

DET KONGELIGE DEPARTEMENT
FOR HANDEL, SJØFART, INDUSTRI, HÅNDVERK OG FISKERI

NORGES SVALBARD- OG ISHAVS-UNDERSØKELSER
LEDER: ADOLF HOEL

SKRIFTER OM SVALBARD OG ISHAVET

Nr. 33

JOHAN KIÆR

CTENASPIS

A NEW GENUS OF CYATHASPIDIAN FISHES

A PRELIMINARY REPORT

WITH 4 FIGURES IN THE TEXT



OSLO
I KOMMISJON HOS JACOB DYBWAD
1930

Results of the Norwegian expeditions to Svalbard 1906—1926 published in other series. (See Nr. 1 of this series.)

The results of the Prince of Monaco's expeditions (Mission Isachsen) in 1906 and 1907 were published under the title of 'Exploration du Nord-Ouest du Spitzberg entreprise sous les auspices de S. A. S. le Prince de Monaco par la Mission Isachsen', in *Résultats des Campagnes scientifiques, Albert 1^{er}, Prince de Monaco*, Fasc. XL—XLIV. Monaco.

ISACHSEN, GUNNAR, Première Partie. Récit de voyage. Fasc. XL. 1912. Fr. 120.00.

With map: Spitzberg (Côte Nord-Ouest). Scale 1:100 000. (2 sheets.) Charts: De la

Partie Nord du Foreland à la Baie Magdalena, and Mouillages de la Côte Ouest du Spitzberg.

ISACHSEN, GUNNAR et ADOLF HOEL, Deuxième Partie. Description du champ d'opération. Fasc. XLI. 1913. Fr. 80.00.

HOEL, ADOLF, Troisième Partie. Géologie. Fasc. XLII. 1914. Fr. 100.00.

SCHETELIC, JAKOB, Quatrième Partie. Les formations primitives. Fasc. XLIII. 1912. Fr. 16.00.

RESVOLL HOLMSEN, HANNA, Cinquième Partie. Observations botaniques. Fasc. XLIV. 1913. Fr. 40.00.

A considerable part of the results of the ISACHSEN expeditions in 1909 and 1910 has been published in *Videnskapsselskapets Skrifter. I. Mat.-Naturv. Klasse, Kristiania (Oslo)*.

ISACHSEN, GUNNAR, Rapport sur l'Expédition Isachsen au Spitzberg. 1912, No. 15. Kr. 5,40.

ALEXANDER, ANTON, Observations astronomiques. 1911, No. 19. Kr. 0,40.

GRAARUD, AAGE, Observations météorologiques. 1913, No. 1. Kr. 2,40.

HELLAND-HANSEN, BJØRN and FRIDTJOF NANSEN, The sea west of Spitzbergen. 1912, No. 12. Kr. 3,60.

ISACHSEN, GUNNAR, The hydrographic observations. 1912, No. 14. Kr. 4,20.

With chart: Waters and anchorages on the west and north coast. Publ. by the Norw. Geogr. Survey, No. 198.

HOEL, A. et O. HOLTEDAHL, Les nappes de lave, les volcans et les sources thermales dans les environs de la Baie Wood au Spitzberg. 1911, No. 8. Kr. 4,00.

GOLDSCHMIDT, V. M., Petrographische Untersuchung einiger Eruptivgesteine von Nord-westspitzbergen. 1911, No. 9. Kr. 0,80.

BACKLUND, H., Über einige Olivinknollen aus der Lava von Wood-Bay, Spitzbergen. 1911, No. 16. Kr. 0,60.

HOLTEDAHL, OLAF, Zur Kenntnis der Karbonablagerungen des westlichen Spitzbergens. I. Eine Fauna der Moskauer Stufe. 1911, No. 10. Kr. 3,00. II. Allgemeine stratigraphische und tektonische Beobachtungen. 1912, No. 23. Kr. 5,00.

HOEL, ADOLF, Observations sur la vitesse d'écoulement et sur l'ablation du Glacier Lilliehöök au Spitzberg 1907—1912. 1916, No. 4. Kr. 2,20.

VEGARD, L., L'influence du sol sur la glaciation au Spitzberg. 1912, No. 3. Kr. 0,40.

ISACHSEN, GUNNAR, Travaux topographiques. 1915, No. 7. Kr. 10,00.

With map: Spitzberg (Partie Nord-Ouest). Scale 1:200 000 (2 sheets).

GUNNAR ISACHSEN has also published: Green Harbour, in *Norsk Geogr. Selsk. Aarb.*, Kristiania, 1912—13, Green Harbour, Spitzbergen, in *Scot. geogr. Mag.*, Edinburgh, 1915, and, Spitzbergen: Notes to accompany map, in *Geogr. Journ.*, London, 1915.

All the above publications have been collected into two volumes as *Expédition Isachsen au Spitzberg 1909—1910. Résultats scientifiques. I, II. Christiania 1916*.

As the result of the expeditions of ADOLF HOEL and ARVE STAXRUD 1911—1914 the following memoir has been published in *Videnskapsselskapets Skrifter. I. Mat.-Naturv. Klasse*.

HOEL, ADOLF, Nouvelles observations sur le district volcanique du Spitzberg du Nord. 1914, No. 9. Kr. 2,50.

The following topographical maps and charts have been published separately:

Bjørnøya (Bear Island). Oslo 1925. Scale 1:25 000. Kr. 10,00.

Bjørnøya (Bear Island). Oslo 1925. Scale 1:10 000. (In six sheets.) Kr. 30,00.

Chart of Bear Island. (No. S1). Oslo 1929. Scale 1:40 000. Kr. 4,00. (With description).

Bear Island Waters. (No. S2). Oslo 1930. Scale 1:350 000. Kr. 5,00.

A preliminary edition of topographical maps on the scale of 1:50 000 covering the regions around Kings Bay, Ice Fjord, and Bell Sound, together with the map of Bear Island, scale 1:25 000, is published in:

Svalbard Commissioner [Kristian Sindballe], Report concerning the claims to land in Svalbard. Part I A, Text; I B, Maps; II A, Text; II B, Maps. Copenhagen and Oslo 1927. Kr. 150,00.

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1930

A. W. BRØGGERS BOKTRYKKERI A/S

The large number of fish remains, which the Norwegian expeditions have collected in the Downtonian Red Bay Series in Spitsbergen, contain many new forms of Cyathaspidian fishes. A monographical work on these will be issued in the near future; as, however, the reproduction of the more than one hundred photographic plates and the printing of the paper will take a considerable time, the author would like to give a short preliminary report on one group which differs quite considerably from the earlier known forms. It was previously mentioned by the author in a lecture given at the Academy of Science in Oslo. For this type the author proposes the new genus *Ctenaspis*, which embraces several species, and plays an important part in the Downtonian Red Bay series.

Ctenaspis nov. gen.

Quite small Cyathaspidian fishes (*Cyathaspida*¹) with short, and broadly drawn - out dorsal and ventral - shields, especially distinguished by the ornamentation of the surface, not, as usually, consisting of fine, dentine ribs but of isolated dentine tubercles in different stages of development.

The dorsal shield comparatively flat, and furnished with a lateral toothed brim, freely jutting out. The surface does not show any division as in *Cyathaspidei*, it is entire and undivided as in *Palaeaspidei* (*Palaeaspis* and kindred forms). The rostral area very short, and the orbital notches situated very far to the front. In front of the orbita as usual strong, praeorbital processes, and between the latter, under the anterior margin of the rostral area, a flat maxillar-brim with transverse ribs which inwards dissolve into teeth. The post-branchial area very short.

The ventral shield more arched with a concave frontal margin, curved grooves in the front corners, and a flatter marginal-area which backwards widens into flat, sharp, sometimes toothed corners.

The lateral line system is sketched in Fig. 2. It differs from that which is usual in *Palaeaspidei* and shows some transition towards the system found in *Pteraspis*. The lines are distinctly segmentally

¹ In *Heterostraci* the author proposes a separate sub-order, *Cyathaspida* with the two tribes *Palaeaspidei* and *Cyathaspidei*, which again contain several families and a large number of genera.

arranged, and are found in a fixed relation to the impressions of the branchiae, the sense organs and the brain. The pores are very scanty and difficult to discern.

The structure of the dermal skeleton is simplified by the transformation of the dentine layer, which presumably is owing to a reduction. The cancellous and basal layers are normally developed, whereas the reticular layer is almost quite reduced.

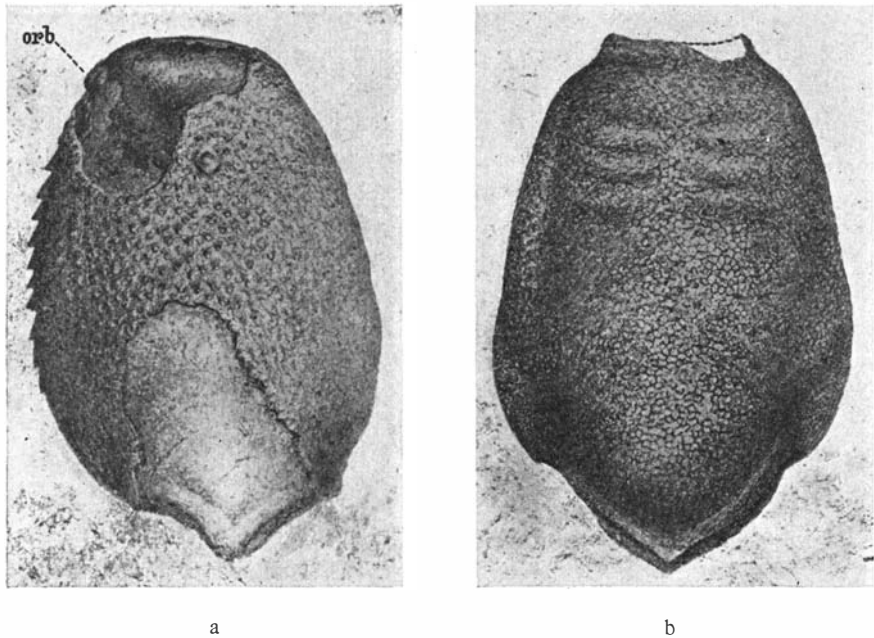


Fig. 1. *Ctenaspis dentata* nov. gen. & sp., \times ca. 2.5. a. Dorsalshield, horizon L Ben Nevis, upper part of Red Bay Series. A. Hoel coll. Holotype for the species. b. Ventralshield. horizon O, Ben Nevis, upper part of Red Bay Series. A. Hoel coll.

Free branchial plates have not yet been found, nor have the plates belonging to the skeleton of the mouth. Scales are also quite unknown.

To this short description the author will only make a few remarks. *Ctenaspis* is closest allied to *Palaeaspidei* which comprises the yet imperfectly known American genus *Palaeaspis* and the European forms which group with Lancaster's *Holaspis sericea*. To the latter belong *Cyathaspis Sturi*, *Cyathaspis Barroisi* and several new species from Spitsbergen. They form an easily distinguishable group which the author has named *Poraspis*, as *Holaspis* is preoccupied and cannot be used. *Ctenaspis* differs from these forms and other genera, which the author will later on describe, especially on account of the form of the body, the ornamentation of the surface and development of the lateral line

system. The special form of the body is a particular type of adaptation which is also found in *Cyathaspis Banksii*, the typical genus for *Cyataspidei*, and even in some *Pteraspis*-forms. It is, therefore, of no great systematical importance. The surface ornamentation is more important, and one might perhaps suppose that this character would make it necessary to wholly banish the genus from the *Palaeaspidei* with its fine dentine ribs. The author, however, has found that the ornamentation

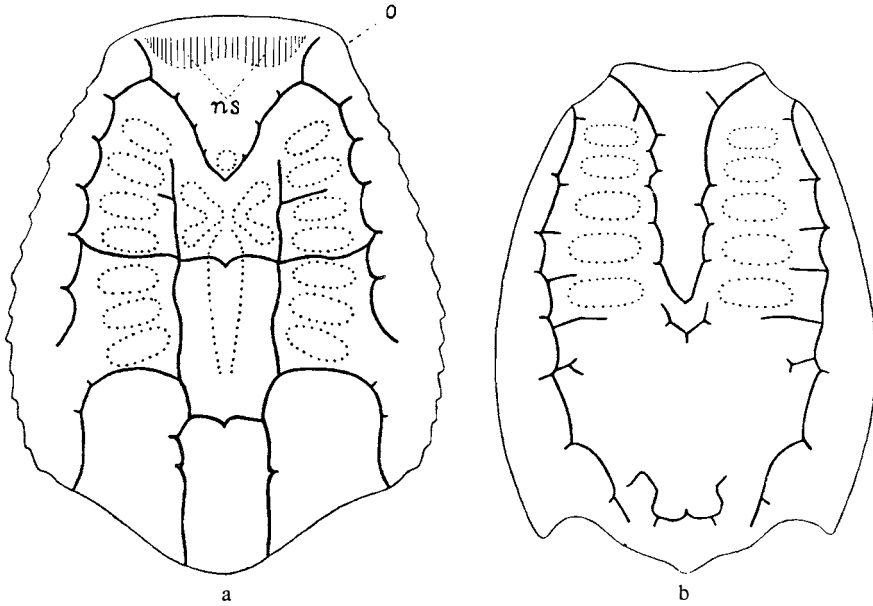


Fig. 2. *Ctenaspis dentata* nov. gen. & sp. Sketch of the dorsal- (a) and ventral- (b) shields with the lateral line system and its relation to the brain, the sense organs and the branchiae (dotted lines), \times ca. 2.5. *ns*, nasal sacks. *o*, orbita.

in *Heterostraci* is more plastic than has before been supposed and also that in *Cyathaspids* and *Pteraspids* there are several lines with transitions from the typical dentine ribs to different forms of dentine tubercles, an ornamentation which may be called psammosteid.

The peculiar ornamentation in *Ctenaspis*, therefore, does not necessitate a separation.

Thus we have only left the pteraspid-like development of the lateral line system. There are good reasons for laying greater stress on this character, as the system in its principal characters appears to be rather constant. The author has, therefore, for the forms mentioned, established a new family *Ctenaspidae*, which, in his opinion, must be regarded as a specialised and advanced line of *Palaeaspidei*.

Several species have been found, of which the two following are the most common.

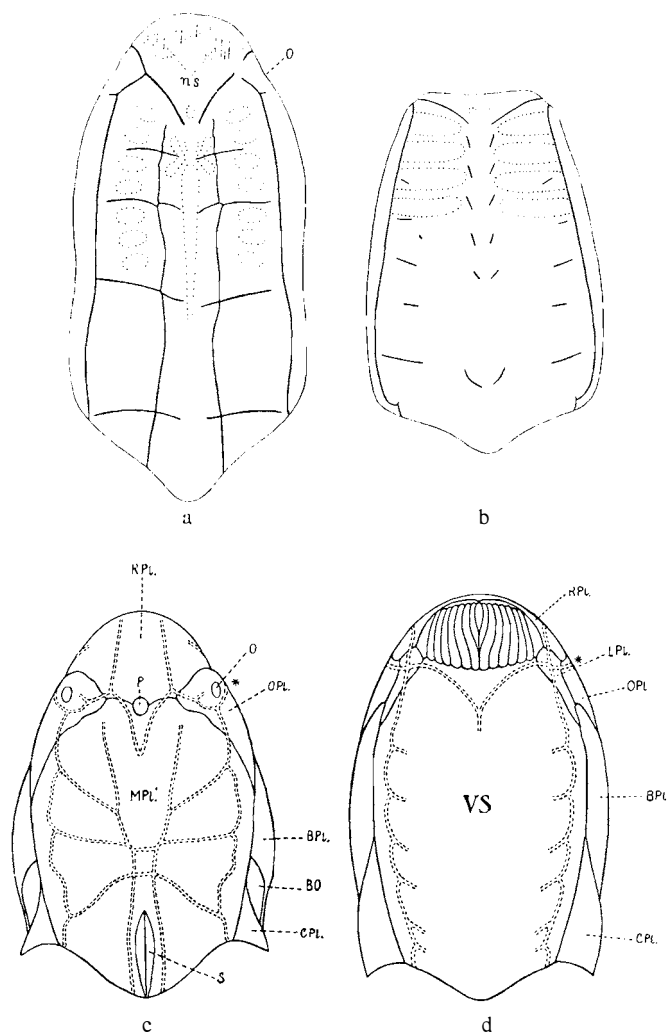


Fig. 3. Sketches of the lateral line system in *Poraspis* and *Pteraspis*. a—b, *Poraspis polaris* nov. gen. & sp. (Palaeaspidei), dorsal and ventral shields with the lateral line system and its relation to the impressions of the brain, the sense organs and the branchiae (dotted lines). Lower part of Red Bay Series. c—d, *Pteraspis primaeva* nov. sp. (manuscript), dorsal shield and *Pteraspis Vogti* nov. sp. (manuscript), ventral shield and plates. Both from Red Bay Series.

BPL, Branchial plate. *BO*, Branchial opening. *CPL*, Cornual plate.

MPL, median plate or disc. *NS*, nasal sacks. *O*, Orbita.

RPL, Rostral plate. *S*, Dorsal spine. *VS*, Ventral shield.

1. *Ctenaspis dentata* nov. sp.

(Fig. 1 and 4 a.)

This is quite a small form with the length of the dorsal shield 25—27 mms., and with a breadth-length index of about 80. The free lateral brim is finely toothed. The surface ornamentation consists of closely-set, flat dentine tubercles backwards extended. They may resemble fine, pointed scales and are evenly distributed on both the shields.

The specimen D 582 (Fig. 1 a) has been chosen as a holotype.

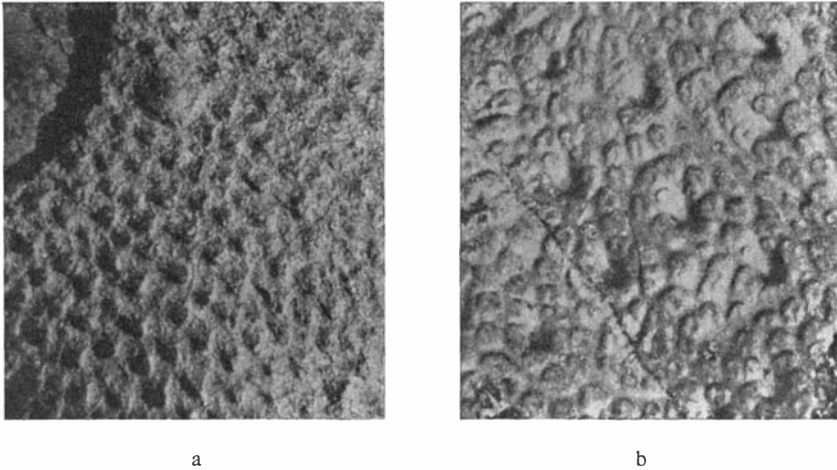


Fig. 4. Ornamentation of the dermal skeleton of *Ctenaspis dentata* (a) and *C. cancellata* (b). $\times 6$.

This species is the genotype of the genus.

It appears in the upper part of the Red Bay series, where it characterises a special rich horizon.

2. *Ctenaspis cancellata* nov. sp.

(Fig. 4 b.)

This is also a small form with the length of the dorsal shield about 30 mms. It has a breadth—length index of about 90, and is thus still broader than the genotype. The free lateral-brim is more coarsely toothed. The surface ornamentation consists of dentine tubercles which are set at a greater distance and are more symmetrical; between these tubercles the surface is plainly cancellated.

The specimen D 543 a has been chosen as a holotype.

It appears also in the upper part of the Red Bay series, but in a somewhat older layer than the rich *Ctenaspis* horizon.



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SKRIFTER
OM SVALBARD OG ISHAVET
RESULTATER AV DE NORSKE STATSUNDERSTØTTEDE
SPITSBERGENEKSPEDITIONER

(RESULTS OF THE NORWEGIAN STATE-SUPPORTED
SPITSBERGEN EXPEDITIONS)

OSLO

VOL. I

- Nr. 1. HOEL, ADOLF, *The Norwegian Svalbard Expeditions 1906—1926*. 1929. Kr. 10,00.
" 2. RAVN, J. P. J., *On the Mollusca of the Tertiary of Spitsbergen*. 1922. Kr. 1,60.
" 3. WERENSKIOLD, W. and IVAR OFTEDAL, *A burning Coal Seam at Mt. Pyramide, Spitsbergen*. 1922. Kr. 1,20.
" 4. WOLLEBÆK, ALF, *The Spitsbergen Reindeer*. 1926. Kr. 10,00.
" 5. LYNGE, BERNT, *Lichens from Spitsbergen*. 1924. Kr. 2,50.
" 6. HOEL, ADOLF, *The Coal Deposits and Coal Mining of Svalbard (Spitsbergen and Bear Island)*. 1925. Kr. 10,00.
" 7. DAHL, KNUT, *Contributions to the Biology of the Spitsbergen Char*. 1926. Kr. 1,00.
" 8. HOLTEDAHL, OLAF, *Notes on the Geology of Northwestern Spitsbergen*. 1926. Kr. 5,50.
" 9. LYNGE, BERNT, *Lichens from Bear Island (Bjørnøya)*. 1926. Kr. 5,80.
" 10. IVERSEN, THOR, *Hopen (Hope Island), Svalbard*. 1926. Kr. 7,50.
" 11. QUENSTEDT, WERNER, *Mollusken aus den Redbay- und Greyhookschichten Spitzbergens*. 1926. Kr. 8,50.

From Nr. 12 the papers will not be collected into volumes, but only numbered consecutively.

- Nr. 12. STENSIÖ, ERIK A:SON, *The Downtonian and Devonian Vertebrates of Spitsbergen. Part I. Cephalaspidae*. A. Text, and B. Plates. 1927. Kr. 60,00.
" 13. LIND, J., *The Micromycetes of Svalbard*. 1928. Kr. 6,00.
" 14. *A paper on the topographical survey of Bear Island*. (In preparation.)
" 15. HORN, GUNNAR and ANDERS K. ORVIN, *Geology of Bear Island*. 1928. Kr. 15,00.
" 16. JELSTRUP, HANS S., *Déterminations astronomiques*. 1928. Kr. 2,00.
" 17. HORN, GUNNAR, *Beiträge zur Kenntnis der Kohle von Svalbard (Spitzbergen und der Bäreninsel)*. 1928. Kr. 5,50.
" 18. HOEL, ADOLF, *Das Festungsprofil auf Spitzbergen. Jura und Kreide. I. Vermessungsergebnisse*. (In the press.)
" 19. FREBOLD, HANS, *Das Festungsprofil auf Spitzbergen. Jura und Kreide. II. Die Stratigraphie*. 1928. Kr. 3,00.
" 20. FREBOLD, HANS, *Oberer Lias und unteres Callovien in Spitzbergen*. 1929. Kr. 2,50.
" 21. FREBOLD, HANS, *Ammoniten aus dem Valanginien von Spitzbergen*. 1929. Kr. 4,00.
" 22. HEINTZ, ANATOL, *Die Downtonischen und Devonischen Vertebraten von Spitzbergen. II. Acanthaspida*. 1929. Kr. 15,00.
" 23. HEINTZ, ANATOL, *Die Downtonischen und Devonischen Vertebraten von Spitzbergen. III. Acanthaspida. — Nachtrag*. 1929. Kr. 3,00.
" 24. HERITSCH, FRANZ, *Eine Caninia aus dem Karbon des De Geer-Berges im Eisfjordgebiet auf Spitzbergen*. 1929. Kr. 3,50.
" 25. ABS, OTTO, *Untersuchungen über die Ernährung der Bewohner von Barentsburg, Svalbard*. 1929. Kr. 5,00.
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" 27. THOR, SIG, *Beiträge zur Kenntnis der invertebraten Fauna von Svalbard*. 1930. Kr. 18,00.
" 28. FREBOLD, HANS, *Die Altersstellung des Fischhorizontes, des Grippianiveaus und des unteren Saurierhorizontes in Spitzbergen*. 1930. Kr. 4,00.
" 29. HORN, GUNNAR, Franz Josef Land. *Natural History, Discovery, Exploration and Hunting*. 1930. Kr. 5,00.
" 30. ORVIN, ANDERS K., *Beiträge zur Kenntnis des Oberdevons Ost-Grönlands*. HEINTZ, ANATOL, *Oberdevonische Fischreste aus Ost-Grönland*. 1930. Kr. 4,00.
" 31. FREBOLD, HANS, *Verbreitung und Ausbildung des Mesozoikums in Spitzbergen*. 1930. Kr. 17,00.
" 32. ABS, OTTO, *Über Epidemien von unspezifischen Katarrhen der Luftwege auf Svalbard*. 1930. Kr. 2,00.
" 33. KLÆR, JOHAN, *Ctenaspis, a new Genus of Cyathaspidian Fishes*. 1930. Kr. 1,00.
" 34. TOLMATCHEW, A., *Die Gattung Cerastium in der Flora von Spitzbergen*. 1930. Kr. 1,00.

Norges Svalbard- og Ishavs-undersøkelser, Bygdø Allé 34, Oslo.