Macroalgae at 75 m in Hudson Bay

F. G. Barber

Department of Fisheries and Oceans
Ocean Science and Surveys
Ottawa, Ontario K1A 0E6

June 1983

Canadian Technical Report of Fisheries and Aquatic Sciences No. 1179

Fisheries and Oceans
Pêches et Océans

Canada

Canadian Technical Report of Fisheries and Aquatic Sciences

These reports contain scientific and technical information that represents an important contribution to existing knowledge but which for some reason may not be appropriate for primary scientific (i.e. *Journal*) publication. Technical Reports are directed primarily towards a worldwide audience and have an international distribution. No restriction is placed on subject matter and the series reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries management, technology and development, ocean sciences, and aquatic environments relevant to Canada.

Technical Reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report will be abstracted in *Aquatic Sciences and Fisheries Abstracts* and will be indexed annually in the Department's index to scientific and technical publications.

Numbers 1-456 in this series were issued as Technical Reports of the Fisheries Research Board of Canada. Numbers 457-714 were issued as Department of the Environment, Fisheries and Marine Service, Research and Development Directorate Technical Reports. Numbers 715-924 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Technical Reports. The current series name was changed with report number 925.

Details on the availability of Technical Reports in hard copy may be obtained from the issuing establishment indicated on the front cover.

Rapport technique canadien des sciences halieutiques et aquatiques

Ces rapports contiennent des renseignements scientifiques et techniques qui constituent une contribution importante aux connaissances actuelles mais qui, pour une raison ou pour une autre, ne semblent pas appropriés pour la publication dans un journal scientifique. Il n'y a aucune restriction quant au sujet, de fait, la série reflète la vaste gamme des intérêts et des politiques du Ministère des Pêches et des Océans, notamment gestion des pêches, techniques et développement, sciences océaniques et environnements aquatiques, au Canada.

Les Rapports techniques peuvent être considérés comme des publications complètes. Le titre exact paraîtra au haut du résumé de chaque rapport, qui sera publié dans la revue *Aquatic Sciences and Fisheries Abstracts* et qui figurera dans l'index annuel des publications scientifiques et techniques du Ministère.

Les numéros 1-456 de cette série ont été publiés à titre de Rapports techniques de l'Office des recherches sur les pêcheries du Canada. Les numéros 457-714, à titre de Rapports techniques de la Direction générale de la recherche et du développement, Service des pêches et de la mer, ministère de l'Environnement. Les numéros 715-924 ont été publiés à titre de Rapports techniques du Service des pêches et de la mer, Ministère des Pêches et de l'Environnement. Le nom de la série a été modifié à partir du numéro 925.

La page couverture porte le nom de l'établissement auteur où l'on peut se procurer les rapports sous couverture cartonnée.

Canadian Technical Report of

Fisheries and Aquatic Sciences 1179

June 1983

MACROALGAE AT 75 M IN HUDSON BAY

by

F. G. Barber

Department of Fisheries and Oceans

Ocean Science and Surveys

Ottawa, Ontario

K1A 0E6

Correct citation for this publication:

Barber, F. G. 1983. Macroalgae at 75 m in Hudson Bay. Can. Tech. Rep. Fish. Aquat. Sci. 1179: iv + 17 p.

Cat. No. Fs 97-6/1179 ISSN 0706-6457

ABSTRACT

Barber, F. G. 1983. Macroalgae at 75 m in Hudson Bay. Can. Tech. Rep. Fish. Aquat. Sci. 1179: iv + 17 p.

Underwater photographs of the seafloor at 75 m in Hudson Bay support speculation that macroalgae may grow at particular sites there, i.e. at sites away from the floor proper where grazing pressure may be less. A test of the speculation appears possible.

RESUME

Barber, F. G. 1983. Macroalgae at 75 m in Hudson Bay. Can. Tech. Rep. Fish. Aquat. Sci. 1179: iv + 17 p.

Des photographies du fond océanique réalisées à une profondeur de 75 m dans la baie d'hudson appuient l'hypothèse selon laquelle de grandes algues poussent en certains endroits à cette profondeur, c'est-à-dire là où elles ne sont pas en contact direct avec le fond et où, par conséquent, la pression due au patûrage est réduite. Il semble qu'on puisse vérifier l'hypothèse.

Sea urchins are known to place material including seaweed at the top of the spines of the aboral surface (e.g. Millott 1975) which has permitted easy detection of certain forms of weed (Zaneveld 1965, p. 223). In our suite of photographs from Hudson Bay sea urchins are frequently seen; in this enlargement (*Theta* station 166, frame 7-79; Note 7) of the two sea urchins that are visible both have material at the top of the spines. For example, the sea urchin about 8 o'clock appears to support a piece of shell (bivalve), while the sea urchin at about 11 o'clock supports what may be a piece of seaweed. In another exposure (not shown) as many as three sea urchins are seen to have material at the upper surface. Conjecture concerning the reason for this "covering reaction" was reviewed by Millott (1975, 1976).

The object at the upper right is a magnetic compass mounted on a strut below the cameras; strobe light and sound source (pinger for determination of distance from the seafloor) are integral parts of the camera system.

Chapman and Lindley (1980, p. 4) drew attention to Wilce's (1967) belief that "Arctic vegetation may occur below 100 m depth." Thus cued I again examined seafloor photographs from Hudson Bay (Note 1) and reviewed the literature concerning the occurrence of vegetation at depth, particularly at high latitude. The several notations of Kjellman (1883) leave little doubt that macroalgae may be found at considerable depth in the arctic, up to 240 m, a depth rather deeper than most of Hudson Bay, while according to Zaneveld (1965; Frontispiece) benthic algae in the antarctic (Ross Sea) have been found to 300 m at least (see also Levring 1969, p. 27). Macroalgae growing on the floor of Hudson Bay could not then be considered unusual; nevertheless, I was rather excited that several photographs showed good evidence for such plants and, in particular, suggested aspects of their relationship within the community of bottom dwellers. Difficulties with the photographs include problems of identification of particular objects, i.e. whether indeed plant and not animal, and of the recent history of each, e.g. whether a mechanism of transport characteristic of the bay, i.e. ice rafting (Pelletier 1969; Note 2) could be significant. Several photographs (Fig. 1) support the latter possibility, for in them are individual plants lying on an apparently even floor, well populated with animals; animals which in the absence of a transport mechanism would soon crop and remove individual plants. However, animals appear fewer on boulders, and it is on the side of a relatively large boulder, in the midst of a sand and cobble strewn floor abundant with invertebrates, that my candidate plant is seen (Fig. 2). I speculate that the particular site on the boulder provided the plant refuge from those of the animals that are grazers, i.e. some relaxation of grazing pressure occurs away from the immediate seafloor there. The speculation may be testable.

DISCUSSION

Primary productivity has been measured at but one area within the bay, i.e. the Belcher Islands, where the maximum rate measured "was notably low in the range of marine values" (Grainger 1982). For Chapman and Lindley (1981; see also Dunton et al. 1982) it appeared the kelp and phytoplankton production at Turton Bay (Foxe Basin) "are of the same order of magnitude", from which it followed that kelps are relatively less important to primary productivity there than at temperate latitude (e.g. St. Margaret's Bay).

Fig. 1. Examples from stations 127 and 166 in which seaweed is seen. At station 127 a number of objects appear to be seaweed and, while animals are fewer at station 127 than at 166, it would seem likely that even here the material would soon be removed by grazers. a) Station 127, frame 3-158. Mostly fine sediment and a large boulder, some animals and at the lower right a piece of seaweed. b) Station 127, frame 3A-172. At top centre a sea urchin is lying on a relatively large piece of seaweed. c) d) e) Station 127, frames 3A-200, 3A-215 and 3A-217. A clump of seaweed is seen in each. f) Station 166, frame 7A-13. On the left (in the area corresponding to that of the shadow of the compass on the right) is a length of seaweed curled upward at the edge and containing sediment, which suggests movement of the sediment by animals. Also note the sea urchin (toward the top centre) with some material on the upper surface.

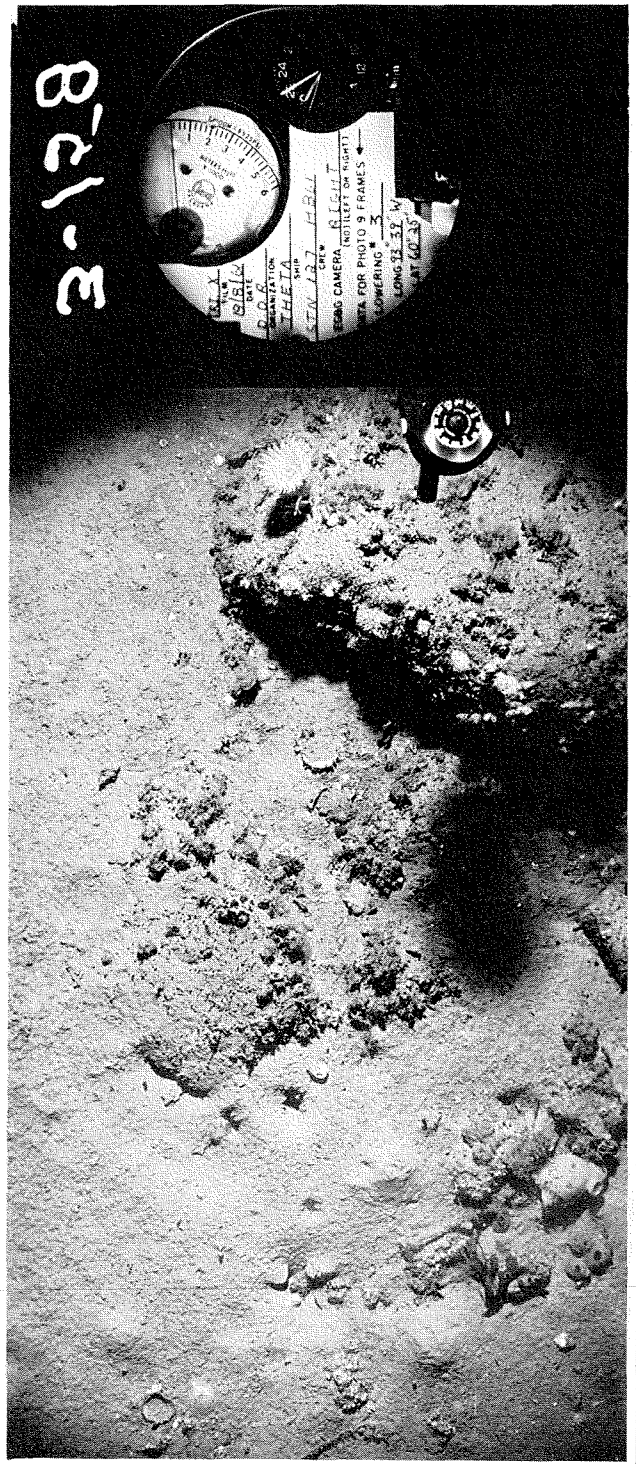


Fig. 1(a)

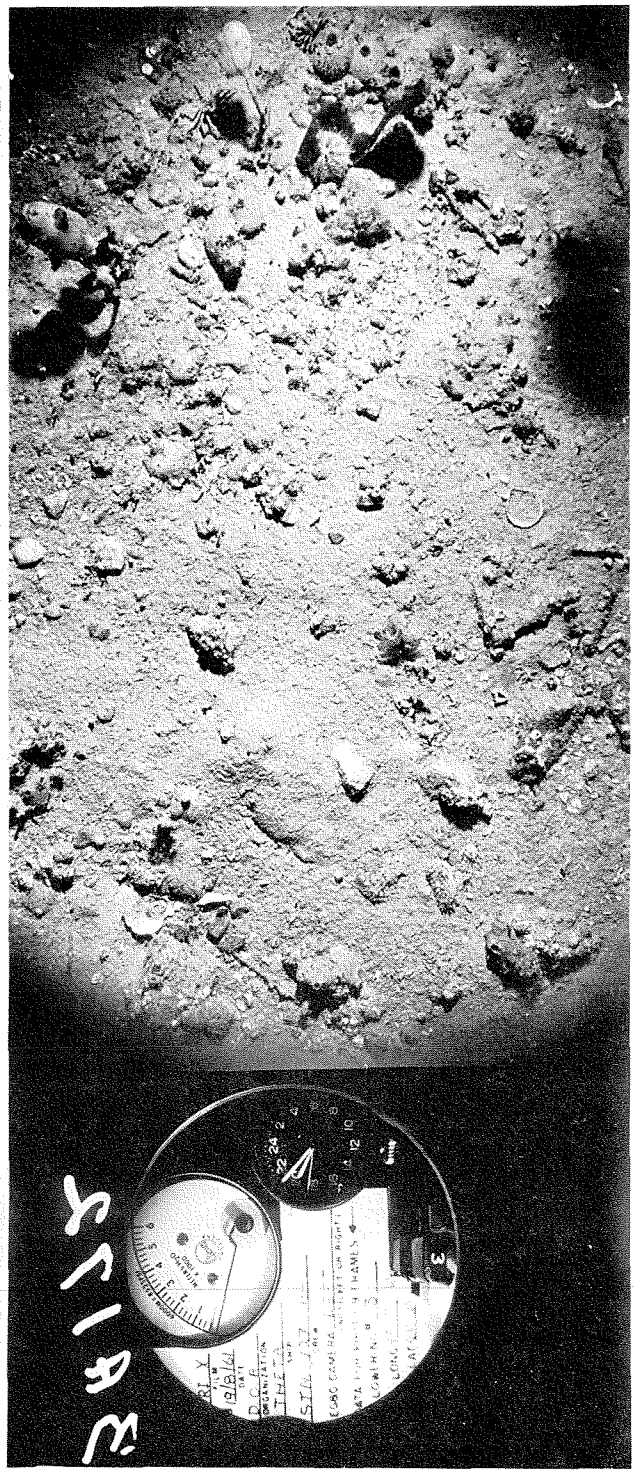


Fig. 1(b)

Fig. 1(c)

Fig. 1(d)

Fig. 1(e)

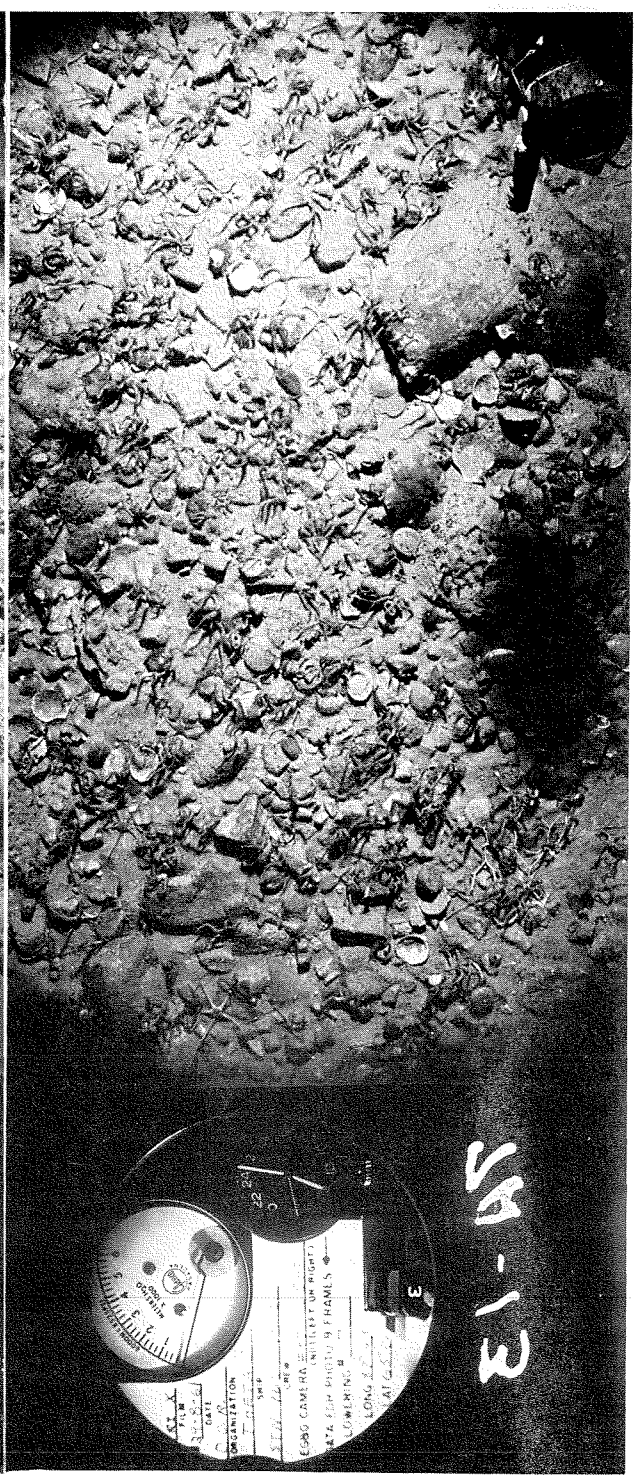


Fig. 1(f)

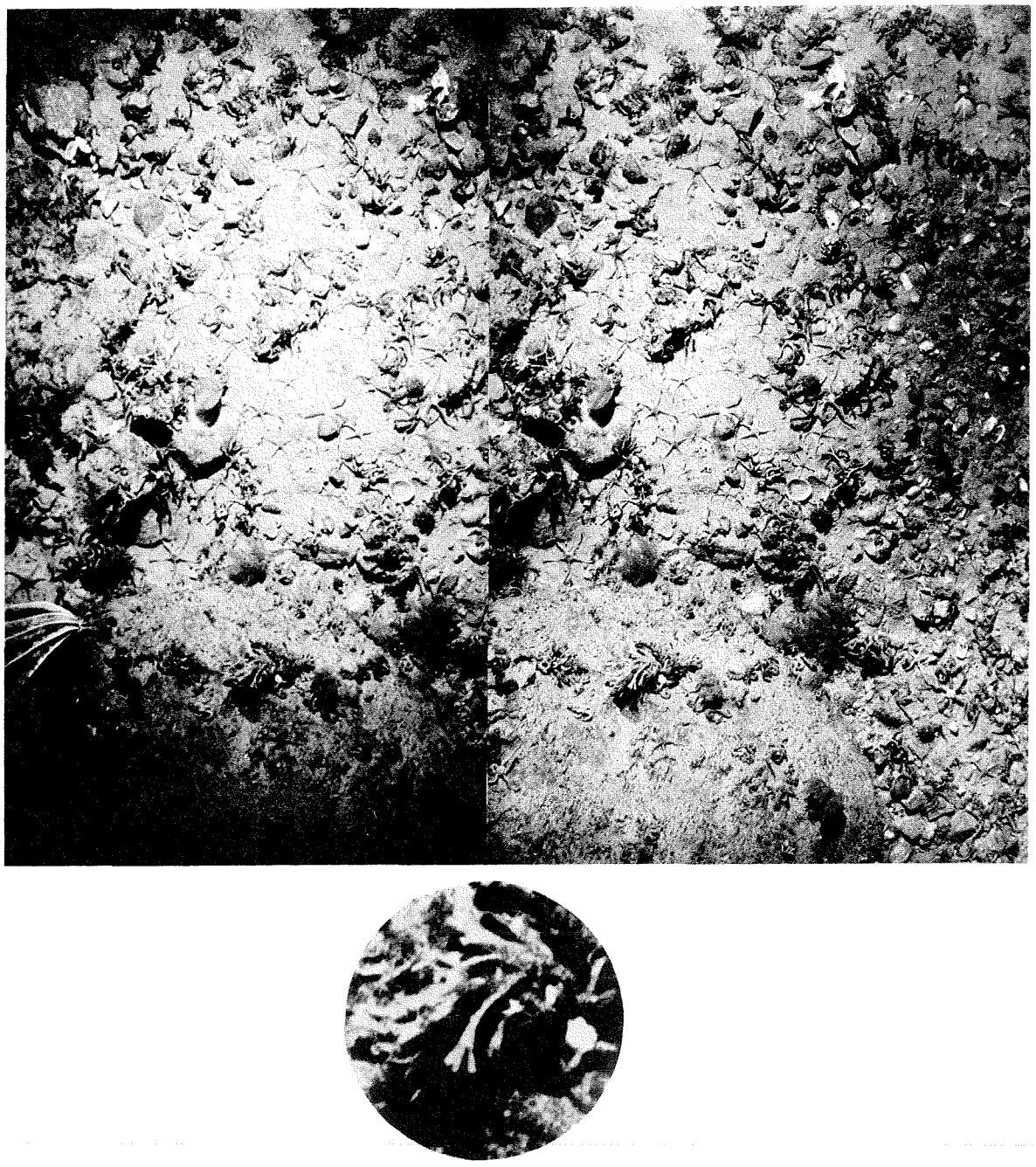


Fig. 2. Stereogram from 75 m depth 65 km offshore in northwest Hudson Bay (Frames 7A-111 and 7A-112, *Theta* station 166). The object believed to be attached seaweed is clearly seen to the left and just below centre of each print; the structures visible on the fronds appear to be fruiting areas, which with Kjellman's (1883) description suggest *Fucus miclonensis*. On the floor proper brittlestars are common but none are on the boulder, while in the frame on the left, a crinoid is attached to the top of the boulder. Camera distance from the floor is uncertain within the range of 2-4 m; the plant is likely 10 cm overall. (Note 8)

But perhaps at Turton Bay growth is grazing limited (Note 3), as I suggest it is at *Theta* station 166, so that in both Foxe Basin and Hudson Bay kelps could (in the absence of grazing) be more productive than phytoplankton (after Chapman and Lindley 1981, p. 247).

Much remains to be learned about the water and distributions of Hudson Bay: of present interest are the lack of commercial fisheries (Hachey 1931; Vladykov 1933; Hunter 1968; Dunbar 1970, 1982) as well as the apparent meagre productivity, and of course the speculation here concerning the role of grazing as a limitation to macroalgae. There are of course other limitations (e.g. light, temperature; Note 4) which are such as to suggest little opportunity for seaweeds; certainly domestication (van der Meer 1983) is not contemplated. But is there a possibility that the present level of abundance reflects some peculiarity of the Hudson Bay system? Previously I (1978) suggested high salinity may have been a barrier to colonization by fish following the most recent deglaciation and that tidal mixing in Hudson Strait uncouples the system from the exterior ocean to some extent, to limit the occurrence of Atlantic zooplankton there (Grainger 1963; Barber 1972). Consider that in the northwest the standing crop of benthic animals is as in the photographs, i.e. relatively high, and that these animals are maintained by food advected into the region from Hudson Strait, i.e. they are dependent on the productivity elsewhere to exceed in abundance that which could be supported by local primary productivity. Thus the intensity of grazing to be experienced by a macroalgae colonist would be unusually high and would prevent or slow local colonization, and perhaps colonization of the bay as well. (Presumably colonists would enter the system mainly through Hudson Strait, which because of ice, steep shores and considerable depth is itself a marginal habitat). So I contrive some support for the notion that macroalgae within the Hudson Bay system may be limited by grazing at the seafloor.

Hudson Bay as it now exists is relatively young; some 10,000 years BP it was overlain with glacial ice and earlier had passed through several glacial epochs. Whatever the course of this recent and somewhat uncertain geologic history (e.g. Dyke et al. 1982; Shilts 1982), it seems that the present distribution of plants and animals there may reflect this youth (Dunbar 1968; Lee 1973, p. 42) and that in the absence of further bathymetric

change (e.g. cessation of glacier rebound) steady state distributions would be somewhat different. An unequivocal test of this notion may not be possible; nevertheless, the conception should not be discarded. That the absence of certain fish may be "akin to accident" (Barber 1978) led to the suggestion that transplants be considered, specifically of the anadromous arctic cisco (*C. autumnalis*). There is the consideration that anadromous species make better use of the arctic marine food resource than do purely arctic marine fishes (Note 5), but also there is the possibility that increased understanding would follow both a transplant attempt and a test of my speculation about an influence of grazing.

The hypothesis to be tested is that in northwest Hudson Bay, i.e. at the location of station 166, grazing pressure on macroalgae is less away from the seafloor; a test it seems would require the insertion there of an artificial substrate. In particular I foresee the application of the longline method used in kombu aquaculture (Anon. 1983; Mottet 1982) in which lengths of plastic rope (positive buoyancy) are seeded by inserting in the strands spores of seaweed (obtained from nearby shores of the bay perhaps) and then moored (with additional flotation if necessary) at the location (Note 6). The test might be carried out at any recoverable site in the northwest, recognising that eventually additional hypotheses may require testing at the site. For example, consider that the trial does indicate greater algae growth away from the seafloor and so support the notion that grazing at the seafloor is limiting. This would direct attention to the character of the grazing, e.g. by what animals and whether by a particular group with a particular habitat, so that consideration might turn to the insertion of artificial reefs in test of particular hypotheses. Reefs do not appear to have been used in arctic or near-arctic situations, but have been at relatively exposed ocean sites (e.g. Bottom 1981); portable reefs may have a particular application (Zahary and Hartman 1983).

ACKNOWLEDGEMENT

Margaret Kathleen Johnstone typed and prepared the MS for publication.

REFERENCES

Able, K. W., and D. E. McAllister. 1980. Revision of the snailfish genus *Liparis* from arctic Canada. Can. Bull. Fish. Aquat. Sci. 208: 52 p.

Anonymous. 1964. Data record, Hudson Bay project - 1961. Can. Oceanogr. Data Centre 1: 173 p.

1983. B.C. Shellfish Mariculture Newsletter. 3(2): 12-14.

Barber, F. G. 1972. On the oceanography of James Bay. Mar. Sci. Branch MS Rep. 24: 5-96.

1978. Speculation concerning fish populations in the water of the Hudson Bay system. Fish. Mar. Serv. Tech. Rep. 829: 6 p.

Barber, F. G., and C. J. Glennie. 1964. On the oceanography of Hudson Bay, at atlas presentation of data obtained in 1961. Mar. Sci. Branch MS Rep. 1: 88 p.

Barber, F. G., E. H. Grainger, and B. R. Pelletier. 1981. Hudson Bay seafloor photographs. Maritime Sediments 16: 11-34.

Bottom, J. 1981. Life in an artificial reef. Sea Grant Today 11(5): 3-5.

Brook. A. J. 1955. The aquatic fauna as an ecological factor in studies of the occurrence of freshwater algae. Rev. Algol. n.s. 3: 141-145.

1975. Aquatic animals aren't hungry in winter, or why *Cymbella* blooms beneath the ice. J. Phycol 11: p. 235.

Bursa, A. 1961. Phytoplankton of the *Calanus* expeditions in Hudson Bay, 1953 and 1954. J. Fish. Res. Board Can. 18: 51-83.

Campbell, N. J., and A. E. Collin. 1958. The discolouration of Foxe Basin ice. J. Fish. Res. Board Can. 15: 1175-1188.

Chapman, A. R. O., and J. E. Lindley. 1980. Growth of *Laminaria solidungula* in the Canadian high arctic in relation to irradiance and dissolved nutrient concentrations. Mar. Biol. 57: 1-5.

Chapman, A. R. O., and J. E. Lindley. 1981. Productivity of *Laminaria solidungula* J. Ag. in the Canadian high arctic, p. 247-252. T. Levring (ed.). Proc. 10th Int. Seaweed Symp. Walter de Gruyter, 780 p.

Dunbar, M. J. 1968. Ecological development in polar regions. Prentice-Hall Inc. 119 p.

1970. On the fishing potential of the sea waters of the Canadian north. Arctic 23(3): 150-174.

1982. Oceanographic research in Hudson and James Bays. Nat. can. 109: 677-683.

Dunton, K. H., E. Reimnitz, and S. Schonberg. 1982. An arctic kelp community in the Alaskan Beaufort Sea. Arctic 35: 465-484.

Dyke, A. S., L. A. Dredge, and J.-S. Vincent. 1982. Configuration and dynamics of the Laurentide Ice Sheet during the late Wisconsin maximum. Géographie physique et Quaternaire 35: 5-14.

Edgerton, H. E. 1963. Underwater photography, p. 475-479. *In* M.N. Hill (ed.). The sea 3: the earth beneath the sea. Interscience, 963 p.

Grainger, E. H. 1963. Copods of the genus *Calanus* as indicators of eastern Canadian waters. Roy. Soc. Can. Spec. Pub. 5, Univ. Toronto Press: 68-94.

1982. Factors affecting phytoplankton stocks and primary productivity at the Belcher Islands, Hudson Bay. Nat. can. 109: 787-791.

Hachey, H. G. 1931. Open water investigation in S. S. *Loubyrne*. Report on Hudson Bay Fisheries Exp. 1930. Studies Biolog. Stations Can., N.S. 6(23): 465-471.

Heezen, B. C. 1957. Whales entangled in deep sea cables. Deep-Sea Res. 4: 105-115.

Hunter, J. G. 1968. Fishes and fisheries, p. 360-378. *In* C.S. Beals (ed.) Science, history and Hudson Bay. 1: 501 p.

Kindle, E. M. 1924. Observations on ice-borne sediments by the Canadian and other arctic expeditions. Am. J. Sci. Fifth Series, 7(40): 251-286.

Kjellman, F. R. 1883. The algae of the arctic sea. Reprint of 1971. Otto Koeltz Antiquariat: 350 p. + 31 plates.

Lee, R. K. S. 1973. General ecology of the Canadian arctic benthic marine algae. Arctic 26: 32-43.

Levring, T. 1969. The vegetation in the sea, p. 1-46. *In* T. Levring, H. A. Hoppe and O. J. Schmid (eds.). Marine algae. Cram. Degruyter and Co. Hamburg: 421 p.

Millott, N. 1975. The photosensitivity of echinoids, p. 1-52. Advances Mar. Biol. 13: 1-52.

1976. The enigmatic echinoids in retrospect, p. 539-541. *In* G.C. Evans, R. Bainbridge, and O. Rackham (eds.). Light as an ecological factor. Blackwell Scientific Pub.

Mottet, M. G. 1982. Enhancement of the marine environment for fisheries and aquaculture in Japan. Wash. Dep. Fish. Tech. Rep. 69: 96 p.

Pelletier, B. R. 1969. Submarine physiography, bottom sediments, and models of sediment transport in Hudson Bay, p. 100-135. *In* P.J. Hood (ed.). Earth sciences symposium on Hudson Bay. Geological Survey of Canada Paper 68-53.

Sergeant, D. E. 1973. Biology of white whales (*Delphinapterus leucas*) in western Hudson Bay. J. Fish. Res. Board Can. 30: 1065-1090.

Shilts, W. W. 1982. Quaternary evolution of the Hudson/James Bay region. Nat. can. 109: 309-332.

Spjeldnaes, N. 1981. Ice-rafting, an indication of glaciation? Science 214: 687-688.

Sverdrup, H. U. 1929. The waters of the North Siberian Shelf. *In* Scientific Results of the Norwegian North Polar Expedition with the *Maud*, 1918-1925. 4(2): 131 p.

1931. The transport of material by pack ice. Geogr. J. 77(4): 399-400.

van de Meer, P. 1983. The domestication of seaweed. Bio Science 33: 172-175.

Vevers, H. G. 1952. A photographic survey of certain areas of sea floor near Plymouth. Mar. Biol. Assoc. 31: 215-221.

Vladykov, V. D. 1933. Fishery possibilities of the Hudson Bay region. Can. Fisherman July: 11-12.

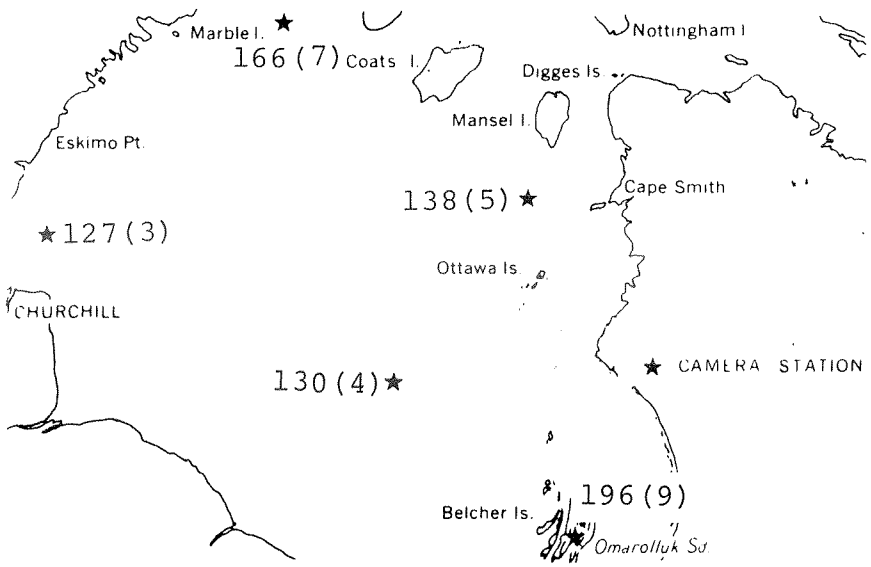
Wilce, R. T. 1967. Heterotrophy in Arctic sublittoral seaweeds: an hypothesis. Bot. Mar. 10: 185-197.

Zahary, R. G., and M. J. Hartman. 1983. Portable artificial reefs of fixed geometry. Prog. Fish-Cult. 45: 58-59.

Zaneveld, J. S. 1966. The occurrence of benthic marine algae under shore-fast ice in the western Ross Sea, Antarctica, p. 217-231. E. Gordon Young and J.L. McLachlan (eds.). Proc. 5th Int. Seaweed Symp. Pergamon, 424 p.

NOTES

1) During the 1961 survey of Hudson Bay by the motor vessels *Calanus* and *Theta*, we in *Theta* deployed at a few locations an underwater camera system comprising two side-by-side vertically mounted 35 mm cameras



(Edgerton 1963; Barber et al. 1981); the arrangement permits stereo-viewing as in figure 2. As mentioned in the text, identification of particular objects is problematic, and as well we understand little about the significant processes at particular locations. Station 166 is located within an area that is utilized by bottom feeding mammals (Sergeant 1973, p. 1069), so that larger aspects of distributions seen in photographs may result from the foraging behaviour of a large mammal, as in ploughing of the seafloor (e.g. Heezen 1957); the sediment on the surface of the seaweed in figure 4 may be an example. Other animals, including some fish, could be expected to similarly modify the distribution of sediment and at another location (*Theta* station 138) evidence of nest building in gravel was inferred (Barber et al. 1981).

2) Ice transport could move seaweed from intertidal zones to any part of the bay, but that this might be more effective than transport at the surface (in the absence of ice) or within the water column by currents is not determined. Transport by ice of animals, animal parts and inorganics has been of longstanding interest (e.g. Kindle 1924; Sverdrup 1929, 1931; Campbell and Collin 1958; Spjeldnaes 1981; Figure 3), so that it would seem likely that the literature contains reference to transport of seaweed by ice, but I have not located one.

3) Brook (1955) remarked that grazing was being ignored in ecological studies and more recently (1975) felt it necessary to draw attention again to a particular influence of grazing, i.e. the variation of grazing intensity in association with variation of activity in grazers.

4) Secchi depth at station 166 (in the absence of ice may be generally about 20 m (Barber 1972, p. 42), and the annual cover of sea ice usually clears early, beginning in May, and is out till late in the autumn. Measurements close to the bottom in summer suggest high dissolved oxygen at a salinity close to 32.6 $^{o}/oo$ and temperature about -1.0^{o}C (Barber and Glennie 1964); bottom temperature in winter is believed at or close to the freezing point, i.e. -1.8^{o}C. A moderate tidal current is believed characteristic at the location with a persistent movement into the bay. Present evidence is that the standing crop of benthic animals is much

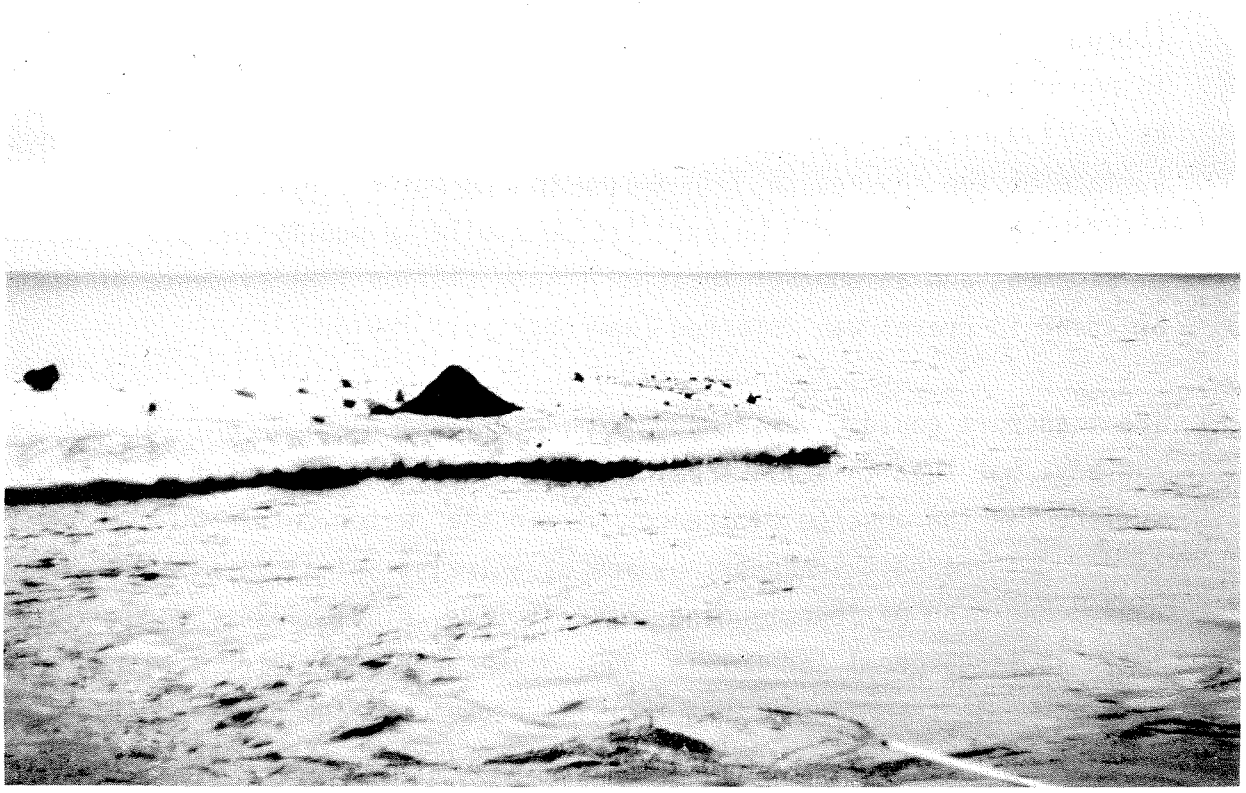


Fig. 3. A mound of cobble in a field of cobbles on a small ice pan (photo by N.J. Campbell; see also Campbell and Collin 1958). Presumably the cobbles would eventually settle to the seafloor, but with a variety of distributions.

higher than at locations further into the bay and that the crop is maintained by advection of nutrients from western Hudson Strait, a region of considerable productivity (Bursa 1961; Dunbar 1982; see also Vevers 1952). Plant nutrients then do not appear to be limiting.

5) Fishes seen in the photographs may occasionally be identified (e.g. Fig. 4).

6) The trial I suggest is rather reminiscent of the experience, albeit in shallow water, of Dunton et al. (1982, p. 480) wherein small styrofoam floats moored 1 m above the seafloor "were not subject to grazing or predation pressures by benthic animals." Should the kombu technique demonstrate that predation on macroalgae is less away from the seafloor it may provide a useful measure of the difference of seasonal growth rates of seaweed in northern waters.

7) In the field after film development each frame was numbered by hand so as to indicate the lowering number and whether by the left or right camera. Frame numbers are given here for precision for at each location several hundred exposures were made. The data portion of each frame (i.e. time/date, group, location, etc.) refers to a previous frame (9 frames earlier) and is usually cropped.

Station (*Theta*)	Lowering	Date 1961	Depth (m)	Position	
127	3	19 August	64	59*25.0	93 39.0
130	4	21 "	183	58 41.5	83 25.0
138	5	23 "	104	61 01.0	80 47.0
166	7	29 "	75	63 02.0	87 49.0
196	9	14 September	55	56 10.0	78 58.0

*In the data report (Anon. 1964, p. 102) the latitude for station 127 is an error.

8) Enlargements of the photographs shown here, as well as of several others, were presented in a poster session of the ASLO meeting[1] at St. John's in June 1983. Many considered that the particular object in figure 2

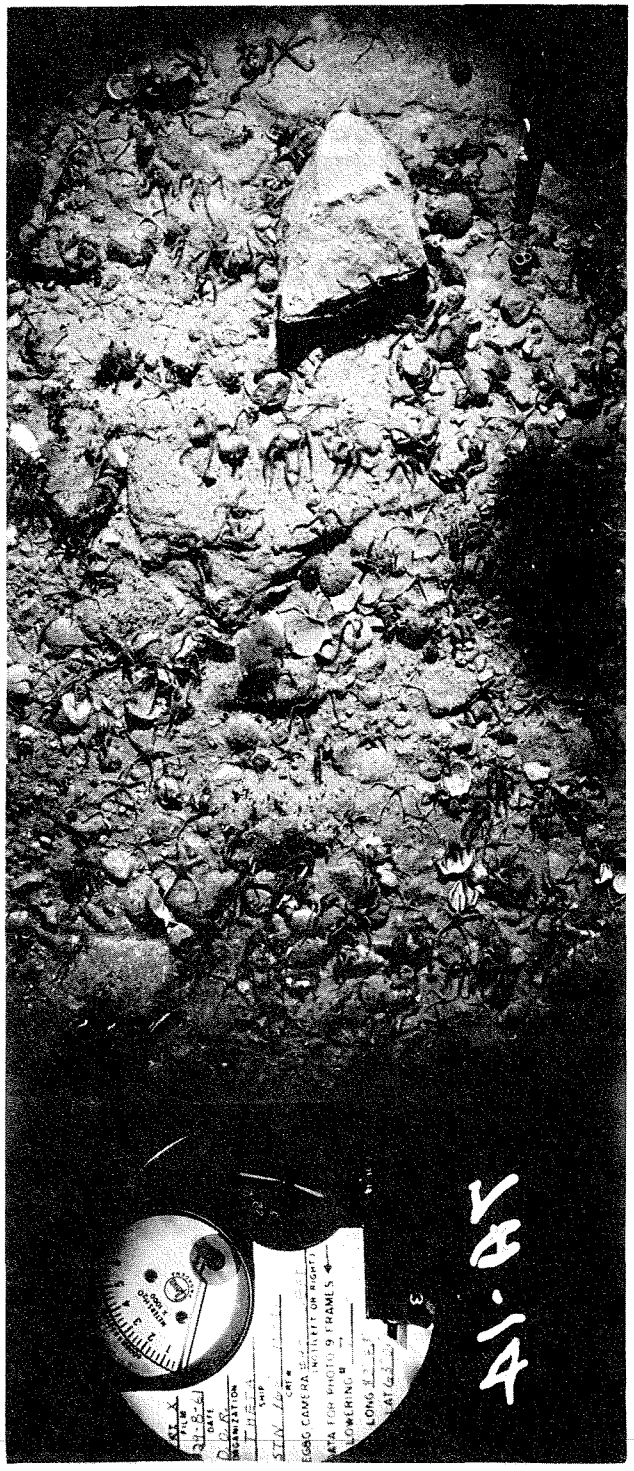


Fig. 4. Frame 7A-14, station 166. A fish, perhaps a snail-fish, is seen at the upper left partly "sheltered" by a large cobble, with the head turned back, perhaps toward the source of light and sound. Large eye(s) and that the "mouth reaches to the level of middle of eye" (Able and McAllister 1980, p. 19) suggests *Liparis fabricii*. Also seen are brittlestars, bivalve shells, sea urchins and other animals, and a recently ice-rafted cobble appears to have settled on a rock ledge or outcrop.

appeared to be an attached plant, probably a fucoid, but as it was located at 75 m and not in a tide pool my identification was deemed problematic indeed.

Participants also drew attention to other works on the effects of grazing and on methods of testing[2], on the covering reaction in sea urchins[3] and on other bottom photographs of plant material at depth[4].

[1] Abstracts of the Forty Sixth Annual Meeting of the American Society of Limnology and Oceanography, 13-16 June, St. John's Newfoundland.

[2] e.g. Leighton, D. L. 1971. Grazing activities of benthic invertebrates in southern California kelp beds, p. 421-453. *In* W.J. North (ed.). The biology of giant kelp beds (*Macrocystis*) in California. Beiheft Nr. 32 zur Nova Hedwigia.

[3] e.g. Dayton, P. K., G. A. Robilliard, and R. T. Paine. 1970. Benthic faunal zonation as a result of anchor ice at McMurdo Sound, Anarctica, p. 244-258. *In* M.W. Holgate (ed.). Anarctic Ecology, 1: 604 p. Academic Press, New York.

[4] e.g. Schoener, A., and G. T. Rowe. 1970. Pelagic *Sargassum* and its presence among the deep-sea benthos. Deep-Sea Res. 17: 923-925.