ARCTIC INSTITUTE OF NORTH AMERICA

TECHNICAL PAPER NO. 6

THE MEDUSAE OF THE CHUKCHI AND BEAUFORT SEAS OF THE ARCTIC OCEAN INCLUDING THE DESCRIPTION OF A NEW SPECIES OF *EUCODONIUM* (HYDROZOA: ANTHOMEDUSAE)

By

CADET HAND AND LAI BING KAN

PUBLISHED JUNE 1961

THE ARCTIC INSTITUTE OF NORTH AMERICA

The Arctic Institute of North America was formed to further the scientific study and exploration of the Arctic. The Institute provides information on the Arctic through its three Offices, awards research grants, and publishes scientific papers and other contributions in its journal *Arctic* and other publications. Those interested in this work are invited to become Members. Members receive all numbers of the journal. The Library and Map Collection at the Montreal Office are principally for their use, and they are welcome there and at the other Institute Offices. Membership dues are $5.00 annually. All remittances should be sent to the Montreal Office.

Offices of the Institute

3485 University Street, Montreal 2, Que., Canada
1530 P Street, N.W., Washington 5, D.C., U.S.A.
2 East 63rd Street, New York 21, N.Y., U.S.A.

ARCTIC INSTITUTE OF NORTH AMERICA

TECHNICAL PAPER NO. 6

THE MEDUSAE OF THE CHUKCHI AND BEAUFORT SEAS OF THE ARCTIC OCEAN INCLUDING THE DESCRIPTION OF A NEW SPECIES OF *EUCODONIUM* (HYDROZOA: ANTHOMEDUSAE)

By

CADET HAND AND LAI BING KAN

PUBLISHED JUNE 1961

CONTENTS

THE MEDUSAE OF THE CHUKCHI AND BEAUFORT SEAS OF THE ARCTIC OCEAN INCLUDING THE DESCRIPTION OF A NEW SPECIES OF *EUCODONIUM* (HYDROZOA: ANTHOMEDUSAE)

Cadet Hand and Lai Bing Kan[1]

Introduction

DURING August 1950 and August and September 1951, a naval icebreaker, the U.S.S. *Burton Island*, made two extensive oceanographic surveys in the Chukchi and Beaufort seas. In 1950 plankton hauls were made at 50 widely distributed stations covering the area between 125°W. and 164°W. and from 70°N. northward to nearly 74°N. In 1951 plankton samples were collected at 56 stations; the area covered was approximately the same as that of 1950 but extended to 76°22′N. and 169°01′W. Johnson (1956) has described the methods used in the biological investigations and has reported on the plankton and its relation to the hydrography of the area. Briefly, the plankton tows were made with a one-half metre Nansen-type net, the upper and lower parts respectively being of No. 2 and No. 10 bolting silk. The tows were vertical ones, one to a station and usually from a depth of 100 to 0 metres. The 1950 survey made 73 plankton tows, the 1951 survey 56. For convenience, Johnson's figures showing the plankton stations occupied in 1950 and 1951 are reproduced here as Figs. 1 and 2. The position of station 29 on Fig. 1 has been corrected to agree with a location of 72°55′N., 161°12′W. rather than north of 73° as in Johnson (1956, Fig. 2, p. 4).

The medusae, which are discussed in the present report, were separated from the plankton samples studied by Johnson. Distributions of the different species of medusae are shown in Figs. 3, 4 and 6–8 and the depth intervals sampled are recorded in Tables 2–7. A short description is given of each species identified, and, as in Johnson's account, we have divided the area covered in these surveys into three parts: the Chukchi Sea, the western Beaufort Sea, and the eastern Beaufort Sea. In the discussion of each species the general distributional data are taken from Mayer (1910) and Russell (1953); authors will be cited only when the distributional data are from other sources.

We wish to thank Dr. Martin W. Johnson, of the Scripps Institution of Oceanography, for sending us the medusae sorted from the plankton samples and also for giving us the data on the locations of stations, date and time of

[1]Department of Zoology, University of California, Berkeley.

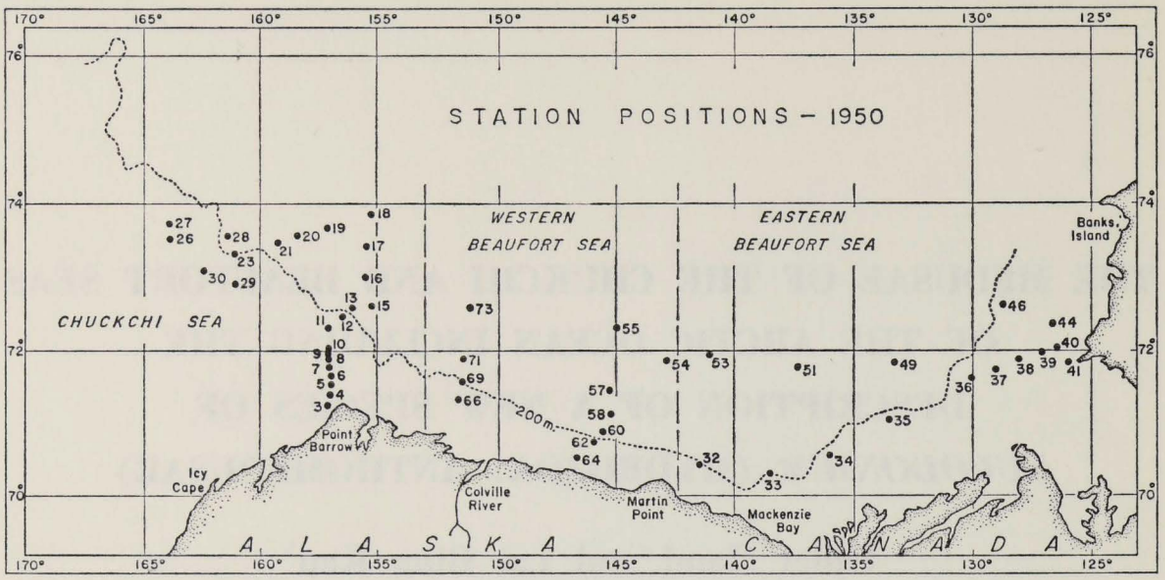


Fig. 1. U.S.S. *Burton Island* 1950 plankton station positions and approximate location of 200-metre contour (after Johnson, 1956).

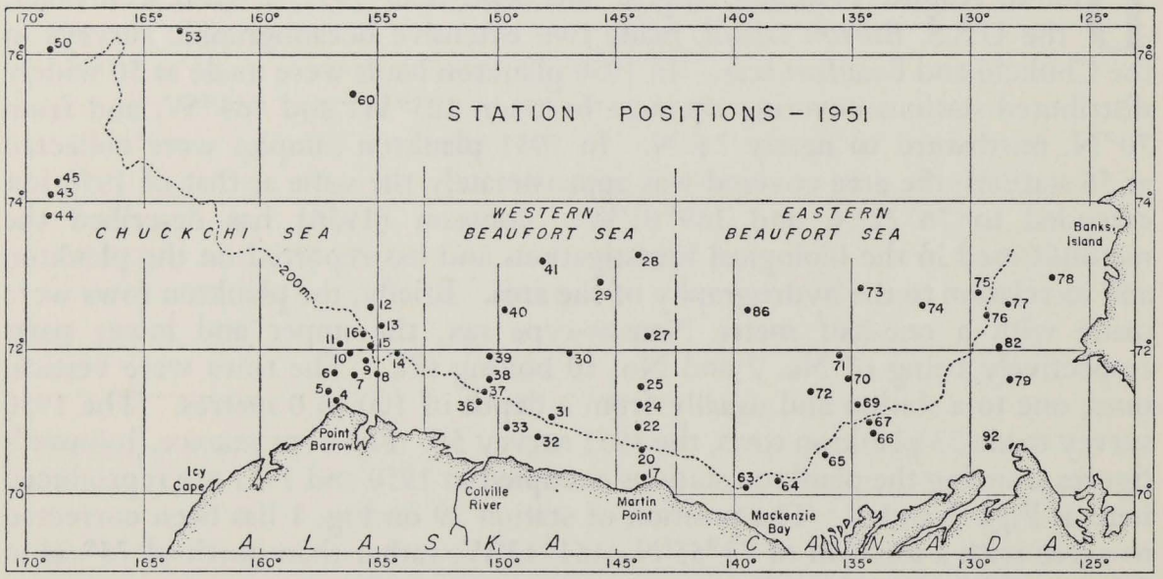


Fig. 2. U.S.S. *Burton Island* 1951 plankton station positions and approximate location of 200-metre contour (after Johnson, 1956).

collecting, and depth interval sampled. We are also grateful to those who contributed to the making of the net collections, the officers and scientists aboard the U.S.S. *Burton Island*. We should like to thank Mrs. Emily Reid of the Department of Zoology at Berkeley for the illustrations in this report. All of the material on which this report is based has been deposited in the United States National Museum.

CLASS HYDROZOA

ORDER ANTHOMEDUSAE

FAMILY BOUGAINVILLIIDAE

***Bougainvillia superciliaris* (L. Agassiz)**

One immature specimen was obtained at station 3, 71°20.8′N., 156°44′W., off Point Barrow, Chukchi Sea in 1950 (Fig. 3).

This specimen has a moderately thick bell, a peduncle, and oral tentacles branching dichotomously four to five times. Most of the tentacles were broken off, but eleven bean-shaped ocelli are present in each of the marginal tentacular bulbs. The bell is 5 mm. tall and 4 mm. in diameter.

This is an arctic species, but it also occurs along the coasts of Norway, Denmark, and Holland, in the Baltic and British waters, and in the southeastern North Sea at Helgoland. It has been recorded in the White Sea and Barents Sea, off Spitsbergen, Bear Island, Iceland, Greenland, Labrador, and along the west coast of the North Atlantic as far south as Woods Hole. It also occurs in the North Pacific, Aleutian Islands, and Vancouver Island region (Foerster, 1923).

MacGinitie (1955, p. 118) reported that six specimens of this medusa were taken near shore off Point Barrow, Chukchi Sea, in August 1948 and July 1949. Another specimen, which appeared to be sexually mature, was taken by him on 23 July 1950.

***Bougainvillia* sp. [near *B. principis* (Steenstrup)]**

A single mature specimen was collected with *B. superciliaris* at station 3, 71°20.8′N., 156°44′W., off Point Barrow, Chukchi Sea, in 1950 (Fig. 3).

This specimen has a moderately thick bell and a short peduncle. Its oral tentacles branch dichotomously five or six times. Most of the marginal tentacles had been broken off but 20–23 ocelli, deep brown in colour and bean-shaped, are clearly seen on each marginal tentacular bulb. The ocelli of typical *B. principis* are described as round by Russell (1953). Although this specimen is sexually mature, and eggs and planula larvae are seen projecting out of the gonads, it measures only 6.0 mm. wide and 6.5–7.0 mm. tall whereas full-grown *B. principis* may be 10–11 mm. tall and those from British waters are usually 7–8 mm. tall.

B. principis is found in arctic waters and in the subarctic of the North Atlantic as far south as the British Isles. It is not known from the Pacific. If this specimen is correctly assigned to *B. principis*, its occurrence in the Chukchi Sea is a new distributional record. If it is not *B. principis*, it must be an undescribed species.

FAMILY PANDEIDAE

***Leuckartiara nobilis* Hartlaub**

Seven specimens, ranging from 3 mm. wide and 5 mm. tall to 19 mm. wide and 21 mm. tall, were taken in 1950 and four more, ranging from 4 mm. wide and 5 mm. tall to 12 mm. wide and 13 mm. tall, in 1951. In 1950 *L. nobilis* was found in all three areas (Fig. 3), whereas in 1951 it was taken in the Chukchi

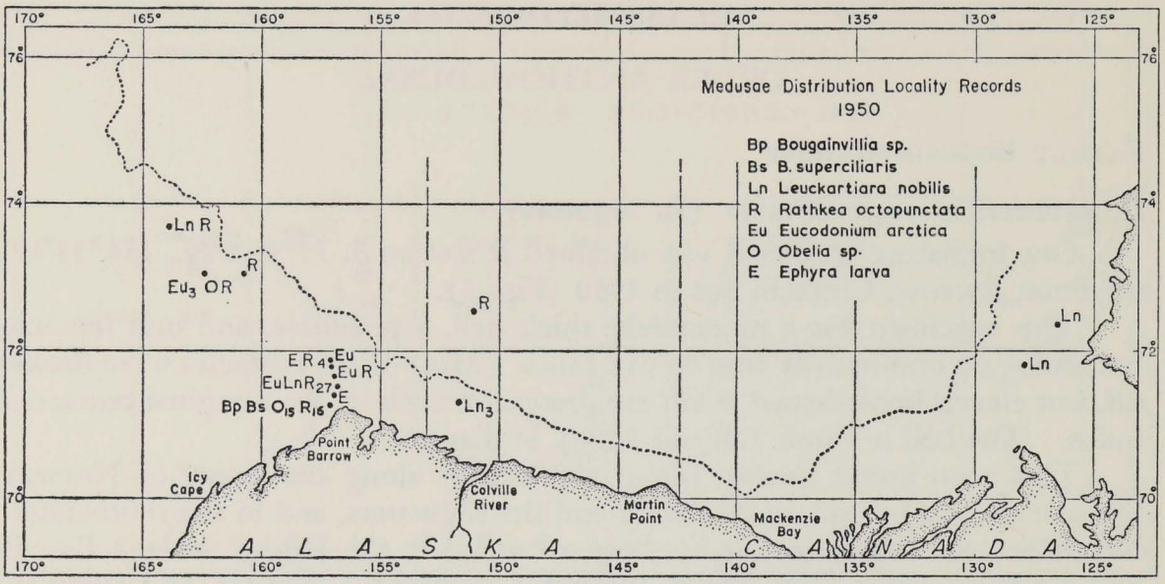


Fig. 3. Distribution of *Bougainvillia superciliaris*, *Bougainvillia* sp. (=*B. principis*?), *Leuckartiara nobilis*, *Rathkea octopunctata*, *Eucodonium arctica*, *Obelia* sp., and ephyra larvae in 1950. The dotted line shows the approximate location of the 200-metre contour. The subscript numbers indicate the number of specimens taken.

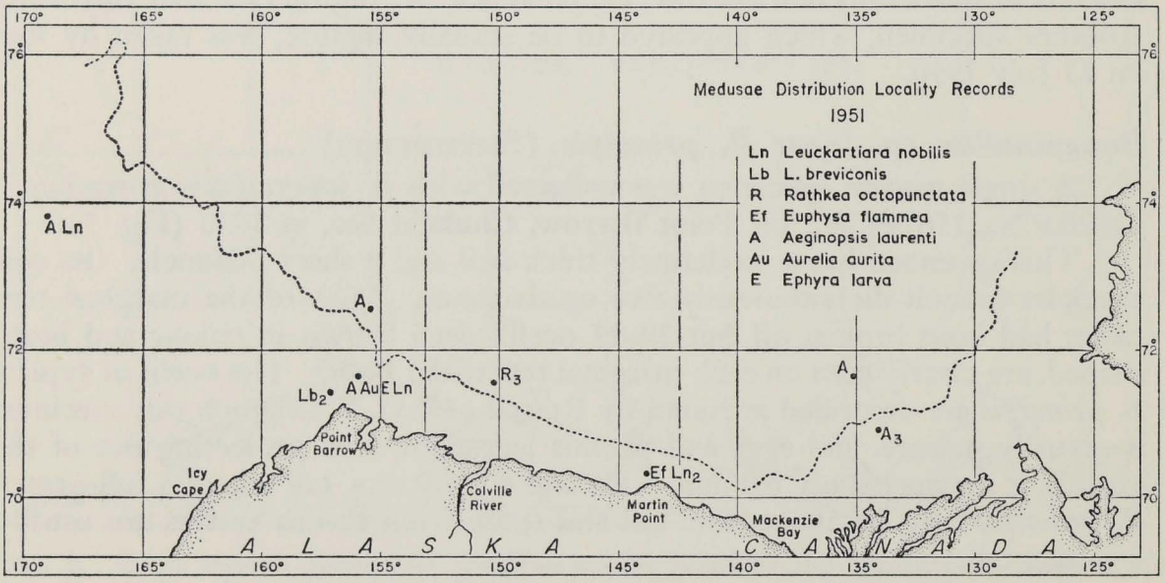


Fig. 4. Distribution of *Leuckartiara nobilis*, *Leuckartiara breviconis*, *Rathkea octopunctata*, *Euphysa flammea*, *Aeginopsis laurenti*, *Aurelia aurita*, and ephyra larvae in 1951. The dotted line shows the approximate location of the 200-metre contour. The subscript numbers indicate the number of specimens taken.

and western Beaufort seas only (Fig. 4). The state of the gonads is very variable; the small specimens have not yet started their development while large ones are fully mature.

This oceanic species has been recorded from Valencia (southwest Ireland); south of Iceland; Atlantic Ocean west of Scotland; Rockall; Great Belt, Denmark; Newfoundland; Mediterranean, and the northern Atlantic area. In the Pacific it has been reported along the coast of British Columbia only, north of

Vancouver Island (Foerster, 1923). The records given above are the first from the North American Arctic.

***Leuckartiara breviconis* (Murbach and Shearer)**

Two specimens were caught in August 1951 in the Chukchi Sea at 71°29.4'N., 156°53.4'W. (Fig. 4). The smaller specimen is 12 mm. wide and 14 mm. tall whereas the larger one is 14 mm. both in width and height. Both possess gonads which are not yet mature.

The presence of large numbers of tentacles (up to 140) in these two specimens distinguished them from *L. octona* and *L. nobilis*. This species has been reported to occur in the northern North Sea; from the Hebrides and off the Orkney and Shetland islands in British waters; southern part of Norway; Rockall; south Iceland; south and west Greenland; Pribilof Islands, Alaska; and Japan. It was reported by Foerster (1923) to occur in the Bering Sea, the Arctic Ocean, and the British Columbia coast in the Vancouver Island region and farther north.

FAMILY RATHKEIDAE

***Rathkea octopunctata* (M. Sars)**

A total of 52 specimens was collected at eight stations in 1950 (Fig. 3). Seven of these stations were in the Chukchi Sea; the other in the western Beaufort Sea. Of the 52 specimens, 48 are from four stations close to Point Barrow. Only three specimens were obtained, and from a single station, in the western Beaufort Sea (Fig. 4) in 1951. Sizes of the specimens range from 0.5 mm. to 2.0 mm. both in width and height. Some of the larger ones carry three series of medusa buds.

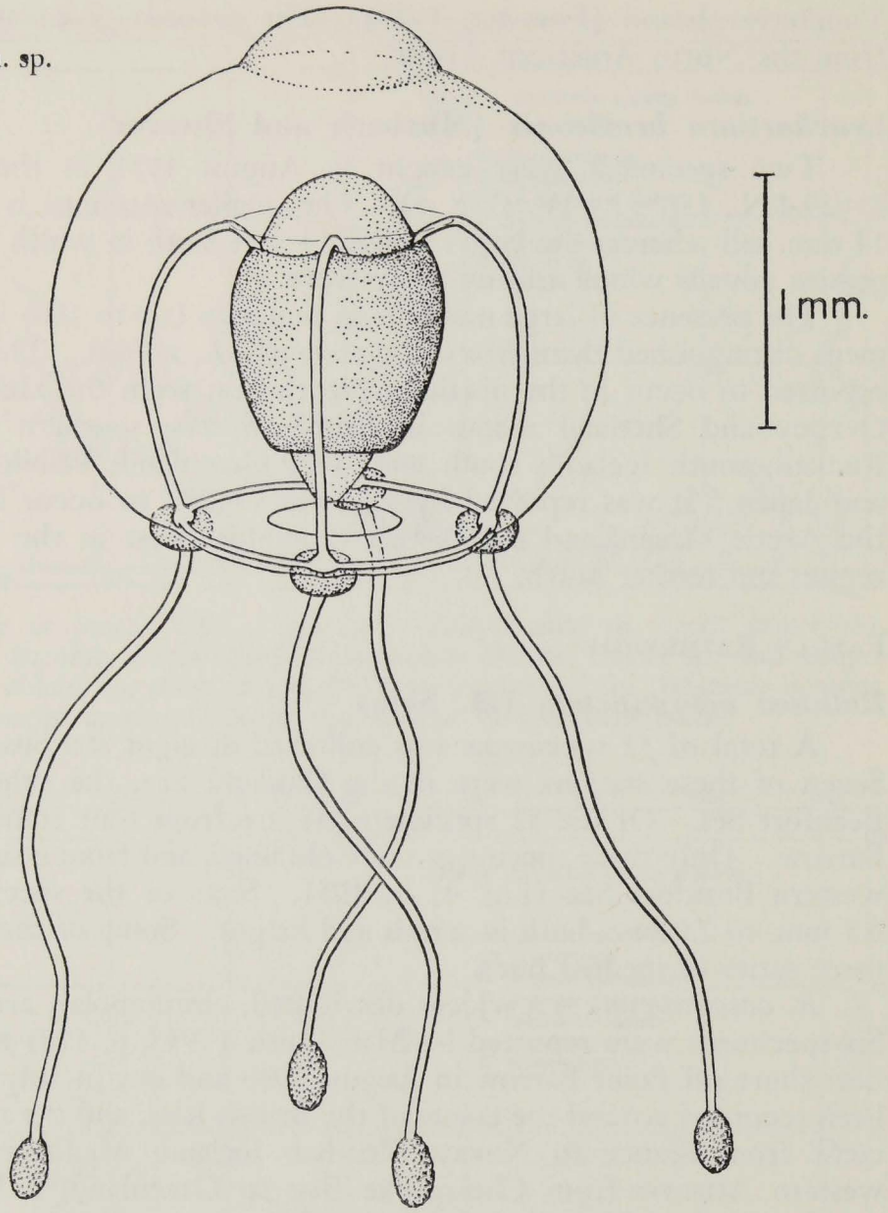
R. octopunctata is a widely distributed, circumpolar, arctic-boreal species. Six specimens were reported by MacGinitie (1955, p. 118) to have been taken near shore off Point Barrow in August 1948 and one in July 1950. It has also been recorded around the coasts of the British Isles, and the northern European coast from France to Novaya Zemlya; Iceland; Mediterranean; Black Sea; western Atlantic from Chesapeake Bay to Greenland; ? Bermuda; and the Pacific coasts of Japan and the Bering Sea.

FAMILY TUBULARIIDAE

***Eucodonium arctica* new species** (see Fig. 5)

Bell, 2.0–2.5 mm. wide, 2.5–3.0 mm. high, almost spherical, thin-walled with a slightly rounded apical projection. Four radially placed, slender tentacles; each with a small basal bulb enclasped by a ring-like nematocyst pad. Eyespots apparently absent. Tentacles up to twice as long as the height of the bell; each with a large, swollen, nematocyst-bearing knob at their end. Margin of the bell is somewhat four-cornered; velum broad; four straight, narrow radial-canals. Stomach cylindrical mounted upon a short gelatinous peduncle with a dome-shaped summit towards the aboral side of the bell and tapering towards the mouth. In the upper half of the stomach, large oil globules are often seen. Mouth is a simple round opening at about the level of the velum. Gonads ring-like, completely surrounding the stomach.

Fig. 5.
Eucodonium arctica n. sp.



Nematocysts: two types of nematocysts, desmonemes and stenoteles, are present. The terminal knob of the tentacles possesses large numbers of desmonemes which range from 16–18μ long by 10–11μ wide. The nematocyst pad, clasping the tentacle bases, possesses both desmonemes and stenoteles. The desmonemes are 15–18μ long by 9–11μ wide, and the stenoteles are 7–10μ long by 6–8μ wide. A few scattered nematocysts, probably all stenoteles, occur on the exumbrellar bell surface.

Distribution: Chukchi Sea, Arctic Ocean.

A total of 6 specimens was collected in August 1950; 3 specimens were caught within 71°–72°N. and 156°–157°W. and 3 specimens were obtained at 72°55′N., 162°28′W. One of these specimens was destroyed in making smears for the determination of nematocysts.

Type locality: Chukchi Sea (72°55′N., 162°28′W.).

Type specimens: holotype, USNM 51085; paratypes, 1 specimen, USNM 51086, 3 specimens, USNM 51087.

Hydroid stage unknown.

The absence of medusoid buds on the stomach, the presence of a ring-like nematocyst pad enclasping the small basal bulb of each tentacle, as well as a dome-shaped summit of the stomach distinguish it from the other species of *Eucodonium* (*E. brownei* Hartlaub). Its similarities to the very young stage of *Ectopleura* are rather pronounced. However, it does not possess nematocyst tracks on the exumbrellar surface and in mature specimens of this new species of *Eucodonium*, the dome-shaped summit of the stomach is persistent although it is surrounded almost to the summit by the well-developed gonads. In view of these characters as well as the possession of ring-like nematocyst pads enclasping the small basal bulbs of the tentacles, this is considered to be a new species of *Eucodonium*. All six of the specimens obtained were in a badly distorted state and most had some of the tentacles missing. Figure 5 is a composite drawing, which it is hoped closely approximates to the appearance of this animal in life.

***Euphysa flammea* (Linko)**

Only one specimen was collected in 1951 at station 17, 70°10'N., 143°40'W., off Martin Point, western Beaufort Sea (Fig. 4). The specimen measures 5 mm. wide and 7 mm. tall and its gonads are not yet mature.

Although only one specimen was obtained within the three areas during these two surveys, it was reported (as *Sarsia flammea*) by MacGinitie (1955, p. 117) to be the most abundant anthomedusan at Point Barrow. *Euphysa flammea* is widely distributed in the Arctic Ocean and the North Atlantic and Pacific oceans.

ORDER LEPTOMEDUSAE

Family Campanulariidae

***Obelia* sp.**

Our present knowledge is not sufficient to describe *Obelia* medusae as species or to make satisfactory distinctions between the so-called species of *Obelia* medusae.

Sixteen specimens were obtained from two stations in the Chukchi Sea in August 1950 (Fig. 3). Sizes ranged from 1.0–2.0 mm. in diameter. The specimens vary from very immature (no gonads developed) to fully mature specimens.

Obelia is of world-wide distribution.

ORDER TRACHYMEDUSAE

Family Rhopalonematidae

***Aglantha digitale* (Müller) var. *camtschatica* (Brandt) comb. nov.**

This very common and most consistently abundant hydromedusan was taken at practically all stations in both years. The total number of young and mature specimens collected in 1950 and 1951 was 1,791 and 450 respectively (Figs. 6 and 7).

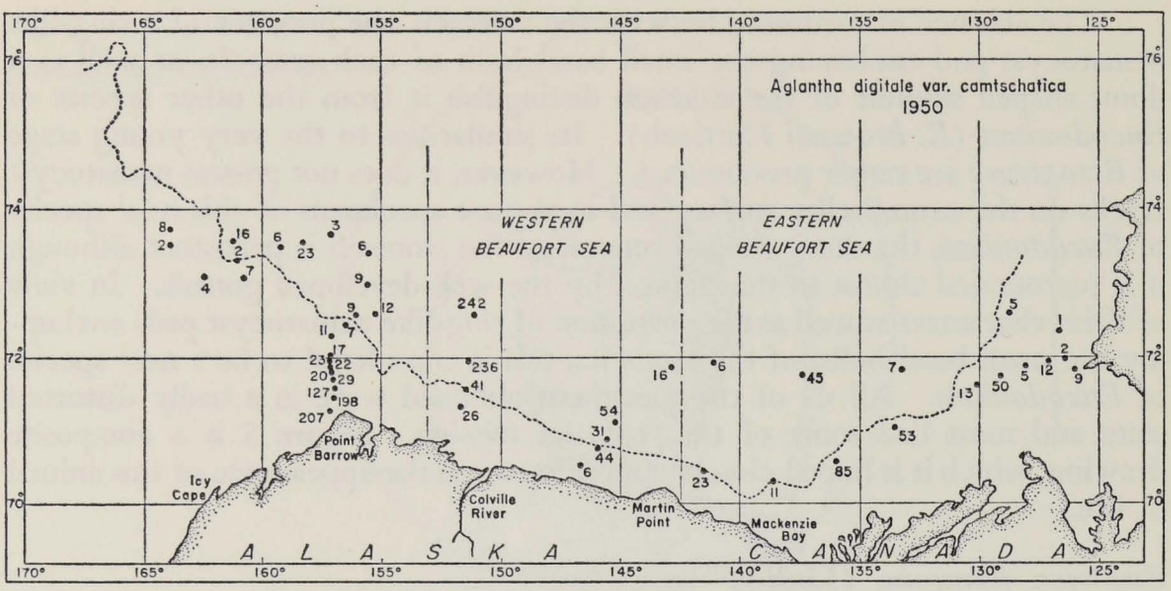


Fig. 6. Distribution of *Aglantha digitale* var. *camtschatica* in 1950. The dotted line shows the approximate position of the 200-metre contour.

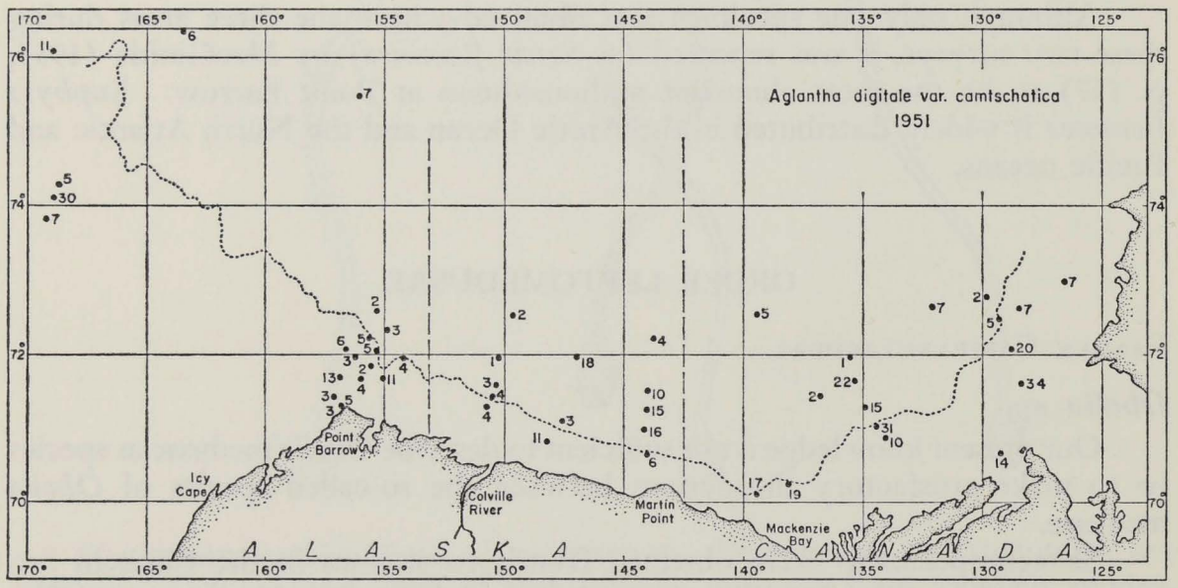


Fig. 7. Distribution of *Aglantha digitale* var. *camtschatica* in 1951. The dotted line shows the approximate position of the 200-metre contour.

Typical *A. digitale* of the North Atlantic are 15 mm. wide and 30 mm. high and possess a peduncle which extends from the inner apex of the sub-umbrella almost to the level of the bell-margin. The specimens collected in these two surveys are of smaller size, and range from saucer-shaped specimens, 0.4 mm. in diameter, to elongated ones of 7–8 mm. in width and 15–16 mm. in height, bearing gonads of 5–6 mm. in length. They all have a shorter peduncle which together with the stomach often does not quite reach the level of the bell-margin. *Circe camtschatica* and *Trachynema camtschatica* (both well-established synonyms of *A. digitale*) of the North Pacific, described and figured by Brandt (1838) and Agassiz (1865) respectively, have shorter peduncles which correspond closely to the length of the peduncle observed in

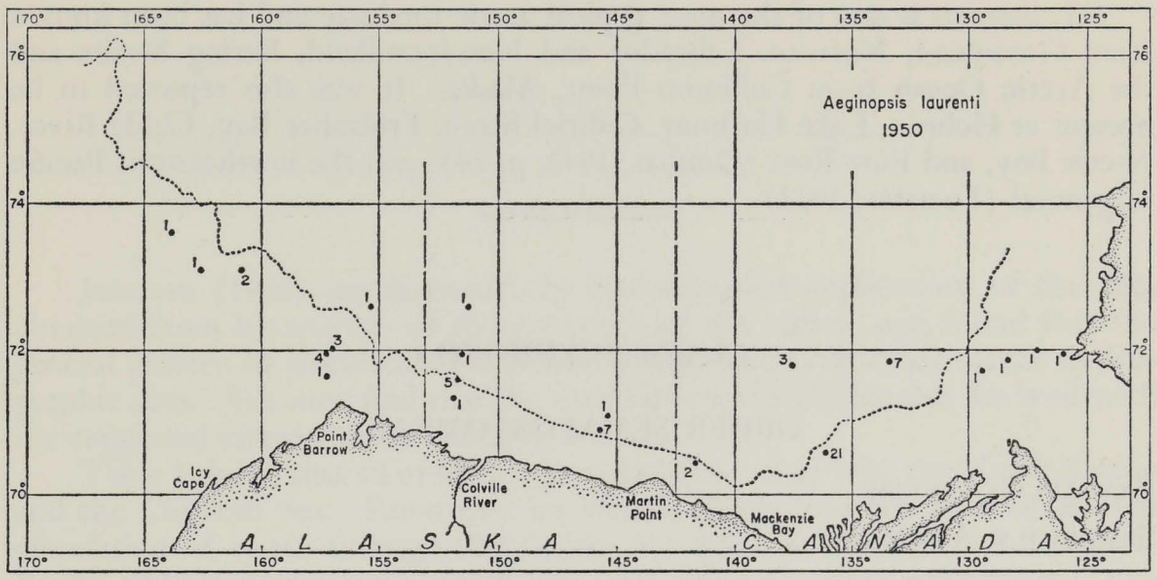


Fig. 8. Distribution of *Aeginopsis laurenti* in 1950. The dotted line shows the approximate position of the 200-metre contour.

all our specimens. In view of this and the smaller size of the North Pacific and Arctic Ocean material we feel justified in recognizing this population as distinct from the Atlantic representatives of *A. digitale*, and we have used Brandt's name, *camtschatica*, to designate this geographical variety. The use of varietal, rather than subspecific, names here follows long-established usage, and seems to us to be wise until a complete revision of *Aglantha*, its species and varieties, is completed.

An unusual specimen was found at station 4, 71°21'N., 156°43.5'W., in 1951. This is very much more slender than the normal, being 14 mm. in height and only 3.5 mm. in width. Its eight sausage-shaped gonads (about 4–5 mm. in length arising from the sides of eight radial canals and hanging down from near the apex of the subumbrella) are similar to those of the other specimens, however, the length of the peduncle, being only two-thirds of the length of the bell, is markedly shorter. Its velum is very broad, leaving only a small circular opening. Whether this is an abnormal *A. digitale* var. *camtschatica* or whether it is an undescribed variety, or species, of *Aglantha* cannot be decided on the basis of the single specimen available.

Aglantha digitale as a species is essentially worldwide in distribution, while the var. *camtschatica* is so far known only from the North Pacific and Arctic oceans.

ORDER NARCOMEDUSAE

Family Aeginidae

Aeginopsis laurenti Brandt

This species ranks second in abundance to *Aglantha*. The total numbers collected were 66 in 1950 and 6 in 1951. It has been taken from all three areas (Figs. 8 and 4). Sizes of individuals vary from 2.0 mm. in the young to 9.0 mm. in diameter in the mature specimens.

A. laurenti is one of the most typical arctic medusae and has been known from Greenland, Norway, Labrador and Newfoundland, Bering Straits and the Arctic Ocean from Collinson Point, Alaska. It was also reported to be present at Hebron, Lake Harbour, Gabriel Strait, Frobisher Bay, Clyde River, Arctic Bay, and Fort Ross (Dunbar, 1942, p. 74), and the northeastern Pacific in general (Foerster, 1923).

CLASS SCYPHOZOA

ORDER SEMAEOSTOMEAE

FAMILY ULMARIDAE

SUBFAMILY AURELINAE

***Aurelia aurita* (Linnaeus)**

One single, very young specimen, only 25 mm. in diameter and without gonads, was collected at station 7, 71°39'N., 155°57'W., in the Chukchi Sea in August 1951 (Fig. 4).

MacGinitie (1955, p. 120) reported that countless thousands of *Aurelia* occurred at Point Barrow near the middle of August 1948. It is widely distributed in the Pacific and is also common from Greenland to the West Indies in the Atlantic.

Larvae

One specimen of an ephyra larva, 5.5 mm. in diameter, of a scyphozoan was collected from station 7 at 71°45'N., 156°45.5'W. and one of the same size at station 4, 71°28.5'N., 156°35'W., off Point Barrow, Chukchi Sea, in August 1950. Another specimen of similar size was obtained from station 7 in 1951 in the same sample with *Aurelia aurita* at 71°39'N., 155°57'W., a little west of Point Barrow. These larvae may well be the ephyra stage of *A. aurita.*

DISCUSSION

Johnson (1956) has discussed the hydrographic implications of the data obtained from his analysis of the copepods of the region, and found that the general pattern of circulation postulated agreed well with other recent hydrographic data. We now find that the distribution of medusae also fits well with the suggested circulation of the area.

Table 1 shows that all of the medusae listed occur in both the North Pacific and the Chukchi Sea. From this we would surmise, on the basis of known circulation of water through the Bering Sea into the Chukchi Sea from the Pacific, that these medusae represent a continuous breeding population. The data for most species are too few to show this is true; however, at most stations where *Aglantha* and *Aeginopsis* were collected the individuals range from small immature specimens to fully mature ones. It also is probably true that all of these species occur as far east as the western Beaufort Sea, although our findings do not show this, and of course these species must occur in the Bering Sea.

Of the species we have studied only the trachymedusan *Aglantha* and the narcomedusan *Aeginopsis* are holoplanktonic. The anthomedusans, leptomedusans, and semaeostomes, all have benthic larval stages, and must be classed as meroplanktonic. It is of interest that only the holoplanktonic *Aglantha* and *Aeginopsis* and two specimens of the meroplanktonic *Leuckartiara nobilis* occur as far east as the eastern Beaufort Sea (see Table 1). This suggests that the holoplanktonic forms have been carried into the eastern Beaufort Sea by the southwesterly flowing current of the clockwise eddy which is assumed to exist there. The two specimens of *Leuckartiara nobilis*, which were collected at stations 38 and 44 (see Table 4 and Fig. 3), were not fully mature; with the scanty data available we cannot do more than suggest, in view of the distribution of *Aglantha* and *Aeginopsis*, that the *Leuckartiara* might also have come into this area from the north. However, the data on the distribution of *Aglantha* strongly suggest that this medusa occurs throughout the whole arctic area and the same may be true for *Aeginopsis* and *Leuckartiara nobilis*, although the information is much less convincing for these two. If these species do indeed reproduce throughout the area, then they can be classified as marine arctic plankton (see Dunbar, 1951).

The distribution of *Aglantha* for the years 1950 and 1951 (see Figs. 6 and 7) shows interesting differences. In 1950 *Aglantha* reached its highest concentrations at stations to the north and slightly to the east of Point Barrow. The three stations immediately north of Point Barrow produced 207, 198, and 127 specimens of *Aglantha*, while the three most northerly stations in the line running north at about 151° produced 41, 236, and 242 *Aglantha*. Figure 9 shows that the isotherms are closely spaced in the area of the three stations north of Point Barrow in this year. This close spacing strongly suggests an area of convergence of currents in which there must be a downward movement of water. It seems likely that a medusa such as *Aglantha* when carried

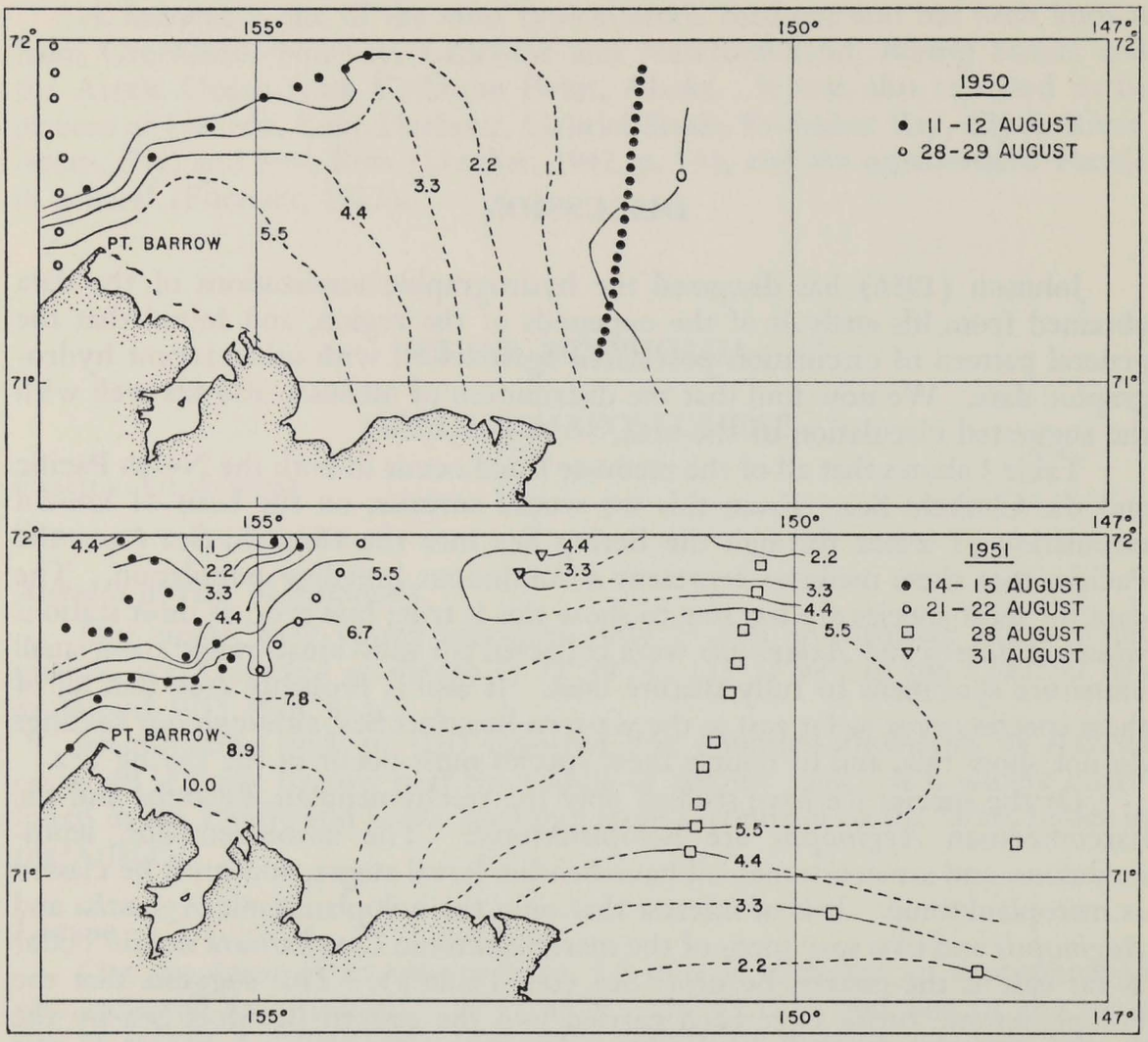


Fig. 9. Surface temperatures (°C) in the region of Point Barrow in August 1950 and August 1951 (after Johnson, 1956).

into a downwelling current would, as a behavioral response, tend to swim upwards and try to maintain itself in the surface layers, which could explain the high concentration of *Aglantha*. That *Aglantha* does normally occur most abundantly in the surface waters seems apparent from the data obtained at station 71 (see Table 3). At station 71 three tows were taken at different depths which resulted in the capture of 5 *Aglantha* between 430 and 700 metres, 4 between 145 and 250 metres, and 227 between 0 and 50 metres depth.

The three stations to the east of Point Barrow which produced high numbers of *Aglantha* do not occur at an area of abrupt temperature change. They do, however, seem to be at the easterly front of the eastward-moving incursion of the warmer and probably more saline water which has moved eastward past Point Barrow. Johnson (1956) found a sharp boundary between the populations of the copepods *Acartia longiremis* and *Limnocalanus grimaldi* in this same area. This sharp boundary between two species of copepods taken with our data on the high concentrations of *Aglantha* suggests again that this area may well be one of convergence of currents and that the high numbers of *Aglantha* again result from an accumulation of this species here as it attempts to remain close to the surface.

In 1951 there were no marked concentrations of *Aglantha* and the highest numbers collected at any station were 30, 31, and 34 (see Fig. 7). In 1950 a total of 1,791 specimens of *Aglantha* were taken while 1951 produced only 450. Of the 1,791 specimens collected in 1950, 1,031 were taken at the six stations discussed above and if these are eliminated the data for the two years are more comparable However, the temperature distribution for 1951 may give us some explanation for the much lower densities of *Aglantha.* In that year the whole area north and much farther to the east of Point Barrow was considerably warmer than in 1950. This would suggest that a very strong easterly flow had developed beyond Point Barrow and that the cold (0°) arctic water which covered much of the area in 1950 had been displaced to the east and north. Since no highs in *Aglantha* were noted in 1951 it may be that the areas of convergence were not sampled or lay outside the areas sampled. On the other hand, the isotherms are closely spaced north of Point Barrow in several areas and also along the 150° parallel just south of 72°N., but did not produce higher numbers of *Aglantha.* It is possible, of course, that the high numbers of *Aglantha* collected in 1950 cannot be explained as suggested and that the differences between the two years may be the result of still unknown biological or physical processes. It seems unlikely to us, however, that the differences could be attributed to differences in sampling or to sampling errors.

The meroplanktonic anthomedusans (except for *Rathkea octopunctata*), leptomedusans, and scyphomedusans are restricted in both years to the areas of less than 20 metres depth. The limiting factor is the availability of satisfactory sites for attachment of their immature benthic stages. The distribution of the attached stages of these medusae has not been worked out, but in general they may be expected to live in shallow water. From the distribution of the adults it seems clear that there is no necessity for any of the attached stages to have occurred farther north or east than Point Barrow, except for *Leuckartiara nobilis* and *Euphysa flammea.* For the two exceptions (see Figs. 3 and 4) it seems better to suggest that their benthic stages occur in the shallow waters of the eastern and western Beaufort Sea rather than that these medusae were carried to their points of collection via a nearly complete circuit of the eddy in the Beaufort Sea. For the meroplanktonic medusae in general our data seem to indicate that these organisms are being carried into the Arctic from lower latitudes and become more sparse as one progresses northward as a result of little or no local replenishment.

SUMMARY

This report is based on a collection of medusae sorted from macroplankton obtained by the U.S.S. *Burton Island* in the Chukchi and Beaufort seas of the Arctic Ocean in 1950 and 1951.

Eleven species of medusae were collected of which 10 were hydromedusans (7 Anthomedusae, 1 Leptomedusae, 1 Trachymedusae, 1 Narcomedusae) and 1 was a scyphozoan (Semaeostomeae). A new species of anthomedusan (*Eucodonium arctica*) is described as well as a new variety of trachymedusan (*Aglantha digitale* var. *camtschatica*).

The hydrographic implications of our data agree very well with previous knowledge of the currents of the Arctic. The distribution of *Aglantha* seems to indicate a strong convergence of currents north and east of Point Barrow, Alaska in 1950, but not in the succeeding year. In 1951 it indicates a marked eastward flow of water well beyond Point Barrow.

Only two of the medusae studied, *Aglantha* and *Aeginopsis*, seem to be true members of the arctic marine plankton community. It is interesting that these two are also the only holoplanktonic medusae collected. Two others, *Leuckartiara nobilis* and *Euphysa flammea*, might possibly be members of this community. The virtual absence of meroplanktonic medusae from the eastern Beaufort Sea is interpreted as showing that neither the areas to the north, nor the eastern Beaufort Sea itself provide suitable environmental conditions for reproduction of fixed stages. The meroplanktonic medusae are limited in general to waters less than 200 metres deep in the areas studied.

References

Agassiz, A. 1865. 'North American Acalephæ'. *Cat. Mus. Comp. Zool. Harvard Coll.*, No. 2, 234 pp.

Brandt, J. F. 1838. "Ausführliche Beschreibung der von C. H. Mertens auf seiner Weltumsegelung beobachten Schirmquallen". *Mém. Acad. Sci. St. Pétersbourg*, Ser. 6, Vol. 4, No. 1, pp. 237–411.

Dunbar, M. J. 1942. "Marine macroplankton from the Canadian Eastern Arctic. II. Medusae, Siphonophora, Ctenophora, Pteropoda and Chaetognatha". *Can. J. Res.* Vol. 20, Sec. D, pp. 71–9.

1951. 'Eastern Arctic waters'. *Fish. Res. Bd. Can. Bull.* No. 88, 131 pp.

Foerster, R. E. 1923. "The hydromedusae of the west coast of North America, with special reference to those of the Vancouver Island region". *Contr. Canad. Biol.* Vol. 1, No. 12, pp. 221–77.

Johnson, M. W. 1956. 'The plankton of the Beaufort and Chukchi sea areas of the Arctic and its relation to the hydrography'. *Arctic Inst. North Amer. Tech. Paper* No. 1, 32 pp.

MacGinitie, G. E. 1955. 'Distribution and ecology of the marine invertebrates of Point Barrow, Alaska'. *Smithson. Misc. Coll.* Vol. 128, No. 9, 201 pp.

Mayer, A. G. 1910. 'Medusae of the world'. *Carnegie Inst. Wash. Publ.* No. 109, 3 vols., 735 pp. + 76 pls.

Russell, F. S. 1953. 'The medusae of the British Isles'. Cambridge, England: 530 pp. + 35 pls.

Table 1. General distributional records of some of the medusae.

	North Pacific	Bering Sea	Chukchi Sea	W. Beaufort Sea	E. Beaufort Sea
Bougainvillia superciliaris	X		X		
Leuckartiara nobilis	X		X	X	X
Leuckartiara breviconis	X	X	X		
Rathkea octopunctata	X	X	X	X	
Euphysa flammea	X		X	X	
Obelia sp.	X		X		
Aglantha digitale	X		X	X	X
Aeginopsis laurenti	X	X	X	X	X
Aurelia aurita	X		X		

Table 2. Medusae distribution in Chukchi Sea — 1950. Total number of specimens given.

Station Depth sampled in metres	3 0–5	4 0–58	5 0–100	6 0–100	7 0–61	8 0–72	9 0–90	10 0–109	11 0–150	12 0–230	13 0–46	15 0–122	16 0–91	17 0–107	19 0–100	20 0–100	21 0–100	23 0–145	26 0–69	27 0–137	28 0–100	29 0–91	30 0–90
Bougainvillia superciliaris	1																						
Bougainvillia sp.	1																						
Leuckartiara nobilis			1																	1			
Rathkea octopunctata	16		27	1	4															1		1	1
Eucodonium arctica			1	1		1																	3
Obelia sp.	15																						1
Aglantha digitale	207	198	127	29	20	22	23	17	11	7	9	12	9	6	3	23	6	2	2	8	16	7	4
Aeginopsis laurenti				1			4	3				1								1		2	1
Ephyra larva		1			1																		

Table 3. Medusae distribution in western Beaufort Sea — 1950. Total number of specimens given.

Station Depth sampled in metres	54 0–100	58 0–100	60 0–91	62 0–61	64 0–27	66 0–46	69 0–100	71 0–50	71 145–250	71 430–700	73 0–100
Leuckartiara nobilis						3					
Rathkea octopunctata											1
Aglantha digitale	16	54	31	44	6	26	41	227	4	5	242
Aeginopsis laurenti		1	7			1	5	1			1

Table 4. Medusae distribution in eastern Beaufort Sea — 1950. Total number of specimens given.

Station	32	33	34	35	36	37	38	39	40	41	44	46	49	51	53
Depth sampled in metres	0–46	0–91	0–46	0–91	0–91	0–100	0–100	0–100	0–15	0–67	0–30	0–100	0–100	0–86	0–100
Leuckartiara nobilis							1				1				
Aglantha digitale	23	11	85	53	13	50	5	12	2	9	1	5	7	45	6
Aeginopsis laurenti	2		21			1	1	1		1			7	3	

Table 5. Medusae distribution in Chukchi Sea — 1951. Total number of specimens given.

Station Depth sampled in metres	1 0–36	4 0–20	5 0–100	6 0–63	7 0–100	8 0–50	9 0–100	10 0–60	11 0–100	12 0–100	13 0–100	14 0–100	15 0–100	16 0–100	43 0–100	44 0–100	45 0–100	50 0–100	53 0–100	60 0–100
Leuckartiara nobilis					1											1				
Leuckartiara breviconis			2																	
Aglantha digitale	3	5	3	13	4	11	2	3	6	2	3	4	5	5	30	7	5	11	6	7
Aeginopis laurenti					1					1						1				
Aurelia aurita					1															
Ephyra larva					1															

Table 6. Medusae distribution in western Beaufort Sea — 1951. Total number of specimens given.

Station Depth sampled in metres	17 0–16	20 0–50	22 0–100	24 0–100	25 0–100	27 0–100	30 0–100	31 0–100	32 0–100	36 0–100	37 0–100	38 0–100	39 0–100	40 0–100
Leuckartiara nobilis	2													
Rathkea octopunctata												3		
Euphysa flammea	1													
Aglantha digitale		6	16	15	10	4	18	3	11	4	4	3	1	2

Table 7. Medusae distribution in eastern Beaufort Sea — 1951. Total number of specimens given.

Station Depth sampled in metres	63 0–100	64 0–100	66 0–100	67 0–100	69 0–100	70 0–100	71 0–100	72 0–100	74 0–100	75 0–100	76 0–100	77 0–100	78 0–100	79 0–100	82 0–100	86 0–100	92 0–100
Aglantha digitale	17	19	10	31	15	22	1	2	7	2	5	7	7	34	20	5	14
Aeginopsis laurenti			3			1											

TECHNICAL PAPERS OF THE ARCTIC INSTITUTE OF NORTH AMERICA

Copies of the *Technical Papers* can be obtained from the Montreal Office of the Institute, 3485 University Street, Montreal 2, Que., Canada.

Number 1. THE PLANKTON OF THE BEAUFORT AND CHUKCHI SEA AREAS OF THE ARCTIC AND ITS RELATION TO THE HYDROGRAPHY. By Martin W. Johnson. 1956. 32 pages, 15 tables, and 11 figures. *Price: $0.50.*

Number 2. THE MAMMALS OF BANKS ISLAND. By T. H. Manning and A. H. Macpherson. 1958. 74 pages, 35 tables, and 15 figures. *Price: to Members of the Institute $1.00; to non-Members $2.00.*

Number 3. THE VEGETATION OF NORTHERN MANITOBA. III. STUDIES IN THE SUBARCTIC. By J. C. Ritchie. 1959. 56 pages, 12 tables, 8 figures, and 8 plates. *Price: to Members of the Institute $1.00; to non-Members $2.00.*

Number 4. THE RELATIONSHIP OF THE PEARY AND BARREN GROUND CARIBOU. By T. H. Manning. 1960. 52 pages, 25 tables, 9 figures. *Price: to Members of the Institute $1.00; to non-Members $2.00.*

Number 5. MARINE INFAUNAL BENTHOS IN ARCTIC NORTH AMERICA. By Derek V. Ellis. 1960. 56 pages; 9 tables, 17 figures, and 2 plates. *Price: to Members of the Institute $1.00; to non-Members $2.00.*

Number 6. THE MEDUSAE OF THE CHUKCHI AND BEAUFORT SEAS OF THE ARCTIC OCEAN INCLUDING THE DESCRIPTION OF A NEW SPECIES OF *Eucodonium* (HYDROZOA: ANTHOMEDUSAE). By Cadet Hand and Lai Bing Kan. 1961. 23 pages, 7 tables, 9 figures. *Price: to Members of the Institute $0.50; to non-Members $1.00.*

PUBLICATIONS COMMITTEE

CONTRIBUTIONS TO THE *TECHNICAL PAPERS*

Scientific papers on all aspects of arctic work which are either too technical or too long for publication in the Institute's journal *Arctic*, may be submitted for publication in the *Technical Papers*. Manuscripts should be complete with maps, diagrams, and good glossy enlargements of photographs. Proofs will be sent to authors for correction.

An allowance of free reprints will be made.

All manuscripts should be addressed to the Editor, the Arctic Institute, 3485 University Street, Montreal 2, Que., Canada.