MARINE MACROPLANKTON FROM THE CANADIAN EASTERN ARCTIC

II. MEDUSAE, SIPHONOPHORA, CTENOPHORA, PTEROPODA, AND CHAETOGNATHA[1]

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Abstract

Thirteen species of medusae, one siphonophoran, two ctenophores, two pteropod molluscs, and two chaetognaths are recorded from coastal waters of the Canadian eastern Arctic, many of them for the first time. All except one are known to be arctic or arctic–boreal species.

Hybocodon prolifer L. Agassiz has not hitherto been recorded from Arctic water. Specimens answering to this species were found by the author in large numbers at Lake Harbour, on Hudson Strait. The determination of the medusa is possibly not satisfactory, and cannot be considered certain until the hydroid is found. No species of *Hybocodon* has been recorded from Greenland water, however, and hence this discovery may be useful to distinguish Canadian polar water from water of the Greenland current.

Introduction

The material described in this paper was collected during the summers of 1939 and 1940, in the coastal water of Baffin Island and northern Labrador. Collecting stations were at Hebron, Port Burwell, Lake Harbour, Gabriel Strait, Frobisher Bay, Pangnirtung, Clyde River, Pond Inlet, Arctic Bay, and Fort Ross (13). The details of method, the hydrography of the area, a general introduction, and a map showing the collecting stations have been given in the first paper of this series (13). As in that paper, the convention of using parentheses around the names of authorities for species whose genus has been changed since the original naming of the species has been abandoned, following the practice of Osgood (42) and others.

I. MEDUSAE

ANTHOMEDUSAE

Family CODONIDAE

Sarsia tubulosa M. Sars

Syn. *Sarsia mirabilis* L. Agassiz

Taken at Hebron, Lake Harbour, Gabriel Strait, Frobisher Bay, Clyde River, and Arctic Bay. Common.

In considering *S. tubulosa* as synonymous with *S. mirabilis*, the lead of Kramp (31) has been followed. Kramp, working on the material of the "Ingolf" expedition, brought to an end a long-felt doubt as to the validity of Hartlaub's (22) many species of *Sarsia* by putting several together under the name *S. tubulosa*. Levinsen (37), in describing specimens from west Greenland, says: "When I refer these specimens . . . . . to this species [*mirabilis*] and not to *Sarsia tubulosa*, it is only because *Sarsia mirabilis* is found on the American coast. It is very difficult to distinguish sharply between the two species." Mayer (39) calls *mirabilis* "*Sarsia tubulosa*, var. *Sarsia mirabilis* L. Agassiz", and the differences that he quotes between the varieties are very slight. Hartlaub himself, who separates the two as species, is doubtful

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as to their validity: "Die Frage ob *Sarsia mirabilis* Ag. eine gute Art und nicht etwa identisch mit *S. tubulosa* Lesson . . . . . ist, kann einstweilen noch für unerledigt gelten. Die Medusen gleichen manchen der als *Sarsia tubulosa* aufgefassten, europäischen Quallen ganz ausserordentlich. Solange aber ein Vergleich authentischer Stücke nicht ausgefürht ist, lässt sich nichts bestimmtes sagen" (22). Such a comparison has now been made by Kramp (31): ". . . . Hartlaub has made an attempt to unravel the northern species, without, however, to attain a final result. I have never willingly believed in these many species, because my examination of material from Denmark, Norway, the Faeroe Islands, Iceland, and west Greenland demonstrated that each of the features which, according to Hartlaub, constitute the characteristics of the various species . . . . . might occur in material from different localities in every possible combination." The present material from the eastern Arctic shows the same variation in characters as does Kramp's material, for instance, the great variation in the development and shape of the apical canal.

S. tubulosa, then, in the broader sense, is known from the boreal and arctic coasts of Europe, the Atlantic coast of North America, the Pacific, Iceland, Greenland, and the Siberian Sea (22, 37, 51, 47, 20, 35, 28, 31, and 32). It has been recorded from Labrador (2), and from Newfoundland (19).

One abnormal specimen, with one radial canal branched into two, and with five tentacles, was taken at Lake Harbour.

Sarsia princeps Haeckel. Taken at Lake Harbour, Gabriel Strait, Frobisher Bay, and Fort Ross. Twenty specimens.

This species is easily distinguished by its large size, shape somewhat narrower than *S. tubulosa*, and above all by the club-shaped so-called apical canal, which widens out at the distal end. Kramp (31) points out that this canal is in reality no true canal, the greater part being solid. He adds that "the shape of the distal dilatation is subject to great variation." At Gabriel Strait, one abnormal specimen was taken in which the mouth was divided into three parts.

S. princeps has been found in the American Arctic at Collinson Point and Point Barrow, Alaska (5), and from Labrador and Newfoundland (2); it has also been recorded from Newfoundland by Pinhey (44), Frost (19), and Kramp (30).

Further distribution: *S. princeps* belongs to Arctic water. It has been recorded from Greenland, Spitsbergen, Barents Sea, and the arctic coasts of Europe.

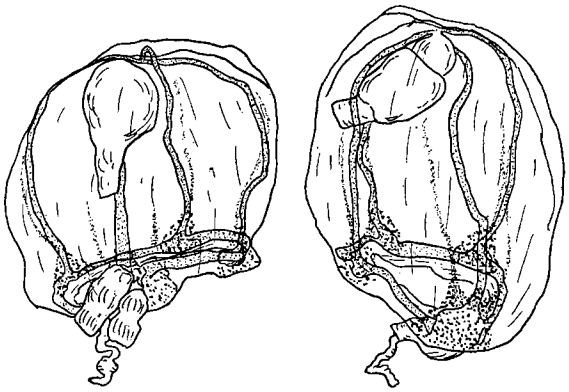

FIG. 1. *Diagram of two specimens of Hybocodon (?) prolifer L. Agassiz showing extremes of variation in width of the radial canal on the side bearing the tentacle.*

Hybocodon (?)**prolifer** L. Agassiz (Fig. 1). Taken in enormous numbers during July and August at Lake Harbour; about 5900 specimens in 1939, and 720 in 1940.

Hybocodon prolifer is very common in summer off the New England coast (20). It is known from Dutch Harbour on the Bering Sea (3), from Vancouver (16), southern Iceland, Norway, the British Isles (31), and from Newfoundland (19). The present specimens are identical with the description and figures of Hartlaub (22) and Kramp (31). The five rows of nematocysts are clearly visible, and their arrangement is typical. The length of the manubrium and the arrangement of the gonads also agree with previous descriptions; the length of some of the specimens is as much as 5 mm., as against 4 mm. quoted by Hartlaub. The radial canal on the side bearing the tentacle varies a little in width, the extremes being illustrated by the two specimens drawn in Fig. 1. It is never so broad as is described for

H. christinae Hartlaub, a form reported only from Bear Island and Bodö, in Norway. According to Bigelow (3), however, the medusae of *H. prolifer* and *H. christinae* closely resemble each other, although the hydroids are easily distinguishable. It seems best, therefore, to refer these specimens to *H. prolifer* provisionally, until the hydroids are found.

The record is interesting, and the distribution appears to be very local. On July 30 and 31, 1940, *Hybocodon* was taken at Lake Harbour; none was found at Gabriel Strait or Frobisher Bay between August 4 and 10, but on returning to Lake Harbour on August 14 large numbers appeared again in the plankton.

The record of *Hybocodon prolifer* from Newfoundland is published briefly in a report of the Newfoundland Fishery Research Commission. It is not qualified by date or locality, and after the species name, Frost has put "*prolifer* tentative" (19). It is possible, on the present record from Hudson Strait, that she found it in Arctic water, which is abundant at Newfoundland, particularly in the spring. From the distribution on the western side of the Atlantic this species would appear to belong to Lancaster Sound water and not to Greenland water. No species of *Hybocodon* has been recorded from the Greenland coasts, nor from Spitsbergen, and it is not known to be an arctic species at all. According to Kramp (31): "*Hybocodon prolifer* is a northern-boreal species, occurring all along the boreal coasts of Europe, but not penetrating into true arctic regions; it is, for example, neither found at the east coast of Iceland nor at the arctic coasts of Norway;" and Kramp and Damas (35) say: "Elle ne pénètre pas dans les régions strictement arctiques".

If these specimens should be confirmed as *H. prolifer*, on discovery of the hydroid, then the range of the species is considerably and remarkably extended. It is too early yet to put very much weight on the fact that it was taken at one station only; it is possible that the seasonal life of the medusa is short, and since the amount of tow-netting that has been done in the Canadian Arctic up to the present work is very small, the record must remain isolated pending further field work.

As to the determination of the specimens, they agree so closely with the existing descriptions of *H. prolifer* that there is little doubt of the determination being correct. In view of the present known distribution of the species, however, and since the hydroid form is not yet known from the same locality, it is necessary to treat the identification with reserve.

Family MARGELIDAE

Bougainvillia superciliaris L. Agassiz. Taken at Hebron, Lake Harbour, Gabriel Strait, and Frobisher Bay. Common.

The presence of a short but distinct peduncle, the inter-radial position of the gonads, and the development of the planulae while still attached to the gonads, fix these specimens as *B. superciliaris*. The number of tentacles in each bunch may be as high as 20. Hartlaub (23) says that the tentacle number per bunch in *superciliaris* is "11–15, seltener bis zu 22".

B. superciliaris has been recorded from Labrador, just south of Nain, by Bigelow (2), but from nowhere else in the American Arctic. It has been recorded from the Straits of Belle Isle (43), Newfoundland (19), Attu Island, in the north Pacific (3), west Greenland (28, 31, and 37), the east coast of North America (20, 4), Spitsbergen and Bear Island (1, 35), the North Sea, and the Norwegian coast (23).

According to Kramp (31) it is a native of Arctic water. Quoting from Kramp and Damas (35): "En allant du sud au nord, on passe du domaine de *Bougainvillia britannica* à celui de *B. principis* pour entrer dans celui de *B. superciliaris*, espèce circumpolaire."

Rathkea octopunctata M. Sars

Syn. *Rathkea blumenbachii* Rathke

Thirteen specimens, taken at Lake Harbour.

Recorded in Arctic America from Cooper Island, off Point Barrow (5). The synonymy of this species is rather complicated. Bigelow (2) records *Lizzia octopunctata* Forbes from Newfoundland, and considers it proved to be generically separated from *Rathkea octopunctata* Haeckel. Hartlaub (23) on the other hand, has decided that *L. octopunctata*, *R. octopunctata*, and *R. blumenbachii* are all synonymous. Mayer (39) puts *L. octopunctata* and *R. octopunctata* together, but separates *R. blumenbachii* from both of them. Kramp (31), who has made a study of much of the original material, has put all three together under the name *R. octopunctata* M. Sars, giving full reasons for retaining the name *R. octopunctata* rather than accepting *R. blumenbachii* as used by Hartlaub.

With the synonymy thus straightened by Kramp, this species, under the name *Lizzia octopunctata*, was recorded from Newfoundland, as mentioned above, by Bigelow. It is widely distributed in arctic and boreal seas, from Dutch Harbour (3) to the Barents Sea and the White Sea, and extending as far south as Bermuda and the Mediterranean (31). It is recorded also from the coast of British Columbia (51).

Family TIARIDAE

Halitholus pauper Hartlaub. Taken at Lake Harbour and Frobisher Bay. Very common during July and August.

Halitholus cirratus Hartlaub. Taken at Hebron, Lake Harbour, Gabriel Strait, Frobisher Bay, Arctic Bay, and Fort Ross. Common, but not caught in such large numbers as *H. pauper*.

The genus *Halitholus*, in the Arctic, is represented only by these two species, both first described by Hartlaub in 1914 (24). *H. cirratus* has been taken also in the Kattegat and Danzig Bay (24), and it has been recorded from the north coast of Alaska (5), and from Newfoundland waters (19). Fewkes' (15) *Tiara conifera*, from Grinnell Land, has been referred to *H. pauper* (24). These present records confirm the circumpolar distribution of the genus in the northern hemisphere.

Leuckartiara brevicornis (?) Murbach and Shearer. Taken at Lake Harbour.

The specimens are not fully mature, and identification is difficult. They have the horseshoe-shaped gonads typical of the genus *Leuckartiara*, and cannot therefore be referred to the next, and closely related genus, *Catablema*.

L. breviconis is known from Alaska, southwest Greenland, Iceland, southwest Norway, and north Scotland (31).

Catablema vesicaria A. Agassiz. Taken at Lake Harbour and Pond Inlet. Forty-six specimens.

Recorded from Labrador (2). *Catablema vesicaria* is an arctic and boreal species, known from West Greenland (31, 37), Iceland (31), Spitsbergen, Bear Island, Barents Sea (24), Bering Sea (3), Massachusetts Bay, and Woods Hole (20).

LEPTOMEDUSAE

Family MITROCOMIDAE

Tiaropsis multicirrata M. Sars

Syn. *Tiaropsis diademata* L. Agassiz

One specimen taken at Clyde River, September, 1940.

Recorded from the Bering Sea and North Pacific (3), Straits of Belle Isle and east Newfoundland (43, 44, 19), coasts of Europe from the English Channel to the Barents Sea and West Greenland (33), Massachusetts Bay, rare at Woods Hole (20).

TRACHYMEDUSAE

Family PTYCHOGASTRIIDAE

Ptychogastria polaris Allmann. One specimen from Lake Harbour, July, 1939.

A circumpolar Arctic form, known from the Bering Sea, Smith Sound, Davis Strait, Greenland coasts, Spitsbergen, Murman coast, Norway (9); Hebron and Cape Mugford, Labrador (2); also found further south in deep water; Nova Scotia (9); Winter Harbour (8). The most southerly record in Europe is from Hjörundfjord in west Norway (35).

Family TRACHYNEMIDAE

Aglantha digitale Müller. This very common northern and Arctic species was taken at Hebron, Burwell, all the Baffin Island stations, and Fort Ross, in large numbers.

NARCOMEDUSAE

Family AEGINIDAE

Aeginopsis laurenti Brandt. Taken at Hebron, Lake Harbour, Gabriel Strait, Frobisher Bay, Clyde River, Arctic Bay, and Fort Ross.

Recorded in the American Arctic from Collinson Point, Alaska (5), Labrador and Newfoundland (2), and the Bering Straits (7). Known also from Greenland (38 and 21), Norway (35), and many other stations in Arctic water. It is one of the most typical of Arctic medusae.

SCYPHOMEDUSAE

Small ephyrae of the Scyphomedusae, not identifiable further, were taken at Lake Harbour, Fort Ross, and Arctic Bay. Twenty-seven specimens.

II. SIPHONOPHORA

Family DIPHYIDAE

Diphyes arctica Chun. One specimen from Clyde River, September, 1940.

According to Kramp (27) *Diphyes arctica* is an Arctic water species. It was found by the Plankton Expedition of 1889 "in the boundary between the Gulf stream and the Irminger Sea", west of Greenland, in the North Sea, and at Bear Island and Spitsbergen (50, 10). In the Gulf of Maine it has been shown (6) to be an indicator, in the intermediate layers (below 50 metres), of mixed Arctic and Atlantic water.

III. CTENOPHORA

Family CYDIPPIDAE

Mertensia ovum Fabricius. Taken at Hebron, Lake Harbour, Gabriel Strait, Frobisher Bay, Pangnirtung, Arctic Bay, and Fort Ross. Common.

An Arctic species, almost certainly circumpolar (49, 2, 40).

Family BEROIDAE

Beroë cucumis Fabricius. Taken at Port Burwell, all the Baffin Island stations, and at Fort Ross. Very common.

An Arctic species, found at Labrador and Newfoundland (11, 2, 43, 44), Point Barrow (5), Davis Strait (14), and from Spitsbergen, north Pacific, Norwegian coasts, and the North Sea (49).

IV. PTEROPODA (Mollusca)

Family LIMACINIDAE

Limacina helicina Phipps. Taken at Hebron, Port Burwell, Lake Harbour, Fort Ross, Pond Inlet, Arctic Bay, Gabriel Strait, Frobisher Bay, and Clyde River; at Clyde River found also in the stomach of a ringed seal, *Phoca hispida* Schreber. Number of specimens, 2460.

An Arctic species "seldom found south of the 60th parallel" (36), but recorded from England and the coast of Provence by Odhner (41). This species has already been recorded from several stations in the eastern Arctic of Canada (26).

Family CLIONIDAE

Clione limacina Phipps. Taken at Hebron, Lake Harbour, Fort Ross, Pond Inlet, Arctic Bay, Pangnirtung, Gabriel Strait, and Clyde River. One hundred and sixty-seven specimens.

Found in all Arctic seas, off the coasts of Norway, Scotland, and the Atlantic coast of North America. It has already been recorded from many stations in the eastern Arctic (26).

V. CHAETOGNATHA

Sagitta elegans Verrill var. **arctica** Aurivillius. Taken at Hebron, Burwell, Fort Ross, and all the Baffin Island stations except Arctic Bay. Number of specimens, 4250.

Sagitta elegans arctica has been found in most Arctic waters, from Spitsbergen (46), west Greenland (29, 34, 12), east Greenland (32, 48), etc. The entry of cold water into the Gulf of St. Lawrence brings *arctica* with it (25). It has been recorded from the Firth of Forth and between the Faeroes and Shetlands (17, 18). It was found by the *Godthaab* expedition in Jones Sound, the mouth of Lancaster Sound, Cape Walsingham, and at the east end of Hudson Strait (34).

Eukrohnia hamata Möbius. Taken at Hebron, Lake Harbour, Frobisher Bay, and Clyde River. Twenty-two specimens.

Ritter-Zahony (45) gives the distribution of this species as "cosmopolitan, mesoplanktonic, in higher latitudes holoplanktonic. Bipolar". The *Godthaab* expedition found it at several stations on the west side of Baffin Bay, Davis Strait, and the Labrador Sea, as well as all up the west coast of Greenland (34).

Conclusion

As in the case of the amphipods of the present collection (13), the list published here is composed of species known to be arctic and arctic-boreal in distribution, with the one exception of *Hybocodon prolifer*. Four of the

species, namely *Ptychogastria polaris*, *Sarsia princeps*, *Aeginopsis laurenti*, and *Mertensia ovum*, are cited by Bigelow (5) as being typical Arctic species, and at all times and places sound indicators of Arctic water. The same is probably true of *Halitholus pauper*. Of the remainder, *Catablema vesicaria*, *Halitholus cirratus*, *Tiaropsis multicirrata*, *Bougainvillia superciliaris*, and *Diphyes arctica* have been found also in water of more temperate character, and others, notably *Rathkea octopunctata*, *Aglantha digitale*, *Leuckartiara brevicornis*, and *Sarsia tubulosa* are as much at home in northern Atlantic water as in Arctic water. The case of *Hybocodon prolifer* is exceptional, and must remain as a possibly most remarkable record until the hydroid is dredged. It has been pointed out (13) that the euphausiids *Thysanoessa inermis* Kröyer and *Thysanoessa raschii* M. Sars, and the mysid *Boreomysis nobilis* G. O. Sars may be useful in distinguishing Canadian polar water from Greenland water. The discovery of *Hybocodon* in the eastern Arctic has the same implications.

References

1. AURIVILLIUS, C. W. S. Kgl. Svenska Vetenskapsakad. Handl., Ny följd, 32 (6) : 1-71. 1899.
2. BIGELOW, H. B. Proc. U.S. Natl. Museum, 37 : 301-320. 1910.
3. BIGELOW, H. B. Proc. U.S. Natl. Museum, 44 : 1–119. 1913.
4. BIGELOW, H. B. Occasional Papers, Boston Soc. Nat. Hist. 7(12) : 1-37. 1914.
5. BIGELOW, H. B. Can. Arctic Expedition, 1913-1918, 8 (H) : 1-22. 1920.
6. BIGELOW, H. B. Bull. U.S. Bur. Fisheries, 40(2) : 1-509. 1926.
7. BRANDT, J. F. Mém. Acad. St-Pétersbourg (Sér. 6), 4 : 237-411. 1838.
8. BROCH, H. Rept. 2nd Norwegian Polar Expedition, 1898-1902, 2(12): 1-12. 1907.
9. BROCH, H. Nord. Plankton, 6 : 481-540. 1929.
10. CHUN, C. Ergeb. Plankton Expedition Humboldt-Stiftung, 2, K.b. : 1-126. 1897.
11. CHUN, C. Ergeb. Plankton Expedition Humboldt-Stiftung, 2, K.a. : 1-32. 1898.
12. DUNBAR, M. J. J. Anim. Ecol. 9(2) : 215-226. 1940.
13. DUNBAR, M. J. Can. J. Research, D, 20(1) : 33-46. 1942.
14. FABRICIUS, O. Fauna Groenlandica. Hafniæ et Lipsiæ. 1780.
15. FEWKES, J. W. Rept. Proc. U.S. Expedition to Lady Franklin Bay, Grinnell Land, 2 : 39-45. 1888.
16. FRASER, C. M. Trans. Roy. Soc. Can. (Ser. 3) 8 (Sec. 4) : 99-216. 1914.
17. FRASER, J. H. J. conseil intern. exploration mer, 12 : 311-320. 1937.
18. FRASER, J. H. J. conseil intern. exploration mer, 14(1) : 25-34. 1939.
19. FROST, N. Newfoundland Ann. Rept. Fisheries Research Lab. 1936–1937 : 25-27. 1937.
20. HARGITT, C. W. Bull. U.S. Bureau Fisheries, 24 : 21-79. 1905.
21. HARTLAUB, C. *In* Duc d'Orléans, Croisière océanographique accomplie à bord de la *Belgica* dans la mer du Grönland, 1905, (463-478). Charles Bulens, Bruxelles. 1907.
22. HARTLAUB, C. Nord. Plankton, 6 : 1-136. 1907.
23. HARTLAUB, C. Nord. Plankton, 6 : 137-236. 1911.
24. HARTLAUB, C. Nord. Plankton, 6 : 237-364. 1914.
25. HUNTSMAN, A. G. Can. Fisheries Expedition, 1914–1915 : 405-485. 1919.
26. KERSWILL, C. J. J. Fisheries Research Board Can. 5(1) : 23-31. 1940.
27. KRAMP, P. L. Bull. trimestriel conseil intern. exploration mer, 522-538. 1913.
28. KRAMP, P. L. Vidensk. Medd. Naturh. Foren. 65 : 257-286. 1913.
29. KRAMP, P. L. Vidensk. Medd. Naturh. Foren. 69 : 17-55. 1918.
30. KRAMP, P. L. Rept. Sci. Results *Michael Sars* North Atlantic Deep Sea Expedition, 1910, 3(2) : (1-13). 1920.
31. KRAMP, P. L. Danish Ingolf Expedition, 5(10) : 1-102. 1926.
32. KRAMP, P. L. Medd. Grønland, 104(11) : 4-20. 1933.

33. KRAMP, P. L. Nord. Plankton, 6 : 541-602. 1933.
34. KRAMP, P. L. Medd. Grønland, 80(5) : 1-40. 1939.
35. KRAMP, P. L. and DAMAS, D. Vidensk. Medd. Naturh. Foren. 80 : 217-324. 1925.
36. LENZ, H. W. C. Nord. Plankton, 2 : 1-8. 1906.
37. LEVINSEN, G. M. R. Vidensk. Medd. Naturh. Foren. 44 : 143-212. 1893.
38. MAAS, O. Fauna Arctica, 4 : 479-526. 1906.
39. MAYER, A. G. Medusae of the world. Pub. 109. Carnegie Institution, Washington, D.C. 1910.
40. MORTENSEN, T. Rept. Sci. Results *Michael Sars* North Atlantic Deep Sea Expedition, 1910, 3(2) : (1-9). 1913.
41. ODHNER, N. H. Kgl. Svenska Vetenskapsakad. Handl., Ny följd, 54(1) : 1-274. 1915.
42. OSGOOD, W. H. Science, 89 : 9-11. 1939.
43. PINHEY, K. F. Contrib. Can. Biol. Fisheries (n.s.), 3(6) : 179-233. 1926.
44. PINHEY, K. F. Contrib. Can. Biol. Fisheries (n.s.), 3(13) : 331-346. 1927.
45. RITTER-ZAHONY, R. Deut. Südpolar Expedition, 1901–1903, 13 : 1-72. 1913.
46. STOTT, F. C. J. Anim. Ecol. 5(2) : 356-369. 1936.
47. THIEL, M. E. Fauna Arctica, 6(2) : 119-158. 1932.
48. USSING, H. H. Medd. Grønland, 100(7) : 1-108. 1938.
49. VANHÖFFEN, E. Nord. Plankton, 6 : 1-7. 1903.
50. VANHÖFFEN, E. Nord. Plankton, 6 : 9-39. 1906.
51. WAILES, G. H. Vancouver Museum Art Notes, 4 : 1-13. 1929.