscinediscus oblongus*, *Grev.*
 “ 5.—*Porodiscus splendidus*, *Grev.*
 “ 6.—*P. oblongus*, *Grev.*
 “ 7.—*Asterolampra marginata*, *Grev.*
 “ 8.— do do *var. minor*, *N. Var., W. & C.*

- “ 9.—*Isthmia minima*, *Bailey & Harvey*.
“ 10.—*Brightwellia Johnsoni*, *Ralfs*.
“ 11.—*Coscinodiscus Excavatus*, *Var. 4-ocellata*, *Grun.*
“ 12.— do do *Var. Biocellata*, *Grun.*
“ 13.—*Rylandsia biradiata*, *Grev.*
“ 14.—*Cestodiscus superbus*, *Hardman*.
“ 15.— do do.

