

The cable, roughly crossing the auroral zone perpendicularly, may be expected to have a minimum of interruptions on account of earth-current storms. The initial outlay for the proposed cable would be greater than that for a simple transatlantic cable between Europe and the east coast of North America; nevertheless, it would be cheaper than two independent cables from Thule to (a) the U.S., and (b) Europe. The actual laying of transarctic cables, although rather more difficult, is not impossible in an age where nuclear-powered icebreakers and submarines are available.

The Arctic is becoming increasingly accessible. Transpolar flights are rou-

tine. On a long-term basis there is little doubt that as civilization advances northward, additional communication circuits will be needed from middle latitudes of North America and Europe to the Arctic. In addition, more circuits will be required for intra-arctic use.

One final word may be said about arctic communications: all present long-range circuits may be replaced by satellite communication links if a sufficient number of communications satellites having polar orbits become available.

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BRYOZOA FROM THE ARCTIC ALASKAN COAST

During a cruise in August 1953 the U.S. Coast and Geodetic Survey LCM *Red* travelled along the northern Alaskan coast from Barter Island to Barrow. On this occasion a scientific party, including the ichthyologists N. J. Wilimovsky and H. Adair Fehlman, and the marine invertebrate zoologist Charles Horvath, was able to occupy a number of hydrographic and collecting stations.

The collections made on this cruise contain the first bryozoan material from the eastern arctic region of Alaska to reach the hands of scientists, except the one sample, containing *Eucratea loricatea* and *Hippothoa hyalina*, taken by the Canadian Arctic Expedition 1913-18 in this area¹. The collections are now at the Allan Hancock Foundation at the University of Southern California. Collections of two previous expeditions have been lost: the *Investigator* from which McClure collected in 1850-3, had to be abandoned; Stefansson had sampled in the area in 1913-14 during the Canadian Arctic Expedition, but the collections were lost with the *Karluk*.

The Bryozoa reported on here are parts of the samples taken with a small

biological dredge at 15 stations listed in Table 1 (from ref. 2). Stations 1, 9, and 14 were shore stations and have therefore been omitted. The following details are added to the original information given in Table 1: gravel was present in the samples from stations 3, 4, 5, 6, 11, 12, 15, 17, and 18; clay was found at station 3; kelp (laminarioids) to which bryozoans attach were represented by fragments only in six stations³.

In 12 stations 11 species of bryozoans were found. They have all been reported earlier from arctic Alaskan waters, specifically from the Point Barrow area^{4,5,6}, and most are common forms. This report establishes the presence of these species eastward beyond Point Barrow. *Hippothoa hyalina*, *Lichenopora canaliculata*, *Alcyonidium disciforme*, and *Vesicularia fasciculata* were reported for the first time off Point Barrow only in the last decade.

The distribution of the species varied considerably (Table 2). Samples rich in species were taken at stations 7 and 8. The species with the largest number of individuals and most widely distributed are *Alcyonidium disciforme* (9) and *Eucratea loricatea* (7). One species is endemic (*Vesicularia fasciculata*), one is bipolar (*Lichenopora canaliculata*), and

Table 1. List of stations.

Station	Locality	Long.	W.	Lat. N.	Date 1953 Aug.	Depth m.*	Sediment type	Kelp	Bryo- zoa
2	N. of Arey Island	143°	54'	70° 08'	9	10.70	sand		
3	Off Kangigivik Point	145°	14'	70° 03'	9	7.30	sand	+	+
4	Off Brownlow Point	145°	55'	70° 12'	10	12.80	? sand		+
5	W. of Flaxman Island	146°	15'	70° 11'	10	22.80	sand and mud	+	+
6	S.E. Stockton Islands	146°	50'	70° 15'	10	4.60	sand and mud	+	+
7	S. of Cross Island	147°	55'	70° 26'	10	7.30- 8.25	gravel	+	+
8	N. of Long Island	148°	50'	70° 31'	10	12.80	muddy clay	+	+
10	Off Thetis Island	150°	15'	70° 34'	11	7.30	sand, clay		
11	East Harrison Bay	150°	59'	70° 43'	11	8.25	clay, sand	+	+
12	Off Atigaru Point	151°	50'	70° 40'	11	4.60	sand		+
13	15 mi. E. of Pitt Point	152°	25'	70° 53'	11	6.40	clay		
15	N.W. of Pitt Point	153°	15'	70° 57'	12	7.30	mud		+
16	Smith Bay	154°	16'	70° 57'	12	6.10	sandy clay		+
17	Sanigaruak Pass, Elson Lagoon	155°	24'	71° 11'	12	3.65- 6.40	clay		+
18	Elson Lagoon, S.W. of Cooper Island	155°	48'	71° 13'	12	3.65	sand, clay		+

* Originally in feet.

one is cosmopolitan (*Hippothoa hyalina*). The remaining eight are restricted to the temperate, cool, and cold waters of the northern hemisphere. The identi-

several colonies on stones; sta. 18: numerous, on gravel. Circumpolar, northern hemisphere; Point Barrow. Common.

Table 2. The species of Bryozoa in the stations of the LCM Red, 1953.

Species	Stations												
	3	4	5	6	7	8	11	12	15	16	17	18	
<i>Euratea loricata</i>	+		+	+	+					+		+	+
<i>Cauloramphus cymbaeformis</i>	+		+							+			
<i>Tegella armifera</i>					+	+							
<i>Scrupocellaria scabra</i> var. <i>paenulata</i>						+	+						
<i>Dendrobaenia murrayana</i>						+	+						
<i>Hippothoa hyalina</i>	+		+			+	+						
<i>Diplosolen obelium</i>							+						
<i>Crisia cribraria</i>						+	+						
<i>Lichenopora canaliculata</i>							+	+					
<i>Alcyonidium disciforme</i>			+	+	+	+		+	+	+	+	+	+
<i>Vesicularia fasciculata</i>			+		+	+	+						+

fications of the species are based mainly on ref. 5.

In the following annotated list of the species their general distribution has been added (after ref. 5, 7, and 8).

Euratea loricata (L.), 1758 — Scrupariidae. Stations 3, 5, 6, 7, 15, 17, 18. Sta. 7: 5 colonies on gravel; sta. 17:

Cauloramphus cymbaeformis (Hincks), 1877 — Hincksiniidae. Stations 3, 5. Sta. 3: 1 juv. specimen on alga; sta. 5: 3 colonies on hydroid stems. Circumpolar; Point Barrow. Common.

Tegella armifera (Hincks), 1880 — Alderinidae. Stations 6, 8. Sta. 8: 2

colonies on algae. Circumpolar; circum-boreal; Point Barrow.

Scrupocellaria scabra var. *paenulata* Norman, 1903 — Scrupocellariidae. Stations 7, 8. Sta. 7: 2 colonies, one on gravel, one on alga; sta. 8: several colonies. Circumpolar; Point Barrow. Common.

Dendrobaenia murrayana (Johnston), 1847 — Bicellariellidae. Station 7. One colony on alga. Widely distributed in northern seas; abundant at Point Barrow.

Hippothoa hyalina (L.), 1758 — Hippothoidae. Stations 3, 5, 7, 8. Sta. 3: 5 colonies with ovicells, on algae; 9 colonies without ovicells; sta. 5: 1 colony on hydroid stem; sta. 7: 3 colonies on algae; sta. 8: 2 colonies on algae. Cosmopolitan; Arctic to the tropics; Point Barrow.

Diplosolen obelium (Johnston), 1838 — Diastoporidae. Station 8. One colony on alga. North Atlantic, North Pacific, Chukchi Sea; Point Barrow. Common in Alaskan waters.

Crisia cribraria Stimpson, 1853 — Crisiidae. Stations 7, 8. In both stations several colonies on algae. East coast of North America, fairly common; Point Barrow.

Lichenopora canaliculata (Busk), 1876 — Lichenoporidae. Stations 8, 11. In each station 1 colony on alga. Antarctic and far southern waters; several colonies at Point Barrow.

Alcyonidium disciforme (Smitt), 1871 — Alcyonidiidae. Stations 4, 5, 6, 7, 12, 15, 16, 17, 18. Most frequent species; occurs in great numbers. Sta. 4: 1 colony; sta. 5: 1; sta. 6: 125; sta. 7: 1; sta. 12: 1; sta. 15: 9; sta. 16: 72; sta. 17: 11; sta. 18: 39 colonies. Outer diameter 5-45 mm. Circumpolar; Point Barrow.

Vesicularia fasciculata Soule, 1953 — Vesiculariidae. Stations 4, 6, 7, 8, 18. Sta. 4: 1 colony; sta. 6: numerous, on gravel; sta. 7: 2 colonies on gravel; sta. 8: 6 colonies; sta. 18: numerous on gravel. Point Barrow.

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¹CAE station 27s, Collinson Point, Camden Bay, 70°24'N. 161°25'W., Oct. 3/4, 1913, 3 fathoms.

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³Mohr, J. L., N. J. Wilimovsky, and E. Y. Dawson. 1957. An arctic Alaskan kelp bed. *Arctic* 10:45-52.

⁴Osburn, R. C. 1923. Bryozoa. Canadian Arctic Expedition 1913-18, 8, Pt. D, 13 pp.

⁵———1950-3. Bryozoa of the Pacific coast of America. Allan Hancock Pacific Expedition. 14, in 3 pts. (Suborder Ctenostomata in pt. 3 by R. C. Osburn and J. D. Soule).

⁶MacGinitie, G. E. 1955. Distribution and ecology of the marine invertebrates of Point Barrow, Alaska. *Smithson. Misc. Coll.* 128, (9), 201 pp., Pub. 4221.

⁷Abrikosov, G. G. 1948. Bryozoa. In *Gaevskaia-Sokolova, N. S., et al. Opredelitel' fauny i flory severn'ykh morei SSSR*. Moskva. pp. 451-61.

⁸Ushakov, P. V. 1952. Chukotskoe more i ego donnaia fauna. *Akad. nauk SSSR. Krainii Severo-vostok Soiuza SSR.*, 2, pp. 5-82.