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NEW AND LITTLE KNOWN *DIATOMS* FROM URUGUAY AND THE SOUTH ATLANTIC COAST

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In plankton gatherings from Atlantida and other parts on the uruguayan coast, that were made during the last ten years, several new diatoms have been found. These and some new facts on diatoms are given on the following pages.

Other gatherings from Brasil and Argentina have shown the extensión to the north and the south on the South American East Coast. The influence of the Malvinas cold current (Falkland Islands current) and the warm Brasil current are studied, the results will be published later as investigations are still pending. The following species are described:

Coscinodiscus Vidovichi n. sp.
Coscinodiscus Hustedtii n. sp.
Actinoptychus campanulifer A. Schmidt.
Actinocyclus platensis n. sp.
Chaetoceros uruguayensis n. sp.
Chaetoceros apendiculatus n. sp.
Chaetoceros confertus n. sp.
Chaetoceros insignis n. sp.
Hemiaulus sinensis Greville. resting spores.

In the following I give new *habitata* for diatoms investigated by myself.

Actinoptychus Frenguellii **Müller Melchers.**
Coscinodiscus punctiger **(Castracane) n. comb. Müller Melchers.**
Biddulphia chinensis **Greville.**

Coscinodiscus Vidovichi n. sp. Plate I. fig. 1

Discoid. Valve slightly convex, depressed at the center. Areola beadlike, fine, in radial, lightly undulated rows, with hyaline interspaces giving a "pyrotechnical" or "sunburst" effect. Onto the margin further rows of beads are inserted, all rows reach the border. Here the beads are somewhat smaller. Center space broadly open, with some scattered beads or a round hyaline space with very few beads. Inside the margin a row of distinct small spinulae. At low power the valves show a steelblue refraction colour of the middle part, beeing of a lighter brown to yellow at the border. (This colour is seen only with mountants of high refractive index, like Sirax or Hyrax. In Styrax this colour is not visible, with this mountant the valves appear yellowish and very hyaline. I call the attention to this fact as it distinguishes. Coscinodiscus Vidovichi easily from Actinocyclus species, for instance Actinocyclus platensis with which it is generally associated).

Diameter 0.102 *to* 0.108 *mm.*
Areolae 10/11 *in* 0.01 *mm. at the border about* 12.
Spinulae 2 *in* 0.01 *mm.*

This beautifull diatom appears in December to January together with *Actinocyclus platensis* plancton in scarce numbers. It looks something like an *Actinocyclus*, but no ocellus or pseudonodule could be found. I dedicate this new species to my friend Dr. O. Vidovich of Montevideo.

Coscinodiscus Hustedill. n. sp. Plate I, fig. 2, 3, 4, 5

Cells disc shaped. Valves about flat with narrow outer margin, this margin without spinulae. Two heavy spines on the border of each valve, showing slightly outwards and upwards, with funnel shaped ends. These spines are difficult to distinguish in valve view. Areolae hexagonal, beeing all of the same size, also at the margin. Areola arranged in straight lines, giving to the valve the appearance of a Coscinodiscus lineatus, *from which it differs for the valve mantle. Chamber openings distinct with central small dot.*

Diameter 0.052 *to* 0.120 *mm.*
Areolae 5 *in* 0.01 *mm.*
Valve margin striae about 6 *to* 7 *in* 0.01 *mm.*

Valves with cylindrical valve mantle, 0.015 *to* 0.017 *mm high, divided into two sections. The one next to the valve consiting of elongated chambers with very fine areolation (upper band). The second part without these chambers and with the same number of areola or puncta. It seems that the first mentioned chambers are in continuance of the hexagonal valve areolae. Plate I, fig.* 3.

Hight of valve mantle 0.015 *to* 0.017 *mm.*
Hight of lower section about 0.008 *to* 0.009 *mm.*
Number of chambers upper section 6/7 *in* 0.01 *mm.*
Areola upper and lower section 12/13 *in* 0.01 *mm.*
Areola of each line about 8,5 *in* 0.01 *mm.*

Habitat from Atlantida to La Paloma. During January to March in moderate numbers. Found for the first time in 1953. In samples received from the Instituto Oceanografico Sao Paulo, through the kindness of Dr. J. de Paiva Carvalho. I found this same diatom in small quantities in gatherings from "Mar de Trepandé" Estado de Sao Paulo, Brasil. These samples were gathered in 1949 during the month of February. The sudden appearance on the uruguayan coast shows the possibility that this new species has been brought to the shores of Atlantida by the warm Brasil current. During Jan./March 1954 only very few valves were found. I dedicate this diatom to my friend the eminent diatomist Dr. Fr. Hustedt of Bremen. Germany.

Actinoptychus campanulifer A. Schmidt. Plate II, fig. 1, 2, 3, 4

1885 A. Schmidt Atlas. plate XXIX. fig. 13. 14, 15

Cells single, discoid. Valve divided into six sectors, alternately raised and depressed. Center plate hyaline hexagonal. The raised sections with a short blunt process lying in a small round, hyaline area on the border of the margin. The whole valve is surrounded by a broad margin with ribs of about two chambers in 0.01 mm. Each section is covered by regular hexagons $2\frac{1}{2}$ in 0.01 mm, over these a covering net of fine puncta, 17 in 0.01 mm. This net extends in a pyramidal spherical plane over the six sectors and reaches down to the broad outer margin, but does not cover the latter with puncta. The sectors are deeply cut and show, changing the focus, the accentuated furrows between high and low sectors.

Diameter 0.038 to 0.08 mm. predominating the small valves.
Net puncta 17 in 0.01 mm.

Actinoptychus campanulifer is a little known diatom, first found at Rio de Janeiro, Brasil. A. Schmidt does not say if found in the harbour of Rio de Janeiro or outside on the coast. As far as I can trace literature this diatom has not been mentioned again since A. Schmidt described it in 1885. I first found this species in plankton pump gatherings taken by engineer J. Weiher in the South Atlantic on the brasilian coast between San Francisco and Santos. Then it was found in samples from the Instituto Oceanografico de Sao Paulo at the following stations: Canal de Santos. Mar de Trepandé and Canal de San Sebastiao, Brasil. (Müller Melchers). The costal samples from the Estado de Sao Paulo are very rich in *Actinoptuchus splendens, A. vulgaris, A. undulatus* and *A. campanulifer*. A. Schmidth in his explanations to plate XXIX fig. 13/15 writes: "von dem daneben auftretenden Act. undulatus constant verschieden". I can confirm this, the *Act. undulatus* are similar in a certain aspect, but also completely different. In Sirax mounts as well as in Styrax the colour of *Act. campanulifer is* grayish black againts that of *Act. undulatus* showing a yellowish brown. But the principal difference consists in the deep furrows between sectors and the broad band circling *Actinoptychus campanulifer.*

Actinocyclus platensis n. sp. Plate III, fig. 1, 2, 3

1928 Frenguelli: Oceano Atlantico. described as Actinocyclus Barklyi. page 523 plate XIV, fig. 1-2.

Cells discoid. Valve surface undulated. Center slightly depressed then rising a little to about the middle of radius and descending gradually to the border — where it rises again to drop over thi border. Center space obtusely angular with a few isolated granules Refraction colour of the valve a bright blue with darker bands, sel dom black. Markings round, granular in undulate rows with hyalin interspaces, the granules becomming smaller at the border, wher they are drawn over the border. Apiculi of the border 2 in 0.01 *mm Border striae distinct* 15/17 *in* 0.01 *mm. Pseudonodule next to on of the border apiculi, round to oval, difficult to discern as the ps dule is generally placed on the sloping border itself or even drag over the border. Size about* 0.0015 *mm.*

Diameter 0.064 *to* 0.140 *mm.*
Granules 8/9 *in* 0.01 *mm.*

Cromatophora numerous, mostly pressed against the valve mantle, cushionlike partly constricted and pointed with globules of fatty matter.

Actinocyclus Barklyi Plate III, fig. 4, differs from the new species as could be ascertained in slides from the original Yarra Yarra (Australia), material. Mr. H. Barrett of Toorak. Victoria, had the kindness to compare my slides with original material and other australian and tasmanian gatherings.

Litoral. Planktonic marine. Will also flourish in brackish water. First appearance about middle of October with a notable maximum around December 24 th., declining end of January. It may have a second winter maximum about July August, this maximum does not always reach the coast and is found further out at sea where this diatom seems to be vegetating during the winter. Present in plankton nearly the whole year round. Habitat: along the uruguayan coast: Atlantida; Punta del Este; La Paloma; Sta. Teresa. Quequen; Necochea; (Argentina). (Müller Melchers). Atlantic Ocean off Mar del Plata; Rio de la Plata; (Frenguelli), Bottom sample off Rio Grande do Sul. Plankton from coast of Brasil, Rio Grande do Sul to Rio de Janeiro. (Müller Melchers).

Chaetoceros uruguayensis n. sp. Plate IV, fig. 1-6

Chains streight not twisted. Valves slightly convex or flat. Valves in surface view round to oval in larger specimens. Valve mantle low, girdle zone high, no constrictions. Setae arising from the corners, without differentiated base. One seta streight and one bending to the front and and then back again. All setae with small spines. Terminal setae shorter. Apertures small slitlike, slightly convex at the middle. Chromatophora small, platelike, numerous. Resting spores robust, heavily spined. Primary valve with crown of strong large and short spines around the dome. The girdle with pallisade spines. The secondary valve rounded, convex to conical, with few shorter spines at the and of the dome.

Cells 0.032 *to* 0.048 *mm diameter.*

Without the resting spores it might be taken for *Chaetoceros teres.* The resting spore resemble in some respect to those of *Chaetoceros Lauderi* but are much larger and heavyer, without the constriction at the neck. The whole build of *Chaetoceros Lauderi* beeing much more delicate, *Chaetoceros uruguayensis* is somewhat like *Chaetoceros siamensis* Ostenfeld, but the latter has two chromatophora and large apertures.

This species was found in plankton off the coast of Atlantida during the months of January to March (1953) it is appearing again this year (1954) in January in numerous specimens. The plankton comuñity consisted of *Ch. lorenzianus, Ch. didymus, Ch. curvisetus, Ch. rostratus, Ch. atlantidae* n. sp. and *Ch. apendiculatus* n. sp. This new species belongs to the *Cylindrica* group.

E. de Sousa e Silva, 1949, p. 314 pl, II. fig. 6. *Ch. Lauderi* gives a drawing of resting spores that have to a certain extent a likeness to *Chaetoceros uruguayensis,* n. sp.

Chaetoceros apendiculatus n. sp. Plate V, fig. 1, 2, 6

Chains short not twisted. When this species was first noted (29.*XI*.1952) *the chains consisted of only one or two cells, very delicate and hyaline with a couple of chromatophora against the cell walls, already with the heavy terminal seta, also containing chromatophora. During the following days chains of two and three cells were formed, always with one heavy terminal, the other cells with* hairlike setae, two to each valve, At first it was believed it might *be a primary state of Chaetoceros Atlantidae n. sp. as indicated by the one terminal seta only. A month later* (27.*XII*.1952) *chains of eight cells were found, filled with highly refringent, grainlike chromatophora. Now the terminal seta was also much more heavy, curved and of swordlike build. In this ultimate state this new Chaetoceros stayed during January to March, beeing found in company of Chaetoceros atlantidae n. sp. Ch. apendiculatus may have two terminal seta on the same side, one above the other. (Plate V, fig.* 2). *Apertures between cells missing. Resting spores not known.*

0.008 *to* 0.01 *mm diameter.*
0.0012 *mm. width of terminal seta.*

Neritic ? — found at Atlantida. The species may be subtropical or tropical as I have found it in the two cell state in plankton gatherings from Brasil. Mar de Trepandé. Rio Batatal, coast of Estado de Sao Paulo. (Müller Melchers). I have placed this species in the brevicatenata group, together with *Chaetoceros atlantidae* n. sp.

Chaetoceros atlantidae n. sp. Plate VI, fig. 1, 3. Plate VII, fig. 2

1949 Müller Melchers. Chaetoceros subtilis in Lilloa XIX. page 164. fig. 1/2. Tucuman.

Chains short streight, not twisted. Valves without constriction, fragile. No apertures. Setae without basal part, fine hairlike, pointing all to the same side. Terminal seta — one only — the other a very short spine or missing completely. This terminal seta is very long, broadened and serrated at the end. One chromatophora only, situated against the broad side of the valve mantle. Resting spores with spines on both sides.

Diameter 0.006 *to* 0.018 *mm.*

This diatom is next to *Chaetoceros subtilis* Cleve. 1896, having two terminal setae. These are fine and not serrated. Cleve does not mention varieties with one terminal only.

Neritic euryhaline.. but seems to prefer higher salinity. Found at Atlantida during the summer months, January to March, declining in April, sometimes starting to appear in November. This species has been found during ten years, never changing, or showing forms with two terminals.

Chaetoceros confertus n. sp. Plate VII, fig. 1

Chains streight, not twisted of 13 *to* 18 *cells, broader than high. Cells pressed tightly together, leaving a small aperture only. Setae fine hairlike. In the middle of the chain standing outwards, at the ends drooping towards the terminal setae. Terminal setae stronger, crossed or in an obtuse angle., serrated at the ends. Terminal setae shorter than side setae. One large chromatophora pressed against valve mantle. Resting spores not known.*

Diameter 0.004 *to* 0.014 *mm.*

This species resembles *Chaetoceros compactus* Ikari 1928, p. 252, f. 7, having no apertures and domelike end cells. The new species has some relation to *Ch. crinitus,* this having less cells and no heavy terminals.

Habitat. Atlantida. Observed during several years (1945.46.49.53.) during January February in *Chaetoceros* plankton, always in scarce and solitary specimens.

Chaetoceros insignis. n. sp. Plate VII. fig. 3

Very rew facts sould be collected on this delicate and very small species.

Chains streight of two cells. No apertures between cells. Setae hairlike, terminal the same. Cells higher than broad. One large chromatophora placed against the girdle. Resting spores not known.

Diameter 0.006 *mm hight* 0.02 *mm.*

Habitat: Atlantida during a case of red water produced by Gymnodinium sp. *Water brackish. Temperature* 24°*C. Diatom plankton scarce,* Gymnodinium *prevailing.*

Hemiaulus sinensis Greville Ann. Mag. Nat. Hist. Vol. I, Nº 591. 1865. Plate VII, fig. 4, 5

Little seems to be known of auxospores and resting spores from Hemiaulus sinensis. Pavillard 1916 refers to his paper 1903 *"L'Etang de Thau"*, where he reports auxospores. 1928. *Dan. Ocean. Exped.* p. 57 he refers again to these auxospores, as not having been found again. He does not meñtioñ resting spores.

During March 1947 and 1950 scarce resting spores of *Hemiaulus sinensis* Grev. were found at Atlantida and Punta del Este. The spores in 1947 were just beginning to form and still connected with the mother cell, (fig. 4). The apendices beeing hairlike of weak silex. The spores during March 1950 — salinity abont 30 ‰, temperature 22°C- were of a heavy refractive silex (fig. 5), these were also connected with the mother sell. Wolle 1894 plate LVII. fig. 17/19 has copied from Pritchard two drawings which he brings under the name of Periptera tetracladia Ehrenberg (Microgeologie). The figures 18 and 19 have some similiarity to the resting spores I have found. As the original Ehrenberg litterature is not available to me I can not say from what material the drawings were made. *Hemiaulus sinensis* is not common on this coast, generally known from summer plankton in scarce numbers. In brasilian plankton gatherings from Cananeia, Estado de Sao Paulo it is quite common. *Hemiaulus sinensis* evidently prefers warm water. Subrahmanyan (1946) fig. 313 shows resting spores similar in form to those found at Atlantida, but the spores from Madras (India), seem to be of a less silicified type.

Fossil resting spores of *Hemiaulus Kittoni* Grunow as shown by Astrid Cleve Euler, 1951. Nº 266. d. of dumbell form, are quite different. These are found frequently in Oamaru findings as for instañce Cormack's sidiñg, together with *Hemiaulus Kittoni Grun.* The spores of the recent *Hemiaulus sinensis* Grev. as shown in my drawings Plate VII, fig. 4, 5. are completely different and nearer to the *Chaetoceros* resting spores, the diameter is also larger.

NEW HABITATAE OF DIATOMS

For the following diatoms I give new localities of which I have been advised of or found in gatherings investigated by myself.

Actinoptychus Frenguellii Müller Melchers

1951 Physis Buenos Aires. Vol. XX. Nº 58.

Through the kindness of Mr. H. Barrett of Toorak, Victoria. (Australia). I received a slide made by this investigator showing this diatom. The material was collected in Tasmania from the Dervent River.

Dr. Vivienne Cassie of Victoria University College, Wellington, (New Zealand.) has kindly sent some plankton gatherings from Marlborough Sounds district New Zealand, collected by Dr. B. M. Bary. In these samples very few specimens of *Actinoptychus Frenguellii* were found, exactly the same diatom as described by me from the Golfo de San Juan (Argentina).

Coscinodiscus Punctiger (Castr.) n. comb. Müller Melchers

1954 Physis Buenos Aires. Vol. XX. Nº 59.

This species was also found at Marlborough Sounds district N. Z. The sample consisted chiefly of *Coscinodiscus perforatus* and *Coscinodiscus radiatus types.*

From Rio Grande do Sul (Brasil) bottom sample collected by Mr. Juan Soriano, *Coscinodiscus punctiger* is found in scarce numbers.

From Brasil — Mar de Trepandé, Rio Batatal and Santos, samples received from Dr. J. de Paiva Carvalho, these also contain very few specimens of *Cosc. punctiger.*

On the South Atlantic coast at Necochea, (Argentina), in my own gatherings *Cosc. punctiger* was found — very rare. So this diatom is found along the East Coast of South America from about 24ºS. Lat. to 39ºS. Lat. On the uruguayan coast it is known plentyfull.

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Biddulphia Chinensis. Greville

Greville R. K. Tr. Micr. Soc. London. 1866.
Müller Melchers, Comm. Bot. Mus. Montevideo II, 26. 1952.

Mr. H. Barrett had the kindness to inform me that he found certain numbers of *Biddulphia chinensis* in the mouth of Tamar. River (Tasmania) flowing into Bass Strait. So the missing australian habitat has been located as I had presumed in my paper 1952 page 2.

I am very much indebted to Dr. R. M. Cassie sending a most interesting surface plankton gathering from Hauraki Gulf, North Island. East Coast. New Zealand (17. Sept. 1953). This sample contains *Biddulphia chinensis* in large numbers together with *Coscinodiscus perforatus* types and several other planktonic diatoms. A few of the *Biddulphia chinensis* were found showing teratological disturbances. (See my paper 1952).

To all that have had the kindness to provide me with samples of plankton and information I wish to tender my very best thanks.

Atlántida, April 1954.

Plankton samples from M. S. Santa Catarina

Some 35 gatherings were taken by pump on board of the M. S. Santa Catarina by engineer J. Weiher to whom I owe my very best thanks. The gatherings have been revised superficialy only, but it is very interesting to be able to state that some diatoms, that have been mentioned further above as *Actinocyclus platensis* n. sp. have been found all along the brasiliañ coast to Fernando Noronha, St. Pauls rocks up to 16º1' N and 21º42'W. In the same gatherings *Coscinodiscus punctiger* M.M. apperars also on the brasilian coast in certain numbers, but further to the north only iñ solitary specimens. The samples taken from the open ocean were rather deficient of diatoms, prevailing *Globigerina, Radiolaria, Ornithocercos* and *Ceratocorys.*

Atlantida June. 1954.

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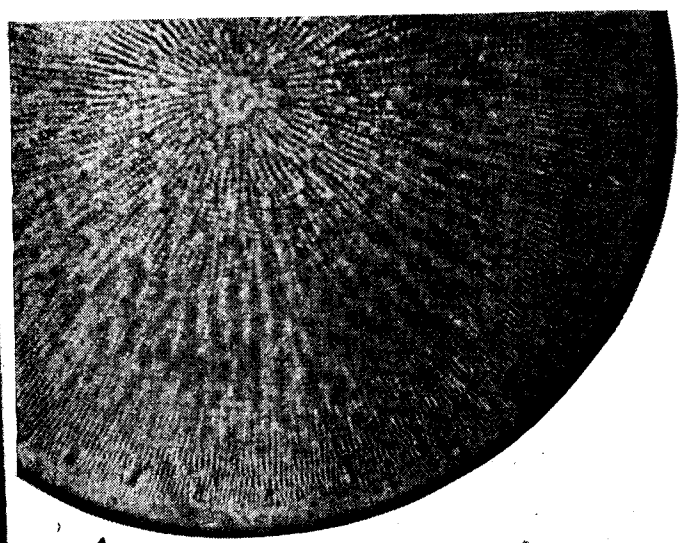
PLATE I

1 *Coscinodiscus Vidovichii*, n. sp.
2 " *Hustedtii*, n. sp.
3 " " *areolation* of boder.
4 " " *girdle view of cell showing chambers with areolation.*
5 " " *border view with border areolation and spine.*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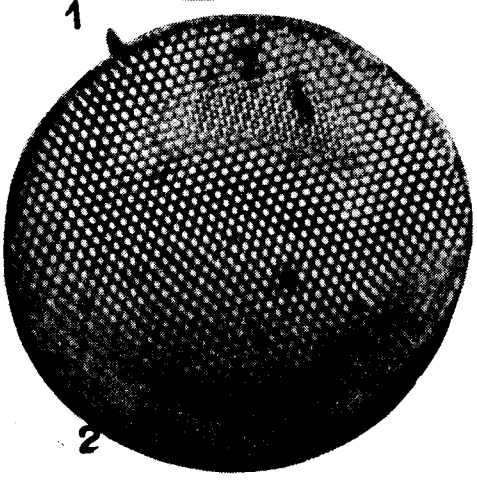
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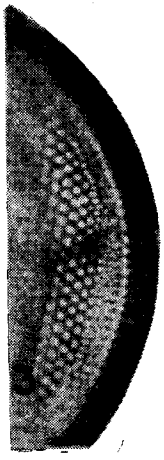

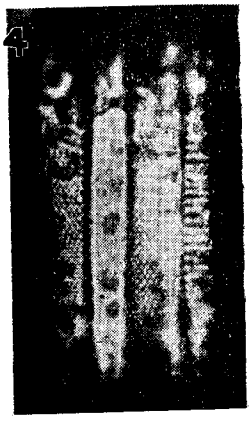
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Plate II

1-2 *Actinoptychus campanulifer* A. Schmidt.
3 *the same, smaller valve, upper focus.*
4 " *lower focus.*

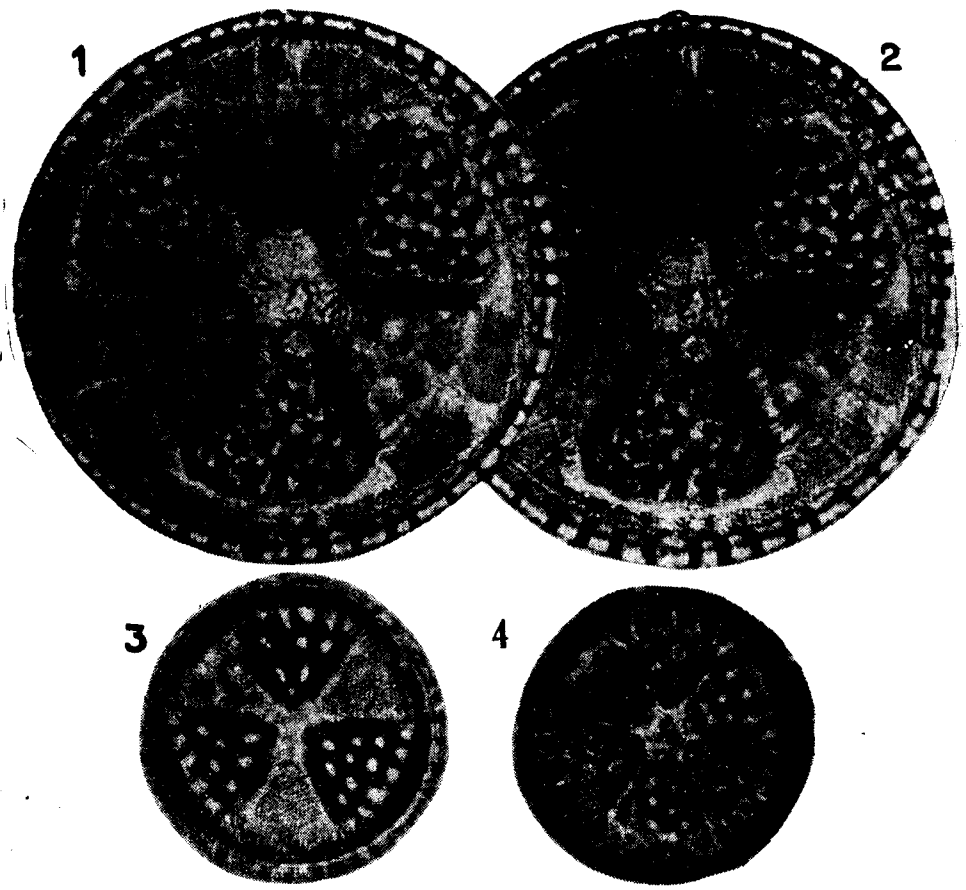
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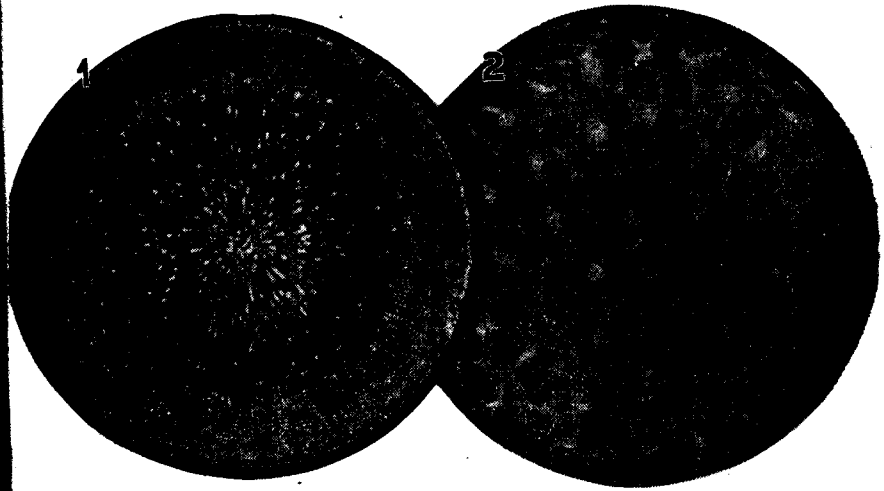
Plate III

1 *Actinocyclus platensis*, n. sp.
2 " *with cromatophora.*
3 " *areolation.* 5 intervals equal to 0.01 m.m.
4 " *Actinocyclus Barklyi* (*Ehrb.*), Grun.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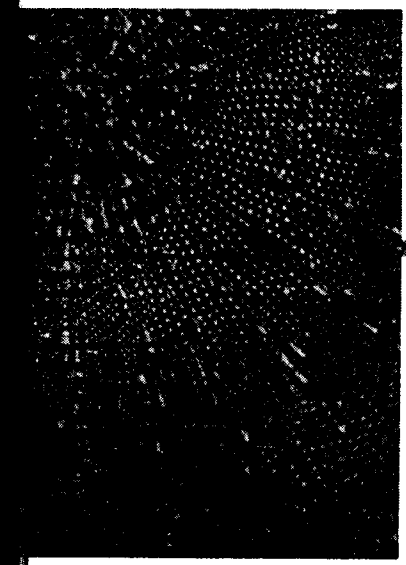

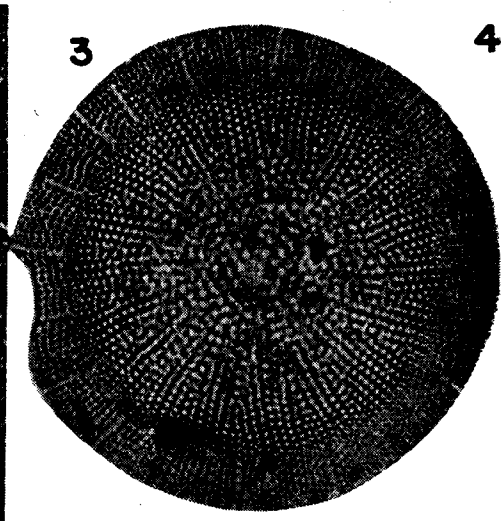
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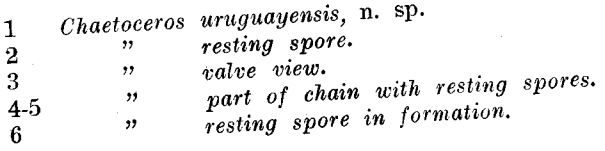
Plate IV



1 *Chaetoceros uruguayensis*, n. sp.
2 " *resting spore.*
3 " *valve view.*
4-5 " *part of chain with resting spores.*
6 " *resting spore in formation.*

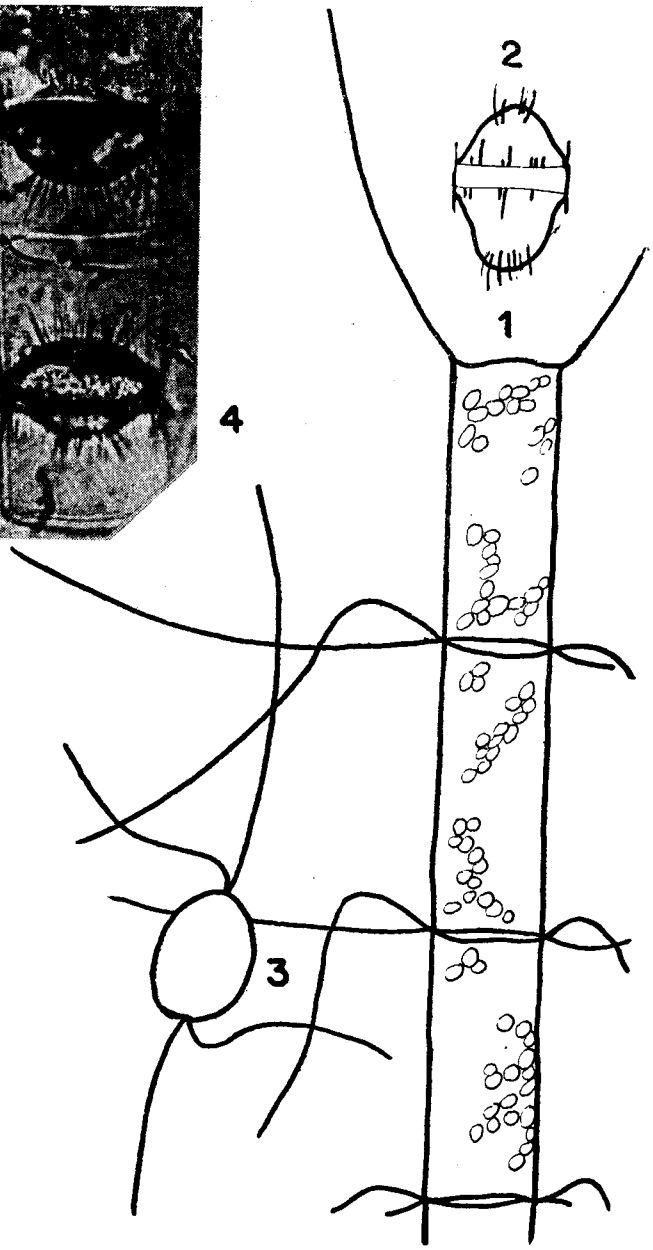

2
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Plate V

1-2-3 *Chaetoceros apendiculatus*, n. sp.
2 " *with double terminal seta.*

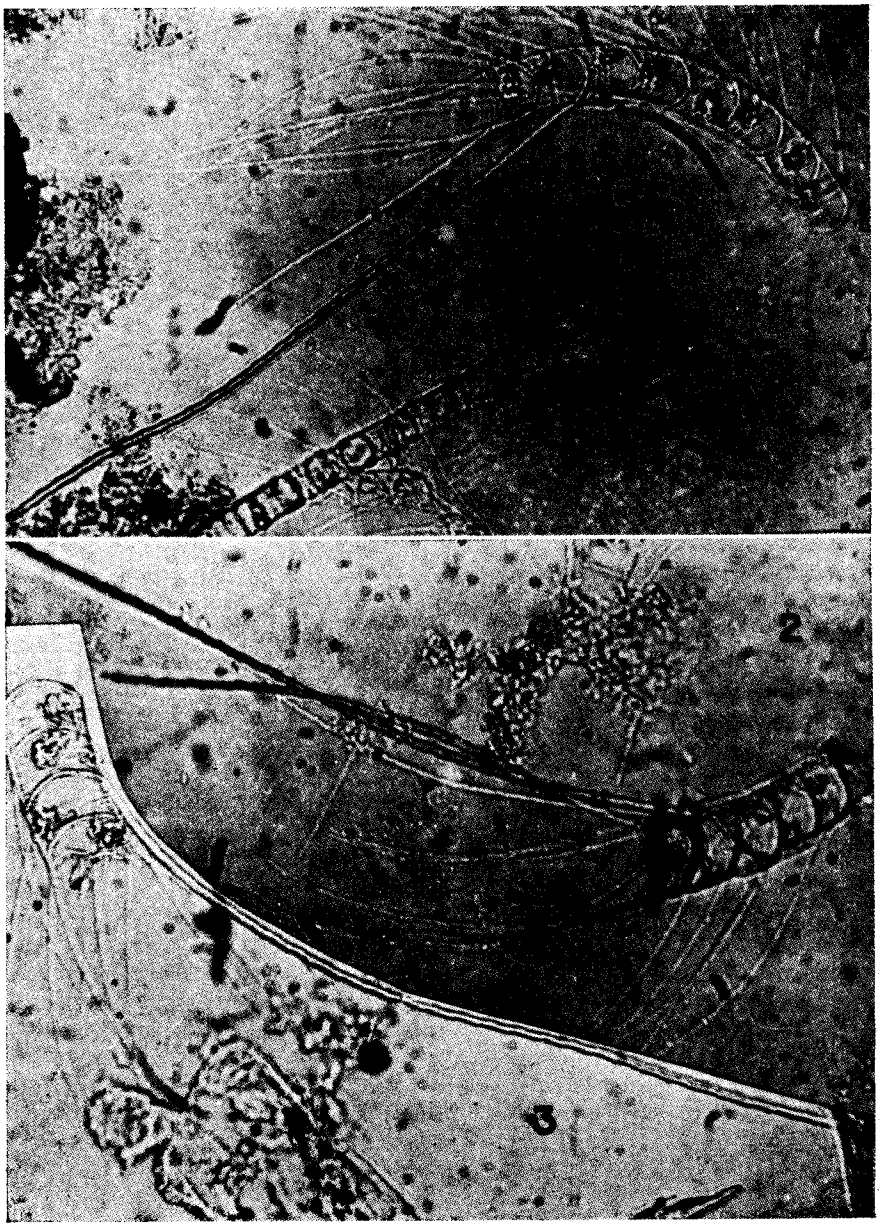

2
3

PLATE VI

1-3 *Chaetoceros atlantidae*, n. sp.
2 " *apendiculatus*, n. sp.

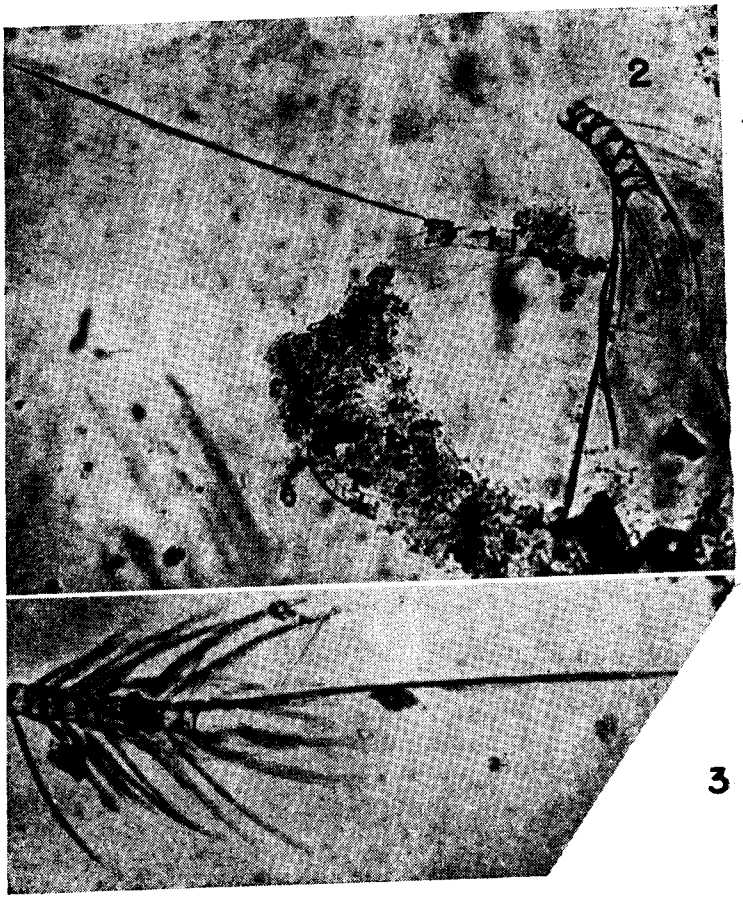
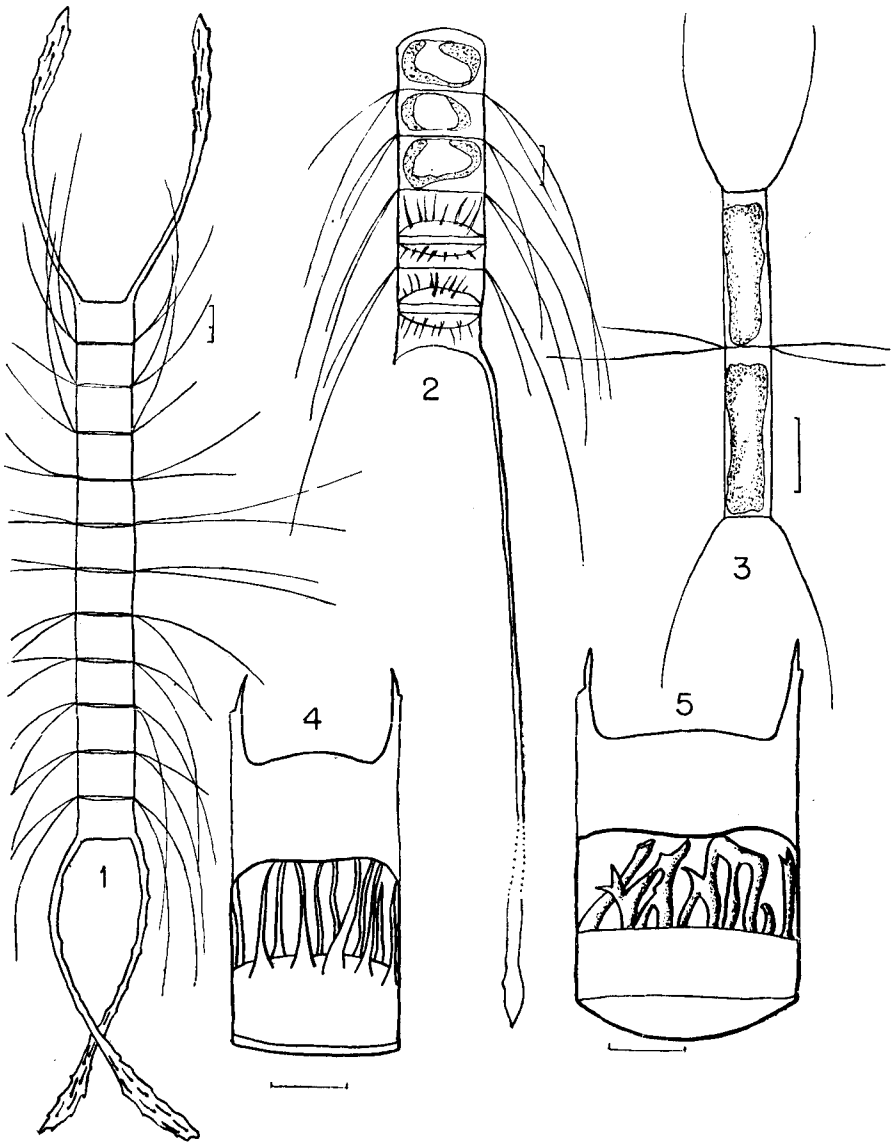

2
3

Plate VII

1 *Chaetoceros confertus*, n. sp.
2 " *atlantidae*, n. sp.
3 " *insignis*, n. sp.
4-5 *Hemiaulus sinensis Greville*, resting spores.

Photographs and drawings originals by
F. C. Müller Melchers.
Atlántida.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