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RECENT FINDS OF  
LYCODINAE IN GREENLAND WATERS

BY

AD. S. JENSEN

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WITH 2 PLATES

ON THE GREENLAND SPECIES OF THE  
GENERA ARTEDIELLUS, COTTUNCULUS,  
AND GYMNOCANTHUS (TELEOSTEI,  
SCLEROPAREI, COTTIDAE)

BY

AD. S. JENSEN

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WITH 1 PLATE

KØBENHAVN

C. A. REITZELS FORLAG

BIANCO LUNOS BOGTRYKKERI

1952



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One of the officials who made excellent contributions to the collections of the Zoological Museum of Copenhagen is JOHANNES HAGEMANN REINHARDT. He was of Norwegian descent, born in 1777 in Vaage Præstegaard (vicarage) in Rensdalen. After having studied in Denmark, Germany and France he was attached to the Kgl. Naturhistoriske Museum of Copenhagen in 1806, and in 1829 he was appointed inspector general of this museum. From 1809 he gave zoological lectures, and in 1814 he was appointed professor of zoology at the university; he held both positions until his death in 1845.

As a museum man Reinhardt worked energetically with augmentations of the collections. He communicated with officials in the tropical colonies which belonged to Denmark at that time (the West Indies and Guinea) and on the Faroes, Iceland and Greenland, arousing their interest so that they collected for the Museum.

Reinhardt was specially interested in the fauna of Greenland, and with great care and untiring energy he procured a rich material in the course of years on which he based his studies.

Reinhardt published very valuable contributions to the knowledge of the fauna of Greenland, notably birds and fishes, in "Det Kongelige Danske Videnskabernes Selskabs Skrifter" and in "Oversigt over Det Kongelige Danske Videnskabernes Selskabs Forhandlinger". He demonstrated a considerable number of species of fish of which many were new to science, and he established new genera, as e. g. *Triglops*, *Lycodes*, *Bythites* which are recognized by ichthyological authors today.

In my early years I was specially interested in *Lycodes*, and I published a detailed paper on it: "The North-European and Greenland *Lycodinæ*"<sup>1</sup>).

The first certain knowledge concerning the group of fishes here dealt with, dates from 1831 when J. Reinhardt established the genus *Lycodes*<sup>2</sup>). With regard to the systematic position of this new genus, the same author in 1838 expressed as his opinion that it was very closely allied to *Zoarces* on account of the slight development of the ventral fins, the

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<sup>1</sup>) The Danish Ingolf Expedition II, 4, 1904. With 10 plates, 1 chart and 33 figures in the text.

<sup>2</sup>) Oversigt over det Kongl. Danske Vidensk. Selsk. Forhandl., p. 20, 1830-1831.

lack of a swimbladder, the formation of the digestive organs, mode of fixation of the scales and the whole form of the body<sup>1</sup>).

Since I published my paper on the Greenland *Lycodinæ* in 1904 much material of the genus *Lycodes* from Greenland has come to the Museum, and it deserves publication. I shall therefore treat this material, one species after the other, taking them in the sequence indicated by the course of the lateral line (cf. my paper from 1904, p. 3—4).

### *Lycodes vahlii* Reinhardt.

*Lycodes Vahlii* Reinhardt, Overs. Kgl. D. Vidensk. Selsk. Forh. 1830—31, p. 74 (1831); *ibid.* 1834—35, p. 77 (1835); Kgl. D. Vidensk. Selsk. naturvidensk. og mathem. Afh., VII, 1838, p. 153, Tab. 5; Lütken, Vidensk. Meddel. Naturhist. Foren. Kbhvn., 1880, p. 311; Smitt, Skandinaviens Fisker, II, 1895, p. 613 (partim); (f. *gracilis*) *idem*, Bih. K. Sv. Vet.-Akad. Handl., Bd. 27, Afd. IV, No. 4, 1901, p. 22; Jensen, Vidensk. Meddel. Naturhist. Foren. Kbhvn., 1901, p. 202 & 212; *idem.*, The Danish Ingolf-Expedition, II, 4, 1904, p. 13, Tab. I, Fig. 2 a, b, c, Tab. II, Fig. 12, b, and Figs. 1—2 in the text; (v. *septentrionalis*) Knipowitsch, Mém. de l'Acad. Imp. des sci. de St.-Pétersbourg, Cl. phys.-mathém., XIX, No. 1, 1906, p. 95. — *Lycodes gracilis* M. Sars, Forh. Vidensk. Selsk. Chria. 1866, p. 40, Pl. I, Figs. 1—3; Tillægsh. til Forh. Vidensk. Selsk. Chria. 1874, p. 100 (1875); The Danish Ingolf-Exped., II, 1, 1898, p. 22; Collett, Vidensk. Selsk. Skr. Chria. 1899, No. 6, pls. 1—3. — *Lycodes rossii* Lilljeborg (non Malmgren). Sveriges och Norges Fisker, III, 1891, p. 785. — *Lycodes lugubris* Lütken, Vidensk. Medd. Naturhist. Foren., 1880, p. 315.

West Greenland. When I wrote my paper: "The North-European and Greenland *Lycodinæ*", (l. c. 1904) 14 specimens, from 143 to about 520 mm long, besides 3 skeletons from West Greenland were kept in the Copenhagen Zoological Museum; some of these 17 specimens were provided with dates of locality, running as follows:

Nanortalik, Fiskeræset, Godthaabsfjord, Sukkertoppen,  
Davisstrædet (66°35' N. 55°54' W., 88 fms., Ingolf St. 31).

Since then 62 specimens have been caught in West Greenland waters at the following localities:

Narssaq in Julianehaab northern district, about 200 fms., September 1914, Line, 1 specimen, 485 mm.

<sup>1</sup>) Slægten *Lycodes* og dens to grønlandske Arter, *L. Vahlii* og *L. reticulatus*. D. Kongl. Danske Vidensk. Selsk. Naturv. og Mathem. Afhandl. VII, 1838, p. 147, Tab. V and VI + *L. seminudus*, *ibid.* p. 223.

- Tunugdliarfik, from Mussartût across the fjord, 80—200 fms., 28.7.1909, Line, 3 specimens. Tjalfe St. 572.
- Tunugdliarfik, 100—200 fms., 24.7.1909, Line, 1 specimen, 392 mm. Tjalfe St. 552.
- Tunugdliarfik, 100—200 fms, 26.7.1909, Line, 1 specimen, 479 mm. Tjalfe St. 556.
- Tunugdliarfik, 125—200 fms., 31.7.1909, Line, 2 specimens, 410 mm and 480 mm. Tjalfe St. 565.
- Kvanefjord (S. of Frederikshaab) E. of Kvanø, 60—200 fms., 6.7.1909, Line, 8 specimens<sup>1</sup>). Tjalfe St. 511.
- Kvanefjord (S. of Frederikshaab), across the bay 2 miles W. of the capelin place, 100—150 fms., 5.—6.7.1909, Line, 4 specimens, 391 mm—415 mm. Tjalfe St. 507.
- Kvanefjord (S. of Frederikshaab) near the capelin place at the mouth of the arm of the fjord Ekaluit Imak, 30.6.1912, Line, 2 specimens, 398 mm and 448 mm.
- Godthaabsfjord near Qugssuk, between Marrûrsuk and Sermitsiôp iterdlâ, 150 fms., 15.6.1908, Line, 1 specimen, 375 mm. Tjalfe St. 55.
- Sukkertoppen, 1910, 1 specimen, 325 mm; 1919, 3 specimens, 368 mm—410 mm. Evighedsfjord, in the stomach of a shark, 1913<sup>2</sup>).
- 66°41' N. 56°17' W., about 150 fms., 31.5.1909, Trawl, 1 specimen, 110 mm. Tjalfe St. 396.
- 66°44' N. 56°16' W., about 150 fms., 20.5.1909, Trawl, 1 specimen, 269 mm. Tjalfe St. 371.
- 66°45' N. 56°23' W., about 175 fms., 20.5.1909, Trawl, 1 specimen, 109 mm. Tjalfe St. 370.
- 66°45' N. 56°30' W., about 200 fms., 20.5.1909, Trawl, 1 specimen, 250 mm. Tjalfe St. 369.
- 68°20' N. 54°03' W., 220—280 fms., 9.7.1908, Trawl, 1 specimen, 205 mm. Tjalfe St. 107.
- 68°28' N. 54°47' W., 245—184 fms., 18.8.1908, 4 specimens, 26 cm—37 cm. Tjalfe St. 199.
- 69°15' N. 53°18' W., 144—161 fms., 10.8.1908, Trawl, 8 specimens, 246 mm—417 mm. Tjalfe St. 182.
- 69°17' N. 52°14' W., 227—234 fms., 16.7.1908, Trawl, 2 specimens, 324, 327 mm. Tjalfe St. 122.
- Umanak Fjord (70°42' N. 54°48' W.), 253 fms., 7.8.1908, Trawl, 12 specimens, 172 mm—386 mm. Tjalfe St. 177.
- Umanak Fjord (70°49' N. 53°16' W.), 260 fms., 30.7.1908, Trawl, 2 specimens, 319 mm, 326 mm. Tjalfe St. 159.

<sup>1</sup>) Were thrown away without being measured.

<sup>2</sup>) With the fish sent down the following information was given: "Nearly all sharks caught in Evighedsfjord have their stomachs full of this kind of fish."

Umanak Fjord (70°52' N. 53°6' W.), 260 fms., 6.8.1908. Trawl, 1 specimen, 237 mm. Tjalfe St. 176<sup>1</sup>).

During the Tjalfe Expedition it was also found in the stomachs of Greenland Halibut (*Reinhardtius hippoglossoides*) taken in Agdluitsoq Fjord (the fjord near Sydprøven).

It will thus be seen that *Lycodes vahlii* is common in the waters round south-western Greenland, from Nanortalik (about 60° lat. N.) to Umanak Fjord (about 71° lat. N.) and also out in Davisstræde (66°35'—66°45' N. 55°54'—56°30' W.) at depths from (60) 88—260 (280) fms. It attains a considerable size, viz. about 520 mm.

In the following years (1925—1939) 38 specimens of *Lycodes vahlii* were caught in addition in West-Greenland waters, from Julianehaab to Umanak Fjord and out in Davisstræde. The localities are as follows:

- Off Julianehaab, 250 m, 1.9.1934, 1 specimen, 39 cm. Paul Hansen.  
63°36' N. 55°15' W., 1200 m, Trawl, clay and stones. Temperature 3°28 C.  
2 specimens, 42 cm and 48 cm. "Godthaab", 5.10.1928. S. 179. (Both specimens very dark, chocolate-coloured, bands completely disappeared, lateral line distinct, ventral).
- Grædefjord off Eqaluit, Long line, 13.6.1926, 1 specimen, 38 cm. The largest of these specimens is 480 mm.
- Off Sârdloq, about 250—500 m, 30.5.1935, Long line, Paul Hansen, 1 specimen, 35 cm.
- Sârdloq, Godthaabsfjord, about 300 m, Long line, Paul Hansen, 1 specimen, 46 cm.
- Ikertôq, Holsteinsborg, 180—190 fms., 20.9.1937, 2 specimens, 9.5 cm and 12 cm.
- Amerdloq near Holsteinsborg, 180—250 fms., 4 specimens, 18 cm, 19.5 cm, 25 cm, and 42 cm. Fishing master Martin Hansen, 15.6.—1.9.1936. Prawn trawl.
- Amerdloq, inner prawn area, 375—400 m, 18.8.—1.9.1938, Prawn trawl, 1 specimen, 14 cm.
- Amerdloq, 150—180 fms., Prawn trawl, 29.5.1939, 1 specimen, 10 cm.
- Amerdloq, 220—275 fms. and 130—150 fms., Prawn trawl, 21.8.—3.9.1939, Martin Hansen, 1 specimen, 10 cm.
- 68°08' N. 57°30' W., 398 m, 19 specimens, 9 cm—37 cm, "Dana", 26.6.1925, St. 2361. Bottom temperature 2°47 C.

<sup>1</sup>) The specimens from the six last mentioned localities, which are the most northerly records in West Greenland waters, are so conspicuous by their very dark colour as to suggest a specific difference from *L. vahlii*. A closer examination however did not reveal any essential difference in shape, pattern or number of rays, nor could the structure of skeleton give any basis for segregating *L. vahlii*.

68°17' N. 58°14' W., 410 m, Sigsbee trawl, 1 specimen, 34 cm. Bottom temperature 2°56 C. "Godthaab", 12.9.1928. St. 160.

69°30' N. 56°32' W., 202 m, Trawl. "Dana" 27.6.1925. Bottom temperature 0°98 C, 2 specimens, 156 and 190 mm. St. 2363.

69°44' N. 51°22' W., 540 m, Trawl (Sigsbee), grey clay. Bottom temperature 0°67 C, 1 specimen, 32 cm. "Godthaab", 7.9.1928. St. 154.

East Greenland. From Angmagssalik originates a desiccated, defective specimen, about 275 mm long, sent down by Søren Nielsen, the settlement manager in 1905.

Distribution. Besides in the waters off south-west and south-east Greenland *L. vahlii* occurs in Iceland waters, in eastern Kattegat, in the Skagerrak, along the whole Norwegian coast with fjords as Oslo- and Trondhjemsfjord and on the Murman coast. *Lycodes vahlii* is thus a warmwater form, since it lives at temperatures above 0° C. Its bathymetric distribution is about 30—300 fms.

Remarks. In a small paper: "Ichthyologische Studier" (Ichthyological studies) I have directed the attention to a remarkable line of variation in *Lycodes vahlii*, since this species attains its maximum size in Greenland waters, but is smaller round Iceland and still smaller in Scandinavia, and parallel with this decrease in size there is a decline in the number of fin rays and vertebrae; and I have advanced the view that the variation is ascribable to the different nature conditions<sup>1)</sup> prevailing in these seas. Hitherto three species had been distinguished, viz. the Greenland *L. vahlii* Reinhardt, the Iceland *L. lugubris* Lütken, and the Scandinavian *L. gracilis* M. Sars, but I could only consider them local varieties of the same species<sup>2)</sup>. This view was later adopted by R. COLLETT and N. KNIPOWITSCH.

In an appendix to my paper on *Lycodes* in 1904 (l. c. p. 21) it is stated that later on I got the opportunity to examine a specimen of *L. vahlii* from East Finmark which was considerably larger than specimens known from west and south Norway; this specimen from half-arctic northernmost Norway approached the variety occurring in Iceland waters (*lugubris*) also in the number of rays. Later Prof. KNIPOWITSCH got at his disposal a large number (65) of *L. vahlii* from these northern districts of Europe (East Finmark and the Murman coast up to 75°18' N. and 33°10' E.), and by these specimens he was able to confirm my view on this form and greatly add to the knowledge of it<sup>3)</sup>. He calls it var. *septentrionalis*.

1) Vidensk. Meddel. Naturhist. Foren. in Copenhagen, 1901, pp. 202–204.

2) The evidence of this is given in my paper: The North-European and Greenland Lycodinae, 1904, pp. 13–18.

3) Cf. N. KNIPOWITSCH, l. c., pp. 95–107.

The following summary in tabular form may give an idea of the line of variation in *Lycodes vahlii*.

	Greenland <i>L. vahlii</i> <i>f. typica</i>	Iceland <i>L. vahlii</i> <i>v. lugubris</i>	Murman coast and East Finmark <i>L. vahlii</i> <i>v. septentrio-</i> <i>nalis</i>	Scandinavia from Trond- hjemsfjord to the Kattegat <i>L. vahlii</i> <i>v. gracilis</i>
Maximum size in mm....	520	355	336	196
Rays of pectoral fins ....	20—19	19—18 (17)	(20) 19—18	17—18 (19)
Rays of dorsal fins .....	117—113	105—103	106—100	97—95
Rays of anal fin.....	99—90	90	91—84	86—84
Number of vertebrae .....	119—112	105	?	101—98

#### *Lycodes esmarkii* Collett.

*Lycodes Vahlii* Esmark (non Reinhardt), Forh. Skand. Naturf. 10. Møde i Chria. 1868, p. 524 (1869); Collett, Forhandl. Vidensk. Selsk. Chria. 1879, No. 1, p. 62 (partim); Smitt, Skandinavien's Fiskar, II, 1895, p. 613 (partim), Fig. 149. Lönnberg, Bihang K. Sv. Vetensk.-Akad. Handl., Bd. 24, Afd. IV, No. 9, 1899, p. 23. — *Lycodes esmarkii* Collett, Tillægsh. til Forhandl. Vidensk. Selsk. Chria. 1874, p. 95 (1875); idem. The Norw. North-Atlantic Exped., Fishes, 1880, p. 84 (partim), Pl. 3, fig. 22; Lilljeborg, Sveriges och Norges Fiskar, II, 1891, p. 6 (partim); Jensen, Vidensk. Meddel. Naturhist. Foren. Kbhvn., 1901, p. 213; idem, The Danish Ingolf Expedition, II, 4, 1904, p. 27, Tab. III, fig. 2 a, b, c; Knipowitsch, Mém. Acad. Imp. Sci. St. Pétersbourg, Cl. phys.-math., XIX, 1, 1906, p. 85, fig. 15.

West Greenland. Three small specimens (102, 103 and 106 mm long) were taken by the Tjalfe-Expedition in 66°41' lat. N. 56°17' long. W., 150 fms., on May 31st 1909. St. 396. Trawl.

These specimens show the pattern characteristic of the young of this species: on body and tail light  $\lambda$ -shaped cross bands; in addition the usual light stripe across the nape (in one specimen interrupted in the middle). Body and tail are already covered with scales.

Later on, during the cruise of the "Dana" in 1925, I caught in a trawl three adult specimens (27, 35 and 41 cm long) in 66°37' N. 56°37' W., i. e. not very far from the place in Davisstrædet where the said young individuals were taken; the depth was 460 m, the bottom temperature 3°12 C. The locality was situated west of Store Hellefiskebanke 4—5

miles from the west ice. These specimens have the pattern characteristic of the adults, as shown in my paper on Lycodinæ from 1904, Pl. III, fig. 2 b and 2 c, and finally form festoon-shaped markings (fig. 2 c).

**Distribution.** This species was taken off Finmarken, north of Finmarken, between Norway and Beeren Eiland, west of South Norway, between Scotland and the Faroes, east of the Faroes, between the Faroes and Iceland, east of Iceland, off eastern and northern Iceland<sup>1)</sup>, on the east coast of North America (from Cape Cod to Nova Scotia) and also in Davisstrædet. Its bathymetric distribution is about 100—620 fms., and it is a warm-water fish, which only exceptionally occurs at temperatures below 0°.

### *Lycodes eudipleurostictus* Jensen.

*Lycodes Vahlîi* Collett (partim), Forh. Vidensk. Selsk. Chria., 1878, No. 4, p. 11, 1878, No. 14, p. 54 and 1879, No. 1, p. 62; Smitt (partim), Skandinaviens Fiskar, II, 1895, p. 613; (forma *pallida*) Smitt (partim) Bih. K. Sv. Vet.-Akad. Handl., Bd. 27, IV, No. 4, p. 24; (*typica*) Smitt (partim) *ibid.* p. 26. — *Lycodes esmarkii* Collett (partim), The Norw. North-Atlantic Exped., Fishes, 1880, p. 84, Pl. 2, figs. 19—21; Lilljeborg (partim), Sveriges och Norges Fiskar, II, 1891, p. 6; Lütken, The Danish Ingolf Exped., II, 1, 1898, p. 21; Knipowitsch, Ann. Mus. zool. Acad. Imp. St. Pétersbourg, T. VI, 1901, p. 21. — *Lycodes eudipleurostictus* Jensen, Vidensk. Meddel. Naturhist. Foren. Kbhvn., 1901, p. 206; *idem*, Meddel. om Grønland, XXIX, 1904, p. 257; The Danish Ingolf-Exped., II, 1, 1904, p. 33, Tab. III, fig. 1 a, b; Knipowitsch, Mém. Acad. Imp. Sci. de St. Pétersbourg, Cl. phys.-math. XIX, No. 1, 1906, p. 76.

**West Greenland.** As early as in 1834 a specimen of this species, measuring about 275 mm was sent down from Umanak; it is mentioned by REINHARDT among the seven *Lycodes* which he had before him when preparing his detailed paper on *Lycodes vahlîi*<sup>2)</sup>; however, the state of preservation of this specimen is not good, and it looks as if Reinhardt when preparing his description did not make much use of it. Not until 1901 was the mistake corrected by the present author (*l. c.*)<sup>3)</sup>, and the specimen was referred to the new species: *L. eudipleurostictus*.

<sup>1)</sup> According to B. SÆMUNDSSON, in Skýrsla um hid íslenzka náttúrufræðisfélag, félagsárin 1911 and 1912 (Reykjavik 1913), p. 28.

<sup>2)</sup> K. D. Vidensk. Selsk. naturv. og mathem. Afh., VII, 1838, p. 165.

<sup>3)</sup> Cf. also the author's paper from 1904, p. 36.

Later on the species was found again in West Greenland waters by the "Tjalfe"-Expedition which took it in the following places:

Tunugdliarfik in Julianehaab northern district, 100—200 fms., 26.7.1908, Line. St. 556, 3 specimens, 303, 354, 369 mm.

Kangerdluarssuk in Julianehaab northern district, 100—250 fms., 22.7.1909. St. 550, 1 specimen, 372 mm.

68°20' N. 54°03' W., 220—280 fms., 9.7.1908, Trawl. St. 107, 5 specimens<sup>1)</sup>, 147, 151, 153, 240, 245 mm.

68°28' N. 54°47' W., 245—184 fms., 18.8.1908, Trawl. St. 199, 1 spec., 73 mm.

69°46' N. 51°35' W., about 200 fms., 23.7.1908, Trawl. St. 146, 1 spec., 265 mm.

Umanak Fjord (70°49' N. 53°16' W.), 260 fms., 30.7.1908, Trawl. St. 159, 2 specimens, 303, 317 mm.

Umanak Fjord (70°52' N. 53°6' W.), 260 fms., 6.8.1908, Trawl. St. 176, 2 spec., 308, 323 mm.

As will be seen the species is common in Umanak Fjord and in Disko Bugt; to the south it has only been taken in the inner ramifications (Kangerdluarssuk and Tunugdliarfik) of the extensive Bredefjord in the northern district of Julianehaab. It has been taken at depths of (100) 200—260 (280) fms.

Later on *Lycodes eudipleurostictus* in the years 1925—1939 was taken in many places from Godthaabsfjord right up to Smith Sund in 78°14' N. These localities are the following:

Off Nûgârssuk, Godthaabsfjord, long-line, about 500 m, 1 spec., 32½ cm, 3.6.1935. Dr. Paul Hansen.

Off Sârdloq, Godthaabsfjord, long-line, about 300—500 m, 1 spec., 31 cm, 8.6.1936. Dr. Paul Hansen.

Off Sârdloq, about 250—500 m, long-line, 1 spec., 34.5 cm, 30.5.1935. Dr. Paul Hansen.

Amerdloq near Holsteinsborg, 180—250 fms., 2 spec., 17 cm and 23 cm.

Fishing master Martin Hansen, 15.6.1936, Prawn trawl.

Amerdloq, 180—225 fms., 15.7.—20.8.1937, 1 spec., 145 mm.

Amerdloq, 200 fms., 1938, 1 spec., 90 mm.

Amerdloq, 375—400 m, 18.8.—1.9.1938, Prawn trawl, 1 spec., 140 mm.

Amerdloq, 250—375 m, 1.—5. sept. 1939. Prawn trawl. Martin Hansen, 1 spec., 115 mm.

Ikertôq, Holsteinsborg, about 180 fms., 1 spec., 19½ cm. Fishing master Hansen, 13.8.1935, Prawn trawl.

<sup>1)</sup> In one of these specimens a shell came out of the anus by a pressure; this shell was a *Cylichna* shell which gastropod the fish consequently must have swallowed.

- 68°08' N. 57°30' W., 398 m, 5 spec., 9—20½ cm. The "Dana", 26.6. 1925, St. 2361. Bottom temperature 2°47 C.
- 70°51' N. 52°01' W., 733 m, Trawl, 15 spec., 7—31 cm. Bottom temp. 1°13 C. The "Godthaab", 4.9.1928. St. 144.
- 70°53' N. 54°03' W., 685 m, Trawl, 13 spec., 12—28 cm. Bottom temp. 1°06 C. The "Godthaab", 3.9.1928. St. 143.
- 73°12' N. 58°08' W., 850 m, Sigsbeetrawl, 1 spec., 22.5 cm. Bottom temp. 0°47 C. The "Godthaab", 28.7.1928. St. 64.
- 74°12' N. 77°00' W., 680 m, 3 spec., Sigsbeetrawl, 680 m, 3 spec., 14, 18, and 19 cm, 22.8.1938. The "Godthaab", St. 131. Bottom temp. —0°38 C.
- 75°26' N. 62°26' W., 820 m, Trawl, 1 spec., 28 cm. Bottom temp. 0°69 C. The "Godthaab", 31.7.1928. St. 77.
- 75°35' N. 65°41' W., 490 m, 113 spec. (6—32 cm). The "Godthaab", 1.8.1928, St. 81. Bottom temp. 0°73 C.
- 75°54' N. 81°01' W., 610 m, Trawl, 1 spec., 35 cm. Bottom temp. —05°C. The "Godthaab", 17.8.1928. St. 119, Jones Sound.
- 77°05'5 N. 71°13' W., 790 m, trawl, 155 spec., 7.5—44.5 cm. Temp. —0°43 C. The "Godthaab", 4.8.1928. St. 87.
- 77°28'5 N. 68°46' W., 875 m, Trawl, 3 spec., 26—31.5 cm. Bottom temp. —0°42 C. The "Godthaab", 6.8.1928. St. 94.

78°14' N. 74°10' W., 672 m, 17 spec., 10—35 cm. The "Godthaab", 8.8.1928, St. 99, Smith Sund.

Several specimens were filled with ripe eggs. A female measuring 35 cm had some eggs protruding from the genital opening which was circularly expanded, being 10 mm in diameter. The ovary was 90 mm long, 50 mm high, the abdomen of the fish was strongly dilated, its height to the lower edge of the dorsal fin was 65 mm. The number of eggs still present in the ovary was 260, their diameter was 8 mm. The number of the light bands varies from 9 to 13, most of them have in addition a light band across the nape. Besides the large ripe eggs there were in the ovary numerous small undeveloped eggs for the next spawning period, which were only 1 mm in diameter.

East Greenland. The NATHORST-Expedition in 1899 took 2 specimens in Kejser Franz Josephs Fjord at a depth of 400 fms., and the KOLTHOFF Expedition in 1900 secured 2 specimens likewise in Kejser Franz Josephs Fjord at a depth of 105—158 fms. The length is 68—320 mm.

General distribution. *Lycodes eudipleurostictus* is a cold water form since it thrives at a temperature ruling about 0° (+ 2°25 — —1°C.).

It has been taken in several localities in the "cold area" of the Norwegian Sea (W. of Norway, NE. of the Shetland Islands, NW. of the Faroes, E. of Iceland, between Iceland and Greenland), besides in the northern East-Greenland waters, off West Greenland from Julianehaab District right up to Smith Sund. To the north it extends to Spitsbergen, to the east to the Barents Sea. Its bathymetric distribution is 100—470 fms.

### ***Lycodes pallidus* Collett.**

*Lycodes pallidus* Collett, Forh. Vidensk. Selsk. Chria, 1878, No. 14, p. 70; idem, The Norwegian North Atlantic Expedition, Fishes, 1880, p. 110, Pl. III, Fig. 26—27; Lütken, Dijnphna-Togtets zoologisk-bot. Udbytte, 1886, p. 134, Tab. XVII, Fig. 1—3; Lütken, The Danish Ingolf-Expedition, II, 1, 1901, p. 22 (partim); Knipowitsch, Ann. Mus. Zool. Acad. Imp. Sci. St. Pétersbourg, VI, 1901, p. 23; Jensen, Meddel. om Grønland, XXIX, 1904, p. 256; The Danish Ingolf Expedition, II, 4, 1904, p. 38, Tab. IV, Fig. 1 a, b, c, d, e (*typica*); Tab. IV, Fig. 2 a, b (var. *squamiventer*); Tab. V, Fig. 2 a, b, c, d, & Tab. VI, Fig. 3 a, b, c, d (var. *similis*); Knipowitsch, Mém. Acad. Imp. Sci. St. Pétersbourg, Cl. phys.-math., XIX, No. 1, 1906, p. 54. — *Lycodes VahlII* f. *pallida* Smitt, Bih. K. Sv. Vet.-Akad. Handl., Vol. 27, Afd. IV, No. 4, 1901, p. 24, (partim) No. 12 & 14—26; f. *typica* idem, ibid. p. 26 (partim), No. 30—39. — *Lycodes reticulatus* f. *frigida* Smitt, Bih. K. Sv. Vet.-Akad. Handl., Vol. 27, Afd. IV, No. 4, 1901, p. 29 (partim). No. 2—9.

East Greenland. The NATHORST-Expedition in 1899 took this species in Kejser Franz Josephs Fjord at a depth of 400 fathoms (4 specimens) and in 73°20' lat. N. 21°20' long. W., at a depth of 37 fathoms (1 specimen). Furthermore, the KOLTHOFF-Expedition in 1900 caught it in Mackenzie Bugt (north of Kejser Franz Josephs Fjord), where the depth was 6—18 fathoms (35 specimens), off Mackenzie Bugt, depth 53 fathoms (3 specimens), at the head of Moskusoksefjord (Kejser Franz Josephs Fjord), depth 53 fathoms (2 specimens), in the outer part of Moskusoksefjord, depth 105 fathoms (1 specimen), at the mouth of Kejser Franz Josephs Fjord, depth 105—158 fathoms (4 specimens), off Kejser Franz Josephs Fjord (between Bontekoe Ø and Mackenzie Bugt), depth 132 fathoms (2 specimens), and south-east of Hvalros Ø, depth 42—53 fathoms (1 specimen).

In 1899 and 1900 Swedish expeditions in the waters of north-eastern Greenland caught no less than 53 specimens<sup>1)</sup> measuring 40—178 mm. Depths range between 6—18 and 400 fathoms.

<sup>1)</sup> Further discussed in my paper in The Danish Ingolf Expedition, II, 4, 1904, p. 44.

In north-eastern Greenland, viz. in Kejser Franz Josephs Fjord, south-west of Kap Franklin, also a Danish Expedition has taken *Lycodes pallidus*; a young specimen measuring 113 mm was caught on 13.8.1932 with Sigsbeetrawl, at a depth of 320 m, where the bottom consisted of clay and stones. The Godthaab Expedition, St. 96. — The same Expedition also caught, with Sigsbeetrawl, a small specimen (87 mm) between Kap Weber and Ymer Ø. Depth 400 m, clay with many stones, 13.8.1932. The Godthaab Expedition, St. 97.

Distribution. *Lycodes pallidus* is a pronounced arctic species which lives at temperatures ruling about 0° (1°1— —2° C.). Besides in the waters of northern East Greenland it occurs south of Jan Mayen, north and north-east of Iceland, north of the Faroes, west of southern Norway, off Spitsbergen and Franz Josephs Land, in the European Arctic Sea and in the Kara Sea. Its vertical distribution ranges from 6—18 to 957 fathoms; in southern latitudes it is only met with at great depths (300 fms. and more), but in high-arctic seas it extends right to the sublittoral zone.

#### ***Lycodes reticulatus* Reinhardt.**

*Lycodes reticulatus* Reinhardt, Overs. Kgl. D. Vidensk. Selsk. Forhandl. 1834—35, p. 77; idem, Kgl. D. Vidensk. Selsk. naturvid. og mathem. Afh., VII, 1838, p. 167, tab. 6; Lütken (partim), Vidensk. Meddel. Naturhist. Foren. Kbhvn., 1880, p. 318; F. A. Smitt (partim), Skandinaviens Fisker, II, 1895, p. 611; Vanhöffen, Grönland-Expedition der Gesellschaft für Erdkunde zu Berlin, II, 1, 1897, p. 101; Jensen, The Danish Ingolf-Expedition, II, 4, 1904, p. 61, Tab. II, fig. 2 & figs. 9—10 in the text.

West Greenland. At great intervals (1833—1939) specimens have appeared along the west coast of Greenland on stretches from Julianehaab (about 60° lat. N.) right up to Smith Sund (78°15' lat. N.). The localities noted are as follows:

Julianehaab, 3 specimens, 225, 286, and 345 mm long, sent down in the years 1840 and 1841.

Sermilik within Bredefjord (the northern district of Julianehaab), 30—240 fms, 1 specimen, 342 mm long, taken on line on 3. Aug. 1909. The "Tjalfe", St. 571.

Fiskenæsset, 1 specimen, 270 mm, sent down in 1833.

Godthaab, 1 specimen, 370 mm, sent down in 1842.

66°22' N. 76°16' W., 686 m, 1 specimen, 46.8 cm. The "Tjalfe", 19.5.1909, St. 366, long-line.

- Amerdloq, Holsteinsborg, 160 fms., Prawn trawl, 1 specimen, 140 mm, 17.9.1935. Martin Hansen.
- Amerdloq, Holsteinsborg, 180—200 fms., 2 specimens, 122—130 mm, 3.—25.8.1937.
- Amerdloq, Holsteinsborg, 250—275 m, Prawn trawl, 1 specimen, 11 cm, 1.—9. Sept. 1939. Martin Hansen.
- 69°30' N. 56°32' W., 202 m, 19 specimens, 7.3—24 cm. The "Dana", 27. June 1925, St. 2363. Bottom temperature 0°98 C.
- 71°21' N. 54°27' W., 47 m, 4 specimens, 6.5—10 cm. The "Godthaab", 3. Sept. 1928, St. 139.
- Umanak, 1 specimen, 380 m, sent down in 1834.
- Qarajaqs Isfjord, the innermost part of Umanak Fjord, 1 specimen, 255 mm, taken in a trap at a depth of 100 fathoms, 27. March 1893 (Vanhöffen).
- Upernavik, 1 specimen, 51 cm. Drosvad, 1928. (This specimen has swallowed a hook, an attached piece of thick string sticks out of its gape).
- 73°30' N. 59°36' W., 225 m, 3 specimens, 22.5, 24.5, and 26.5 mm. The "Godthaab", 28. July 1928, St. 65. Bottom temp. — 0°12 C.
- 76°35' N. 68°16' W., 150 m, 1 specimen 29 cm. The "Godthaab", 3. Aug. 1928, St. 85. Bottom temp. — 1°35, Trawl. Mouth of Wolstenholme Fjord.
- 77°17' N. 69°59' W., 930 m, 14 specimens, 6—24 cm. The "Godthaab", 5. Aug. 1928, St. 90. Bottom temp. — 0°42 C. Trawl.
- 77°28'5 N. 68°46' W, 875 m, 1 specimen, 31 cm. The "Godthaab", 6. Aug. 1928, St. 94. Bottom temp. — 0°42 C, Trawl.
- 78°14' N. 74°10' W., 672 m, 3 specimens, 10, 10, and 18 cm. The "Godthaab", 8. Aug. 1928, St. 99, Trawl.
- 78°15'5 N. 73°29' W., 290 m, 2 specimens, 9 and 12 cm. The "Godthaab", 8. Aug. 1928, St. 97. Bottom temp. — 1.05° C, Dredge.

Provided that the form described by Krøyer as "*Lycodes perspicillum*" is the young stage of *L. reticulatus* Reinh.—which must be considered highly probable<sup>1)</sup>—the following specimens of *L. reticulatus* have further been taken in West Greenland waters:

West Greenland, 90 fms., 1 spec., 65 mm, sent down in 1844. Original specimen of *L. perspicillum* Krøyer.

West Greenland, 30 fms., 1 spec., about 40 mm, sent down in 1844. Original specimen of *L. perspicillum* Krøyer.

<sup>1)</sup> Cf. my paper: The North-European and Greenland Lycodinæ, pp. 64–66 in The Danish Ingolf-Expedition, II, 4, 1904.

65°34' N<sup>1)</sup> 54°31' W., 68 fms., 1 spec., 43 mm, 29 July 1895. The "Ingolf", St. 29. Bottom temp. 0°2 C.<sup>2)</sup>

Murchison Sund (Smith Sund), 45 fms., 1 spec., 43 mm, 29 July 1894<sup>3)</sup>.

Distribution. *Lycodes reticulatus* Reinh. according to American records occurs in the northern part of the east coast of the U.S.A., 17—140 fms.<sup>4)</sup>

### *Lycodes reticulatus* Reinhardt

var. *macrocephalus* Jensen.

*Lycodes reticulatus* Steindachner, Die Österr. Polarst. Jan Mayen (Internat. Polarforsch. 1882—83), 3. Bd., 1886, p. 107; (forma *reticulata*) Smitt, Bih. K. Sv. Vet.-Akad. Handl., Bd. 27, Afd. IV, No. 4, p. 33 (partim), No. 26 & 28—36, Figs. 4—5; (forma *seminuda*) Smitt, ibid., p. 31 (partim), No. 13. — *Lycodes reticulatus* Reinhardt, var. *macrocephalus* Jensen, The Danish Ingolf-Expedition, II, 4, 1904, p. 66, Tab. VIII, Fig. 1 a, b, c, d, e, f; idem, Medd. om Grønland, XXIX, 1904, p. 258, Pl. XIII, Fig. 2 a, b; Knipowitsch, Mém. Acad. Imp. sci. St. Pétersbourg, Cl. phys.-math., XIX, No 1, 1906, p. 43, Pl. Fig. 8; Johansen, Medd. om Grønland, 45, 1912, p. 663, Pl. 45, Fig. 4.

East Greenland. The NATHORST-Expedition in 1899 took a single specimen in Kejser Franz Josephs Fjord at a depth of 53—58 fathoms. The KOLTHOFF Expedition in 1900 took six specimens in 72°25' N. 17°56' W., where the depth was 158 fms., three specimens in 73°55' N. 19°20' W., at a depth of 79 fms., and one specimen in 75°35' N. 18°15' W. (south of Pendulum Øer), at a depth of 79 fms. These eleven specimens measure from 61 to 245 mm. Finally, the DANMARK Expedition took one specimen in Stormbugt (about 77° lat. N.) at a depth of 11—21 fms. (9 Sept. 1907), and three specimens in the same place at a depth of 5—11 fms. (20 Aug. 1907); they were young ones, the first specimen taken measured 75 mm, the others 38 mm, 45 mm and 46 mm.

<sup>1)</sup> By a misprint in my above cited paper given as 63°34' lat. N.

<sup>2)</sup> LÜTKEN mentions (Dijmphna-Togtets zoologisk-botaniske Udbytte, 1886, pp. 137—138, Tab. XVII, Fig. 6) another specimen of *L. perspicillum* of 69 mm (from Disko Bugt), but it actually is a young specimen of *L. seminudus*. In the same work (p. 136) LÜTKEN mentions and figures (tab. XVII, figs. 4—5) two probably young specimens of *Lycodes reticulatus* from the Kara Sea; they however belong to *L. rossi* Malmgren.

<sup>3)</sup> This specimen was collected by Dr. A. OHLIN who joined "The Peary Auxiliary Expedition" as a zoologist. It is kept in Riks-Museum in Stockholm, and I had previously the opportunity to examine it and could ascertain that it belongs to "*Lycodes perspicillum*".

<sup>4)</sup> GOODE & BEAN: Oceanic Ichthyology, 1895, p. 305.

The variety *macrocephalus* is a high-arctic fish, which besides in East Greenland waters occurs off Jan Mayen, Spitsbergen and in the Barents Sea; it lives at temperatures below zero or slightly above zero and at moderate depths (11—200 fms.).

### *Lycodes seminudus* Reinhardt.

*Lycodes seminudus* Reinhardt, Kgl. D. Vidensk. naturvid. og mathem. Afh., VII, 1838, p. 223; Collett, Forh. Vidensk. Selsk. Chria., 1878, No. 14, p. 67; Lütken, Vidensk. Medd. Naturh. Foren. Kbhvn., 1880, p. 325 and p. 318 (partim); Collett, The Norw. North-Atlantic Expedition, Fishes, 1880, p. 113, pl. 4, fig. 28; Vanhöffen, Grönland-Expedition der Gesellsch. f. Erdkunde zu Berlin, II, 1, 1897, p. 100; Jensen, Meddel. om Grönland, XXIX, 1904, p. 260; Jensen, The Danish Ingolf-Expedition, II, 4, 1904, p. 71, Tab. 9, fig. 1 a, b, c, d, e, Tab. 10, fig. 1 a, b, and figs. 11—14 in text; Knipowitsch, Mém. de l'Acad. Imp. des Sciences de St. Pétersbourg, Cl. phys.-math., XIX, No. 1, 1906, p. 20. — *Lycodes reticulata* ? jun. Lütken (partim), Dijnphna-Togtets zoologisk-botaniske Udbytte, 1886, p. 137, Tab. XVII, fig. 6. — *Lycodes reticulatus* Smitt, Skandinaviens Fiskar, II, 1895, p. 611 (partim); (forma *seminuda*) Smitt, Bih. K. Sv. Vet.-Akad. Handl., Vol. 27, Afd. 4, No. 4, 1901, p. 31 (partim). — *Lycodes Lütkenii* Lütken, The Danish Ingolf-Expedition, II, 1, 1898, p. 22 (partim).

West Greenland. The first known specimen from here is that on which REINHARDT described the species in 1838; it is from Umanak and measures 445 mm. A specimen received from Godthaab in 1842 is 365 mm long. In 1893 Dr. VANHÖFFEN took a specimen of 335 mm at a depth of about 105 fms. in Qarajaqs Isfjord at the head of Umanak Fjord. A specimen measuring 180 mm was sent to the Zoological Museum of Copenhagen in 1901, and in 1902, 1907, and in 1909 settlement manager KRAUL sent 16 specimens from Upernavik, measuring 393—517 mm. A very young specimen which was only 69 mm long was taken in Disko Bugt at a depth of 200 fathoms, during the cruise of "Fylla" in 1884<sup>1)</sup>.

During the Tjalfe-Expedition it was taken in the following places

<sup>1)</sup> It is this specimen which LÜTKEN in 1886 (l. c.) referred to KRØYER'S "*Lycodes perspicillum*", which again, although with some doubt, is supposed to be a young stage of *L. reticulatus* Reinh.. That the specimen from Disko Bugt is a young of *L. seminudus* is however evident from LÜTKEN'S description and the accompanying figure (the specimen itself has been lost): it had 9 dark and darkely framed saddle-shaped spots from the nape to the tip of the tail interrupted by light transverse bands; there was also a light band across the nape; there were vestiges of scales on the tail, but the scale covering did not reach right to the vent; the lateral line was medio-lateral.

(the first locality is situated in Godthaabsfjord, the following nine in Disko Bugt, the four last in Umanak Fjord):

- St. 57. Off Qôrnoq in Godthaabsfjord, 90—250 fms., 16.6.1908, Line, 1 specimen, 410 mm.
- St. 128. 69°07' N. 51°28' W., about 150 fms., 17.7.1908, Trawl, 1 specimen, 145 mm.
- St. 136. North-western part of Jakobshavn iceberg-bank, 141 fms., 20.7.1908, Trawl, 10 specimens, 220—400 mm<sup>1)</sup>.
- St. 182. 69°15' N. 53°18' W., 144—161 fms., 10.8.1908, Trawl, 50 specimens, 59—395 mm.
- St. 118. 69°17' N. 52°50' W., about 225 fms., 15.7.1908, Trawl, 5 specimens, 245—351 mm.
- St. 122. 69°17' N. 52°14' W., 227—234 fms., 16.7.1908, Trawl, 8 specimens, 258—390 mm.
- St. 120. Off the southeast coast of Disko, between Marrait and Sinigfik, 1½ miles from the coast, 125—190 fms., 16.7.1908, Trawl, 9 specimens, 277—372 mm<sup>2)</sup>.
- St. 142. 69°33' N. 51°11' W., 143 fms., 22.7.1908, Trawl, 1 specimen, medium-sized (tip of tail missing).
- St. 145. 69°41' N. 51°30' W., 174—227 fms., 22.7.1908, Trawl, 1 specimen, 454 mm.
- St. 146. 69°46' N. 51°35' W., about 200 fms., 23.7.1908, Trawl, 1 specimen, 320 mm (had crustaceans (*Pandalus*) in its stomach).
- St. 166. A little south of the settlement Umanak, 100—380 fms, Line, 3.8.1908, 1 specimen, 490 mm.
- St. 177. 70°42' N. 54°48' W., 253 fms., Trawl, 7.8.1908, 2 specimens, 41 mm and 45 mm.
- St. 159. 70°49' N. 53°16' W., 260 fms., Trawl, 30.7.1908, 1 specimen, 280 mm.
- St. 176. 70°52' N. 53°6' W., 260 fms., Trawl, 6.8.1908, 23 specimens, 183 mm—396 mm.

Thus *Lycodes seminudus* is common at Upernavik, in Umanak Fjord and in Disko Bugt; besides it occurs in Godthaabsfjord. Its bathymetric distribution is about 140—260 fathoms.

The colour pattern is varying: some specimens are of uniform colour, others show traces of light transverse bands, but by far the greater part of them have conspicuous light transverse bands on the

1) The specimens from this station had crustaceans and remains of (indeterminable) fishes in their stomachs.

2) A 315 mm long specimen from this station was a dilated female, ready to spawn; it contained 300 eggs which had the considerable size of 8—8.2 mm in diameter.

dorsal fin and on the uppermost portion of the sides, and often a light band across the nape. In young specimens the colour should rather be called light, with dark, saddle-shaped transverse bands across the dorsal fin and the back, between which the light ground colour is seen as light bands; the dark bands have again a lighter portion in the middle. The smallest of the present specimens (44, 45, and 59 mm) are still naked, but the specimen measuring 72 mm has a small group of scales in the middle of the tail (the same was the case of the 69 mm long specimen mentioned p. 2, note 1), and in the 74 mm long specimen the scales reach from the middle of the tail to a little in front of the vent. In the other specimens the extension of the scale covering is somewhat varying; it reaches from the tip of the tail forwards, stopping wedge-like at a point situated a good distance behind the vertical line through the vent or farther anteriorly, until, in some specimens, it attains its greatest extension to nearly at the posterior margin of the backward curved pectorals. The greater or smaller extension of the scale covering on the sides of the body is individual, and does not depend on the size of the fish, since in some of the largest specimens it stops comparatively far backward, and reversely.

The species attains a considerable size, viz. 517 mm. The eggs may measure 8—8.2 mm in diameter, which measurements were found in ripe females from the "Tjalfe", St. 120. In the stomachs of some specimens crustaceans (*Pandalus*) and remains of indeterminable fishes were found.

In the years 1928—1936 no less than 105 specimens of *Lycodes seminudus* were sent to the Zoological Museum of Copenhagen, of which a number derives from the same areas as those enumerated in the above list (Godthaabsfjord, Disko Bugt, and Umanak Fjord), whereas the new specimens shift the occurrence of the species farther north, right to Hvalsund in 77°28' N. lat.

The localities of the specimens caught in 1928—1936 are the following:

Off Sârdloq, about 250—500 m, long line, 1 specimen, 29 cm, 30.5.1935.

Dr. Paul Hansen.

Sârdloq, Godthaabsfjord, about 300 m, long line, 11.6.1936. Paul Hansen, 44 cm, 1 specimen.

69°44' N. 51°22' W., 540 m, grey clay, Sigsbee trawl off Ritenbenk. 1 specimen, 20 cm. Bottom temp. 0°67 C. "Godthaab", 7.9.1928, St. 154.

70°51' N. 52°01' W., 733 m, Trawl, 9 specimens, 7.5—24 cm. Bottom temp. 1°13 C. "Godthaab", 4.9.1928, St. 144.

Umanak Fjord, near Ikerasak, on long line, about 300 m, 22.7.1936. Paul Hansen, 42 cm.

70°53' N. 54°03' W., 685 m, Trawl, 10 specimens, 8—27 cm. Bottom temp. 1°06 C. "Godthaab", 3.9.1928, St. 143.

Vicinity of Upernavik, 1 specimen, 41 cm. "Godthaab", Summer of 1928, Drosvad.

74°41' N. 70°30' W., 1200 m, Trawl, 1 specimen, 30 cm. Bottom temp. — 0°20 C. "Godthaab", 23.8.1928, St. 135.

75°26' N. 62°26' W., 820 m, Trawl, 4 specimens, 15—35 cm. Bottom temp. 0°69 C. "Godthaab", 31.7.1928, St. 77.

75°35' N. 65°41' W., 490 m, Trawl, 11 specimens, 15.5—29 cm. Bottom temp. 0°73 C. "Godthaab", 1.8.1928, St. 81.

75°54' N. 81°01' W., 610 m, Trawl, 4 specimens, 19—44 cm. Bottom temp. — 0°59 C. "Godthaab", 17.8.1928, St. 119, Jones Sound.

77°05' N. 71°13' W., 790 m, Trawl, 56 specimens, 7.5—41 cm. Bottom temp. — 0°43 C. "Godthaab", 4.8.1928, St. 87, 3½ miles off Kap Powlett. The greatest depth at which they go down is 1200 m. Size up to 44 cm.

East Greenland. The NATHORST-Expedition 1899 took 1 specimen S. of Shannon (74°52' N. 17°16' W.), where the depth was 185 fms., and 2 specimens in Kejser Franz Josefs Fjord, at 400 fms. The KOLTHOFF-Expedition 1900 caught 3 specimens at the mouth of Kejser Franz Josefs Fjord, 105—160 fms., and 1 specimen in Moskusoksefjord, 105 fms. In addition, a Danish expedition in 1932 secured a young specimen of 117 mm with Sigsbee trawl in Kejser Franz Josefs Fjord, south-west of Kap Franklin, at a depth of 320 m, clay and stones.

The length of the seven Swedish specimens which all have distinct, light transverse bands and as a rule a light occipital band, is 129—280 mm.

Distribution. *Lycodes seminudus* is a cold water form, which besides in West- and East-Greenland waters is known from the "cold area" of the Norwegian Sea (S. of Jan Mayen, NE. of Iceland, W. of Norway), the Kara Sea and the cold northern part of the European Ice Sea from 71½° lat. N. up to Franz Joseph Land and Spitsbergen. Its bathymetric distribution is 92—580 fms.

### ***Lycodes nigricans* n. sp.<sup>1)</sup>**

(Plate I, fig. 1 a—b).

This species is conspicuous by its dark, almost black colour.

As type for the species I select the biggest specimen, which is 300 mm long. It is mainly jet black, but the posterior points of the pectorals and the ventrals are however white, and there is a white ring round the anus. The under-side of the head is partly white, partly dark.

<sup>1)</sup> From nigricare = to be blackish.

The premaxilla is black, the upper jaw white. On the caudal part brown spots shimmer through the dark colour here and there. There are teeth on the premaxillary, on the palatines, on the vomer and in the lower jaw. Length of head 77 mm = 25.67 % of the total length. The belly is naked to some distance past the anus; along the back there is a naked stretch anteriorly extending for some distance under the dorsal fin, but it is narrow. In the dorsal fin 96 rays have been counted, in the anal fin 75 rays. Lateral line mediolateral; the number of pores is estimated at 95—98. No scales on the unpaired fins.

The species is subject to variation. The dorsal part of the pectorals may be dark, the ventral part may be light; one specimen has the pectorals completely white. In some specimens the light area on the under-side of the head spreads so far backwards that the belly of the fish becomes light from the point of the lower jaw right back to the anus, or even light along the greater part of the under-side of the tail. A young specimen of 111 mm has seven light bands, broader ventrally, narrowing dorsally.

Of this new species 17 specimens have been taken in deep water near Holsteinsborg and adjacent fjords (Amerdloq and Ikertôq). All specimens were taken with the prawn trawl by fishing master Martin Hansen.

The specimens were taken in the following localities:

Holsteinsborg, 20.9.1937, 180—190 fms., 8 specimens, 135—185 mm.

Amerdloq, 17.9.1935, about 160 fms., 1 specimen, 175 mm.

Amerdloq, 15.6—1.9.1936, 180—250 fms., 3 specimens, 110, 125, and 300 mm.

Amerdloq, 3.—25.8.1937, 180—200 fms., 2 specimens, 111 and 195 mm.

Ikertôq, 3.7.1935, about 170 fms., 2 specimens, 185 and 235 mm.

Ikertôq, 13.8.1935, about 180 fms., 1 specimen, 112 mm.

Among the species of *Lycodes* hitherto described *L. seminudus* seems to be most nearly related to *L. nigricans*. The scale covering in *L. seminudus* however does not reach so far anteriorly, it generally ceases behind the vent, above the vent or slightly in front of it; only in one specimen does it extend to a point near the tip of the stretched pectoral fin. In *L. nigricans*, on the other hand, the scale covering reaches to the posterior border of the pectoral fin, from here a single row of scales extends forwards and reaches the head, forming an arch over the gill cover, and ending at its upper incision.

**Lycodes agnostus** Jensen.

*Lycodes Lütkenii* Collett, Lütken, Dijnphna-Togtets zoologisk-botaniske Udbytte, 1886, p. 128 (partim), Tab. XVI, Fig. 2—6 (nec Fig. 1). — *Lycodes reticulatus* Smitt, Skandinaviens Fiskar, II, p. 611 (partim), Fig. 147; (forma *seminuda*) Smitt, Bih. K. Sv. Vet.-Akad. Handl., Bd. 27, Afd. IV, No. 4, p. 32 (partim), No. 19. — *Lycodes agnostus* Jensen, Vidensk. Meddel. Naturhist. Foren. Kbhvn., 1901, p. 209; idem, The Danish Ingolf-Expedition, II, 4, 1904, p. 79, Tab. VI, Fig. 1 a, b; Knipowitsch, Mém. de l'Acad. Imp. Sci. St. Pétersbourg, Cl. phys.-math., XIX, No. 1, 1906, p. 12.

West Grennland.

69°29' lat. N. 55°26' long. W., 116 fms., 8.8.1908. The "Tjalfe", St. 179, Trawl, 1 spec.

The measurements of this specimen are as follows:

Total length	165	mm
Length of head	38	-
Distance between snout and the anus	77.5	-
Height above the anus	17	-
Length of pectorals	20	-
Diameter of eye	5.25	-

In percentage of total length the length of head is 23 %, distance between snout and the anus 47 %, height above the anus 10.3 %, length of pectorals 12.1 %, and diameter of eye 3.2 %.

The dimensions of this specimen thus agree with those in *L. agnostus* (cf. JENSEN, 1904, l. c.). The colour also corresponds fairly well with that of this species: Nine cross bands with a lighter central part and a light stripe across the nape.

The lateral line is medio-lateral. There are no scales.<sup>1)</sup>

The present specimen differs from the diagnosis given by me in the above mentioned paper in having only 18 rays in the pectorals, while in specimens from the Kara Sea and the Polar Sea off Siberia I have found only 16—17 rays. KNIPOWITSCH (l. c.) later on however found that *L. agnostus* occasionally may have 18 rays in the pectorals, and therefore I do not hesitate in referring the Greenland specimen to *L. agnostus*.

<sup>1)</sup> In the other specimens present (27 in all) there are no scales; the 28th specimen, which is the largest and which measures 223 mm was referred by LÜTKEN to *Lycodes Lütkenii* Coll.; but as the figure in LÜTKEN shows (Dijnphna-Togtets zoologisk-botaniske Udbytte, Kjøbenhavn 1886, Tab. XVI, Fig. 1), it has scales on the tail and on a large portion of the body proper, and it actually belongs to another species, viz. *Lycodes rossi* Malmgren (cf. JENSEN 1904, p. 56).

Distribution. The range of distribution hitherto known for *Lycodes agnostus* was: The Kara Sea and the Arctic Ocean of Siberia (Chatanga Bay). To this is added the above mentioned specimen which was taken off the south-west coast of Disko. It is thus a typical cold-water form. It inhabits comparatively small depths, 10—116 fms.

Remarks. In my paper: "The North-European and Greenland Lycodinæ", 1904 (l. c.) I mentioned (p. 81) the great resemblance between the *Lycodes Turnerii* described by BEAN from Bering Strait and Alaska and my specimen of *L. agnostus* from the European-North-Siberian Arctic Sea. The fact that the latter also occurs in the waters of North-West Greenland highly supports the supposition that they are identical, and the distribution of the species will probably prove to extend across the Arctic Sea from Novaya Zemlya eastwards along the north coast of Siberia, north of Arctic America to west of the Island of Disko in North Greenland.

#### ***Lycodes mucosus* Richardson.**

*Lycodes mucosus* Richardson. The Last of the Arctic Voyages, II, p. 362, London 1855, Pl. XXVI, figs. 1—5; Tarleton H. Bean, Bull. U. S. Nat. Mus., No. 15, p. 112. Washington 1879; Ad S. Jensen, Rep. Sec. Norweg. Arctic Exped. in the "Fram" 1898—1902, No. 25, p. 12, Kristiania 1910.

In the above mentioned publication I have described the head and the right pectoral fin of a specimen of *Lycodes* which the SVERDRUP Expedition took on July 7th 1899 near Cape Rutherford on the north-east coast of Ellesmere Island (about 78°50' N. 75° W.) and I have referred these fragments to *Lycodes mucosus*, although with some doubt.

The species was first described by Sir JOHN RICHARDSON (l. c.) on two specimens taken on the BELCHER Expedition in Northumberland Sound on Parry Islands. Another specimen was subsequently taken by the Howgate Polar Expedition in 1877—78 in Cumberland Sound on Baffin Island and described by TARLETON H. BEAN (l. c.).

*Lycodes mucosus* was thus known from some localities within high-arctic Canada.

In 1918 PETER FREUCHEN sent me a specimen of *Lycodes* which was caught on August 3rd 1917 near Thule. I determined it to be *Lycodes mucosus* Rich. Although the skin was covered with slime it could be seen that there were indications of the light pattern so characteristically situated in *L. mucosus*.

The measurements of this specimen are as follows:

Total length.....	310	mm				
Length of head.....	80	—	percentage of total length	26	%	
Distance between snout and						
the anus .....	162	—	—	—	—	50 %
Height above the anus .....	35 <sup>3</sup> / <sub>4</sub>	—	—	—	—	11 %
Length of pectoral fins .....	43	—	—	—	—	14 %
Diameter of eye .....	12	—	—	—	—	4 %

Each of the pectoral fins contains 17 rays.

Besides in the collections of the ГОДТНААВ Expedition I found an excellently preserved *Lycodes mucosus* which was also caught near Thule. According to the label it was taken in the mouth of Wolstenholme Fjord on the shore at the beginning of August 1928.

The measurements of this specimen are as follows:

Total length.....	270	mm				
Length of head.....	66	—	percentage of total length	24	%	
Distance between snout and						
the anus .....	135	—	—	—	—	50 %
Height above the anus .....	27	—	—	—	—	10 %
Length of pectoral fins .....	37	—	—	—	—	14 %
Diameter of eye .....	10	—	—	—	—	4 %

One of the pectoral fins contains 16 rays, the other 17 rays.

The specimen is devoid of scales. The lateral line is medio-lateral and consists of numerous small tubercles; in addition, above the lateral line, there is a discontinued row of similar small tubercles. The colour exactly corresponds to that of the specimen figured by RICHARDSON (l. c. Pl. XXVI, fig. 1) about which this author writes (l. c. pp. 365—66): "The dark upper parts of the fish have a deep clove-brown colour, becoming almost black where it touches the white marks. The white extends over the lips, the under surface of the head, base of the pectoral, over the belly, and, with interruptions, along the base of much of the anal fin. There is a small white spot on each suprascapular, one on the pectoral, and five cross bars, irregular and interrupted, on the dorsal and sides, with a spot or two on the interspaces." "There are no scales".

Finally, in the collections of the Museum I have found a specimen which was previously sent home by KNUD RASMUSSEN, and according to the attached label it was found washed ashore near Thule outside the premises of the Station. This specimen measures 280 mm and the head 65 mm = 23 % of the total length. The state of preservation is not too good, but so much of the characteristic light pattern has been preserved that the specimen with certainty can be determined as *Lycodes*

*mucosus* Rich. It is completely devoid of scales, as is also the case with all the specimens known.

It thus appears that *Lycodes mucosus* occurs in shallow water off northwestern Greenland, near Thule (about 76°35' lat. N.).

#### ***Lycenchelys kolthoffi* Jensen.**

*Lycodes Verrillii* F. A. Smitt (non Goode & Bean), Bih. K. Sv. Vet.-Akad. Handl., Vol. 27, Afd. IV, No. 4, 1901, p. 22, figs. 1—3. — *Lycenchelys kolthoffi* Jensen, Meddel. om Grønland, XXIX, 1904, p. 261, Pl. XIII, fig. 1; idem, The Danish Ingolf-Expedition, II, 4, 1904, p. 88, Tab. X, fig. 2, and figs. 23—25 in text.

Off West Greenland *Lycenchelys kolthoffi* has been taken in the following localities:

69°30' N. 56°32' W., 202 m (close to the west-ice). Bottom temp. 0°98 C, Trawl, 2 specimens, 171 mm and 188 mm. The "Dana", 27.6.1925, St. 2363.

77°17' N. 69°59' W., 930 m (Hvalsund). Bottom temp. — 0°42 C, Trawl, 1 specimen, 190 mm. The "Godthaab", 5.8.1928, St. 90.

77°05' N. 71°13' W., 790 m (Hvalsund). Bottom temp. — 0°43 C, Trawl, 4 specimens, 100—175 mm. The "Godthaab", 4.8.1928, St. 87.

78°14' N. 74°10' W., 672 m (Smith Sund), Trawl, 1 specimen, 185 mm. The "Godthaab", 8.8.1928, St. 99.

East Greenland. The two specimens known from here are males, 128.5—131.5 mm long, taken by the Kolthoff-Expedition on July 30th 1900 off north-eastern Greenland (72°25' N. 17°56' W.) at a depth of 158 fathoms on a stony and sandy bottom.

#### ***Lycenchelys ingolfianus* Jensen.**

*Lycodes muræna* Lütken, The Danish Ingolf-Expedition, II, 1, 1898, p. 20 (partim). — *Lycenchelys ingolfianus* Jensen, Vidensk. Meddel. Naturhist. Foren., 1901, p. 210; idem. The Danish Ingolf-Expedition, II, 4, 1904, p. 90, Tab. X, fig. 3 and figs. 26—28 in text.

West Greenland. The only known specimen of this species is a 275 mm long female taken by the Ingolf-Expedition (St. 27) on 1st July 1905 in Davisstræde (64°54' N. 55°10' W.) at a depth of 393 fms. and at a bottom temperature of 3°8 C.

### Lycodonus.

In my paper: "The North-European and Greenland Lycodinæ"<sup>1)</sup> I defined on p. 93 the genus *Lycodonus* as follows: "The body very elongated (anguilliform), the height over the anus going ca. 21—30 times in the length. Teeth on the intermaxillary, mandible, vomer and palatines. Lower jaw without barbules. Scales small. Lateral line medio-lateral or both mediolateral and ventral. Along the bases of the dorsal and anal fins a row of small bony scutes (lateral outgrowths of the upper ends of the interspinous rays), on which the rays are superimposed. Branchiostegal rays 5".

In my preliminary notice on the Lycodes<sup>2)</sup> of the Ingolf-Expedition I referred two forms from Europe to the genus *Lycenchelys* and called them *L. flagellicauda* and *L. ophidium*, however with the addition that it might be natural to segregate them and refer them to a genus of their own. On a closer examination they proved to be related with *Lycodonus* Goode and Bean. They had the number of radii branchiostegi, which number only five on each side (in *Lycenchelys* however six) in common with this genus. In addition, a peculiar feature in the structure of the dorsal and anal fins: along the bases of these fins there is a row of small bony scutes to which the fin rays are jointed. In my paper on the Lycodinæ of the Ingolf-Expedition these forms are therefore called *Lycodonus flagellicauda* (p. 94) and *Lycodonus ophidium* (p. 97).

Besides in the above mentioned species of *Lycodonus* occurring in the European seas, such as I have defined this genus above, the Godthaab Expedition in 1928 took two specimens of a *Lycodonus* in West Greenland waters which I must refer to the American *Lycodonus mirabilis*.

### *Lycodonus mirabilis* Goode and Bean.

(Plate I, fig. 2a, plate II, fig. 2b—d).

*Lycodonus mirabilis* Goode and Bean, Bull. Mus. Comp. Zool., 1883, X, No. 5, p. 208; Oceanic Ichthyology, 1895, p. 312, fig. 280.

*Lycodonus mirabilis* was taken for the first time by the "Blake" off the New England coast. The "Albatross" also obtained examples from numerous stations off the north-eastern coast of the United States (35°45'23"—41°53' N. 65°21'50"—74°34'45" W.), in deep water, 721—1309 fathoms, cf. Oceanic Ichthyology, pp. 312—313.

During the "Godthaab" Expedition *Lycodonus mirabilis* was taken with Sigsbeetrawl in Baffins Bugt in West Greenland on 28.7.1928 at St. 64: 73°12' N. 58°08' W., where the depth was 850 m and the tem-

<sup>1)</sup> The Danish Ingolf-Expedition, vol. II, 4, 1904.

<sup>2)</sup> Vidensk. Meddel. Naturhist. Foren. Kbhvn. 1901, pp. 210—212.

perature at the bottom  $0^{\circ}47$  C. Two small specimens, 105 mm and 110 mm long, were obtained.

The specimen of 110 mm has the following number of rays: D. 99, A. 93, C. 9, P. 17. The first 8 scutes do not support rays.

The specimen of 105 mm has the following number of rays: D. 98, A. 94, C. 9, P. 17. The first 10 scutes do not support rays.

In 1896 the Zoological Museum of Copenhagen received a fully grown specimen of *Lycodonus mirabilis* from the U. S. Nat. Museum, taken off the east coast of North America ( $39^{\circ}34'33''$  N.  $71^{\circ}04'$  W.). This specimen I examined more closely. Its length is 290 mm. Its number of rays is as follows:

D. 103<sup>1)</sup>, A. 98<sup>1)</sup>, C. 9, P. 17. The first 11 scutes do not support rays.

A characteristic feature in this American-West Greenland *Lycodonus mirabilis* as compared with the European species established by me is that it lacks fin-rays on the anterior scutes on the back. And it is possible that future systematists will consider this difference so important that they will segregate the European species which I reckon under *Lycodonus*.

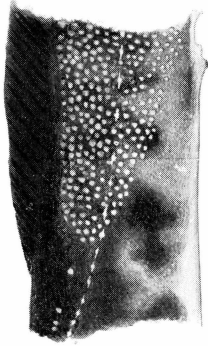
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<sup>1)</sup> There is good reason to state these figures which I found in the said American specimen, because the only statements given by GOODE and BEAN run as follows: D. 80 +; A. 70 +.

## PLATES

### Plate I.

- Fig. 1a. *Lycodes nigricans* n. sp. The 300 mm long holotype; abt.  $\frac{2}{5}$  natural size.  
- 1b. Foremost part of body of the same specimen; natural size.
- Fig. 2a. *Lycodonus mirabilis*. The 105 mm long specimen from Baffins Bugt in West Greenland; abt.  $1\frac{3}{4}$  natural size. 98 D-rays with their scutes are seen; the ten foremost scutes lack fin rays; 94 A-rays with their scutes, 9 C-rays, and 17 P-rays. On the upper jaw there are six, on the lower jaw eight deep grooves. On the side of the body it is seen that the lateral muscles are composed of a series of segments or myomeres, which are zig-zag-shaped or < shaped.



3 cm  
Fig. 1 b.

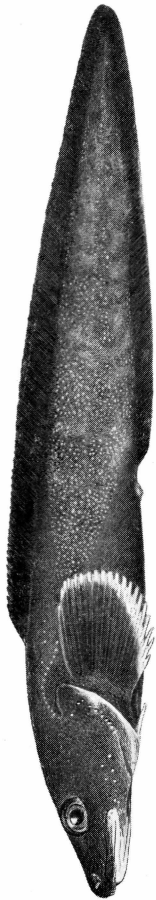


Fig. 1 a.



Fig. 2 a.

**Plate II.**

*Lycodonus mirabilis*. Fig. 2b. 6 scutes with their fin rays belonging to D 21—25.

Fig. 2c. 6 scutes with their fin rays belonging to A 13—17.

Fig. 2d. The head from below showing deep grooves on upper and lower jaws.

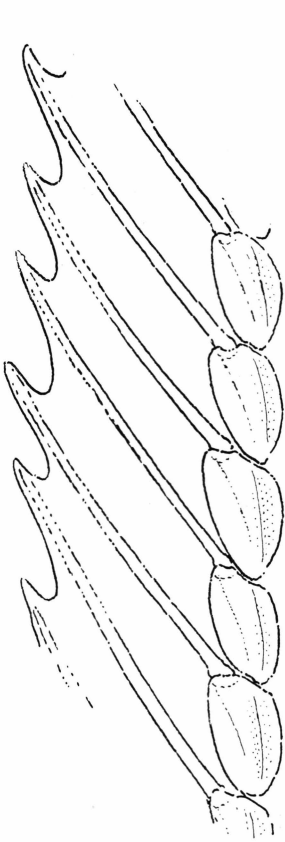


Fig. 2 c.

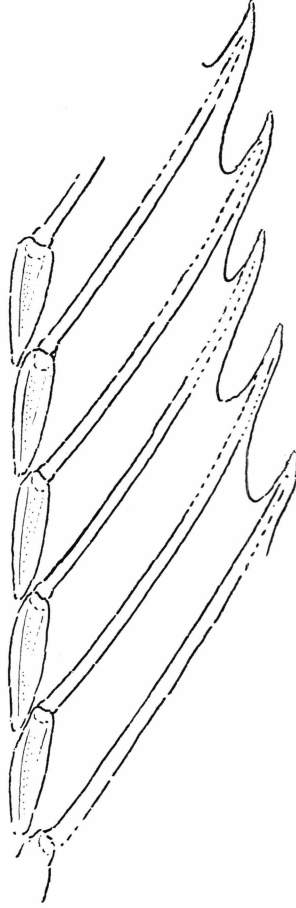


Fig. 2 d.

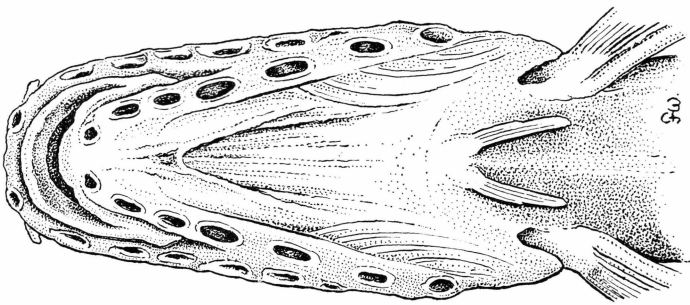


Fig. 2 b.

19 Pl. 49.