können! Übrigens spielt das Ovarialepithel gar nicht überall eine so große Rolle bei der Subitaneibildung. Es hat sich für sie noch ein andrer Ernährungsmodus bei gewissen Gattungen ausgebildet. Bei *Polyphemus* und *Bythotrephes* sind nach Weismann die Subitaneier »dotterlos und so klein, daß kein Embryo aus ihnen hervorgehen könnte, bestünden nicht Einrichtungen, welche das Ei nach seinem Übertritt in den Brutraum[10] mit Nahrungsstoffen versorgten«. Hier werden also im Ovarium die Dauereier besser versorgt. Es bilden sich noch jetzt die Subitaneier einiger Gattungen, wie es scheint, überhaupt ohne jede Hilfe von Epithelzellen, so bei *Leptodora*, *Polyphemus* und *Bythotrephes*, während anderseits bei *Leptodora* gerade bei der Dauereibildung die Epithelzellen der sog. Nährkammern eine sonst nicht beobachtete Rolle spielen. — Gerade gestützt auf die Polypheminen ließe sich vielleicht sehr schön der Weg verfolgen, den die Ernährung der Subitaneier bei den Cladoceren gegangen, von der ursprünglichen Resorption benachbarter Keimgruppen zur Beschränkung auf die eigne Keimgruppe und zur Fruchtwasser- und Ovarialepithelernährung.

Freiburg i. Br., Mai 1907.

## 10. On Ceratium eugrammum and its related species.

By Prof. Ch. A. Kofoid, Zoological Laboratory, Univ. of California Berkeley.

(With 4 figures.)

eingeg. 26. Mai 1907.

In 1859 Ehrenberg[1] described a small species of *Ceratium*, related to *C. lineatum*, as *Peridinium eugrammum* but did not figure it until 1873[2] in a paper whose title failed to suggest its contents. This paper is not cited in any of the earlier or more recent bibliographies of the Dinoflagellata except indirectly in Bütschlis Tierreich monograph. Stein (1883)[3] cites this species in his monograph as a synonym of *C. furca*, a view acquiesced in there after by all other investigators. This species of Ehrenberg has reappeared in subsequent literature in the figures

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[10] Im Original nicht durch besonderen Druck hervorgehoben.

[1] Ehrenberg, C. G., Über das Leuchten und über neue mikroskopische Leuchtthiere des Mittelmeeres. Monatsber. k. preuß. Akad. Wissensch. Berlin 1859. S. 727—738, 791—793.

[2] Ehrenberg, C. G., Die das Funkeln und Aufblitzen des Mittelmeeres bewirkenden unsichtbar kleinen Lebensformen. Festschrift zur Feier d. 100jährigen Bestehens d. Ges. naturforsch. Freunde in Berlin 1873. p. 1—4, 1 Taf.

[3] Stein, F., Der Organismus der Infusionstiere. III. Abt. 2. Hälfte. Die Naturgeschichte der Arthrodelen Flagellaten. 30 S. 25 Taf. 1883.

of Bergh (1881)[4], Hensen (1885)[5], Entz (1902)[6] and Zacharias (1906)[7], along with typical *C. furca* and *C. lineatum* (the so-called *C. furca* var. *baltica* Moeb. nomen nudum), but in no case has it been accorded specific recognition, except by Vanhoeffen (1897)[8] who described it as *Biceratium debile*.

In the course of my investigations in the Dinoflagellata[9] of the plankton

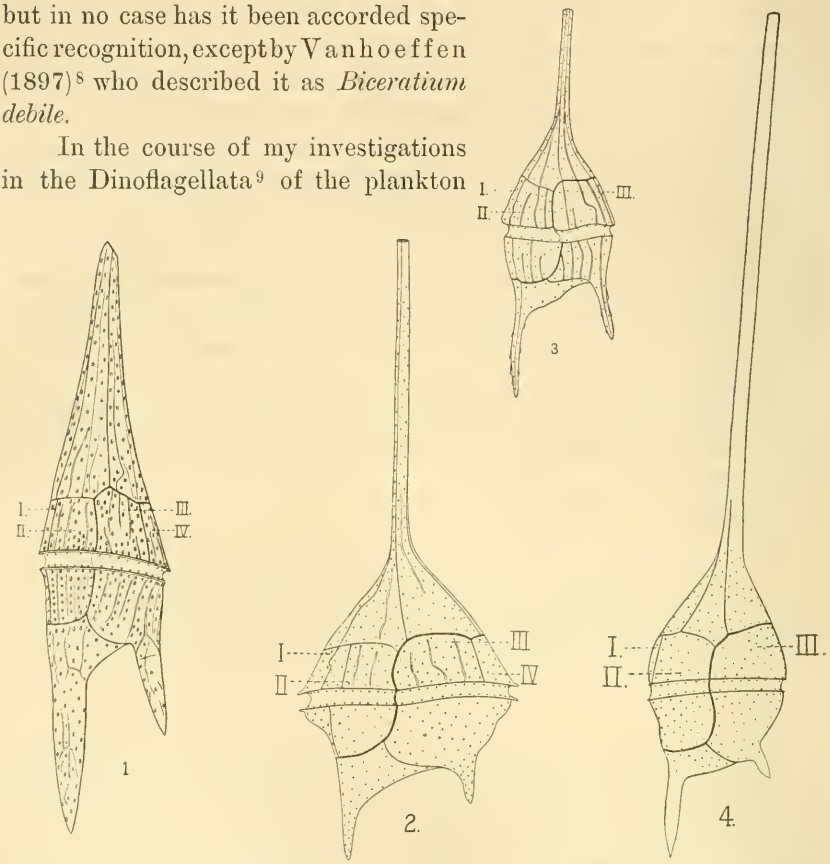


Fig. 1—4. Dorsal views of thecae of *Ceratium furca*, *C. lineatum*, *C. eugrammum* and *C. teres*. I—IV, precingular plates. × 500. Original.

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[4] Bergh, R. S., Der Organismus der Cilioflagellaten. Eine phylogenetische Studie. Morphol. Jahrb. Bd. 7. S. 177—288. Taf. 12—14. 1881.

[5] Hensen, V., Über die Bestimmung des Planctons oder des im Meere treibenden Materials an Pflanzen und Tieren; nebst Anhang. Fünfter Ber. Komm. z. wiss. Unters. d. d. Meere. S. 1—208. Taf. 1—6. 1887.

[6] Entz, G. jr., A Quarnero Peridineái. Növénytani Közlémenyek Bd. 1. p. 83—86. Taf. 1—6. 1904.

[7] Zacharias, O., Über Periodizität, Variation und Verbreitung verschiedener Planctonwesen in südlichen Meeren. Arch. Hydrobiol. u. Planktonkunde. Bd. 1. S. 498—575. 23 Taf.

[8] Vanhoeffen, E., Die Fauna und Flora Grönlands. Grönland Exp. d. Ges. f. Erdkde. Berlin 1891—1893. Bd. 2. S. 1—383. Taf. 1—8. 1897.

[9] Kofoid, C. A., Dinoflagellata of the San Diego Region. III. Descriptions of new species. Univ. of Calif. Pubs. Zool. Vol. 3. p. 299—360. pls. 22—33.

of the Pacific from Alaska to San Diego I have found this species in a large number of collections and am convinced of its distinctness from both *C. lineatum* and *C. furca*, with neither of which it intergrades, and that it is, in all probability, the form the Ehrenberg recognized and must therefore be designated as *C. eugrammum* (Ehrbg.).

The accompanying figures give, for comparison, dorsal views of four species, three of which have been subject to great confusion in the faunistic literature of the group and the fourth (*C. teres*) has been rerently described by me.

*C. eugrammum* is the smallest species in the genus. It has a relatively narrow midboy with steep lateral margins of the epitheca. Its antapicals are straight, and usually not diverging, and the hypotheca is but little contracted between the girdle and the bases of the antapicals. It differs from *C. furca* in its smaller size, greater delimitation of apical

| Species | Relation of apical horn to epitheca | Divergence of margins of epitheca from perpendicular to plane ofgirdle | Postobliquity | Transdiameter | Ratio to transdiameter of axial altitude of midbody. |
|---|---|---|---|---|---|
| *C. furca* | gradually merged | right 14° (10°—18°)<br>left 16° (11°—19°) | 42° (35°—60°) | 35 (30—50) $\mu$ | 1:2,25 (1,5—3) |
| *C. lineatum* | delimited | right 30° (24°—37°)<br>left 38° (33°—42°) | 18° (15°—21°) | 58 (50—67) $\mu$ | 1:1,1 (1—1,25) |
| *C. eugrammum* | delimited | right 23° (15°—27°)<br>left 26° (25°—31°) | 24° (22°—27°) | 25 (19—30) $\mu$ | 1:1,4 (1,3—1,5) |
| *C. teres* | delimited | right 20°<br>left 30° | 12° (6°—19°) | 37 (30—40) $\mu$ | 1:1,5 (1,3—1,8) |

horn from midbody, shorter antapicals, marked linear striae and more delicate habit. From *C. teres* it differs in the more robust habit and presence of striae, in the straight, rather than convex, sides of epitheca and hypotheca and in the absence of distal contraction of the latter. It thus lacks entirely the broadly fusiform outline which *C. teres* presents. From *C. lineatum* it differs in its narrower midbody and steeper slopes of the antero-lateral margins of the epitheca. It is evident that *C. lineatum* and *C. eugrammum* are closely related as shown by their form and surface markings. They differ however in one important structural character, viz: — the precingular plate (fig. 2 *IV*) which is present in *C. lineatum* but apparently not in *C. eugrammum*. The normal number of precingular plates in the genus *Ceratium* is three but in *C. lineatum* and *C. furca* in some individuals, at least, an additional suture line passes from the suture between the apical and precingular series to the girdle plate, spliting the right precingular into two parts. This accessory

suture line is optically similar to sutures other than that of the line of cell-division which is more heavily marked.

The appended table of diagnostic characters based on measurments of a number of individuals will serve more clearly to define the characters of the species in question. Northern forms (Alaskan) are absolutely larger in dimensions of the midbody than southern (San Diego), but horns, especially the apical, tend to be relatively longer in the individuals from warmer waters.

Both *C. lineatum* and *C. furca* are common cosmopolitan species alike in neritic and oceanic plankton. *C. eugrammum* is likewise cosmopolitan and *C. teres* bids fair to exhibit a similar range as it is widespread in Pacific waters. These two species are, however, both relatively rare, perhaps in part because of the fact that their small size permits them to slip through the mesh of the silk gauze used in plankton nets.

A few filter catches which I have examined have not indicated any abundance of these two species equal to that of *C. furca* and *C. lineatum*. They are apparently not well established dominant species and perhaps belong in the category of less sturdy mutants from some member of the *C. furca* group.

Berkeley, California, March 23, 1907.

## 11. Über einige Pseudoskorpione aus Deutsch-Ostafrika.

Von Edv. Ellingsen, Kragerö (Norwegen).

eingeg. 8. Juni 1907.

Vor einiger Zeit erhielt ich durch Herrn Embr. Strand einige Pseudoskorpione zur Bestimmung, die in Amani in Deutsch-Ostafrika von Herrn Prof. Dr. J. Vosseler gesammelt worden waren. Die Sammlung enthielt drei Arten; zwei von diesen waren schon anders woher bekannt, die eine ist die weit verbreitete Art *Chelifer subruber* E. Simon, die andre *Ch. equester* With, vom Kilimandscharo beschrieben, wogegen die 3. Art trotz ihrer großen Ähnlichkeit mit dem gewöhnlichen *Chelifer cancroides* L. als neu beschrieben werden mußte.

*Chelifer equester* With.

Amani, 1905. 1 Exemplar ♂.

*Chelifer subruber* E. Simon.

Amani, 1903. 2 Exemplare. Bomola bei Amani, 1904. 1 Exemplar an Rinde.

*Chelifer strandi* nov. sp.

♂. Zwei kleine, aber deutlich gewölbte Augen, eins an jeder Seite. Körper mäßig breit.

Farbe: Körper braun, Palpen und Beine ein wenig heller.