Canadian Salmon caught off Greenland

On October 10, 1960, an Atlantic salmon 71 cm. total length, weighing 3·7 kgm. (8·2 lb.), and carrying Fisheries Research Board of Canada tag No. 1,616, was caught in the sea off Tassiussaq (65° 06′ N., 52° 08′ W.), near Napossok to the south of Sukkertoppen, Greenland. The fish was tagged on May 22, 1959, in the estuary of the Miramichi River near Chatham, New Brunswick (47° 04′ N., 65° 28′ W.), as a smolt 17·5 cm. in total length. It was one of 3,500 smolts tagged there in May and June, 1959, with tags patterned after those used by Dr. Börje Carlin[1] in Sweden, but had printed laminated plastic pendants supplied by a commercial firm.

Scales from the recaptured fish show three years of river life typical of Miramichi River smolts, followed by a first sea year of moderate growth and a relatively wide winter band. The second sea year includes a period of fast growth followed by a summer check, then a period of fast growth continuing to the time of capture in October.

This recapture represents the longest migration yet recorded, about 1,500 miles, for Canadian Atlantic salmon the river of origin of which is known through fin-clipping or tagging. Many fin-clipped salmon from Quebec, New Brunswick, and Nova Scotia rivers have been recaptured, however, in sea fisheries as far away as Newfoundland and Labrador. The recapture also lends some support to the suggestion[2] that salmon from both sides of the North Atlantic share common feeding grounds. The first direct evidence of Scottish salmon reaching Greenland waters was provided by the recapture in October 1956 near Sukkertoppen, Greenland, of a fish tagged as a kelt in November 1955 at Loch na Croic, Ross-shire[3].

We are indebted to Dr. Jørgen Nielsen, of the Ministeriet for Grønland, for details of this recapture accompanied by a scale sample, and to Dr. P. F. Elson, of the Biological Station, St. Andrews, New Brunswick, for reading the scales.

C. J. Kerswill
M. H. A. Keenleyside

Fisheries Research Board of Canada,
Biological Station,
St. Andrews, New Brunswick.

[1] Carlin, Börje, *Institute of Freshwater Research, Drottningholm, Report* No. 36 (1955).
[2] Menzies, W. J. M., *The Stock of Salmon. Its Migrations, Preservation and Improvement*, 96 (London, 1949).
[3] Menzies, W. J. M., and Shearer, W. M., *Nature*, 179, 790 (1957).

Penetration of Spines from a Marine Diatom into the Gill Tissue of Lingcod (*Ophiodon elongatus*)

Fishermen from the Porlier Pass area of Vancouver Island were experiencing unusually high mortalities among lingcod (*Ophiodon elongatus*), which according to common practice were being held in surface live-wells prior to the weekly slaughtering and transport to market. Examination of dead and dying fish showed only that all specimens had discoloured gills with considerable detritus embedded in the gill mucus (Fig. 1). Much of this detritus was composed of *Chaetoceros convolutus*, one of a common group of marine plankton diatoms[1], and their siliceous spines (Fig. 2). The spines or setæ with their apically directed barbs are shown in Fig. 3. These findings suggested the possibility that the setæ might bring about tissue damage and be a direct or indirect cause of death. Gill tissue is particularly vulnerable to injury from chemical and biotic agents because of its intimate contact with the external environment and because of its delicate structure. It was therefore decided to expose apparently healthy lingcod (18 in.) to 3–4 times the natural concentration (that is, 1–5 × 10^5 cells/l.) of *Chaetoceros* while the fish were held in aquaria. Control fish were kept in natural sea water.

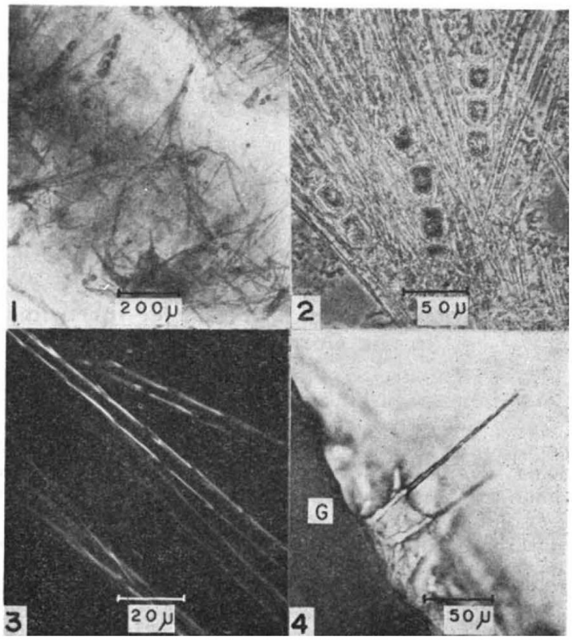

Fig. 1. *Chaetoceros* cells and setæ on surface of lingcod gill filaments. Specimen had died in live-well within 8 hr. of sampling

Fig. 2. Phase contrast view of *Chaetoceros* sp. and setæ on gill mucus. Same specimen as in Fig. 1

Fig. 3. Dark field picture of *Chaetoceros* setæ showing apically directed barbs

Fig. 4. Setæ embedded in gill of dead lingcod which had been exposed for 24 hr. at 11° C. to 1–5 × 10^5 *Chaetoceros* cells/l. *G* indicates gill tissue

Only one of the three treated fish died, from undetermined causes, and although the final results were inconclusive, it is of considerable interest that setæ were found embedded in the gill tissue of the dead fish (Fig. 4). It was established that the spines had actually penetrated the tissue and were not merely trapped in the mucus. The incidence and extent of the penetration were not determined, but four embedded setæ were seen in an area of a few square millimetres. The only comparable record appears to be that of Wood and Yasutake[2], who found that ingested 'hairs' from the lepidopterous larva *Halisidota argentata* penetrated the stomach and visceral organs of fingerling salmon by working their way inwards and thus causing extensive damage to the tissues. The insect hairs, like the algal setæ, have apically directed barbs and therefore both shafts must enter butt first for maximum penetration. This direction of entry into lingcod gill tissue is shown in Fig. 4. Setæ which are entrapped on or embedded in the gills might cause death by capillary hæmorrhage, by anoxia from the stimulation of heavy mucus secretion or by debilitation of the tissue allowing microbial invasion.

It is not yet possible to say whether this penetration is only a laboratory oddity or whether it is also a significant natural phenomenon, but the subject