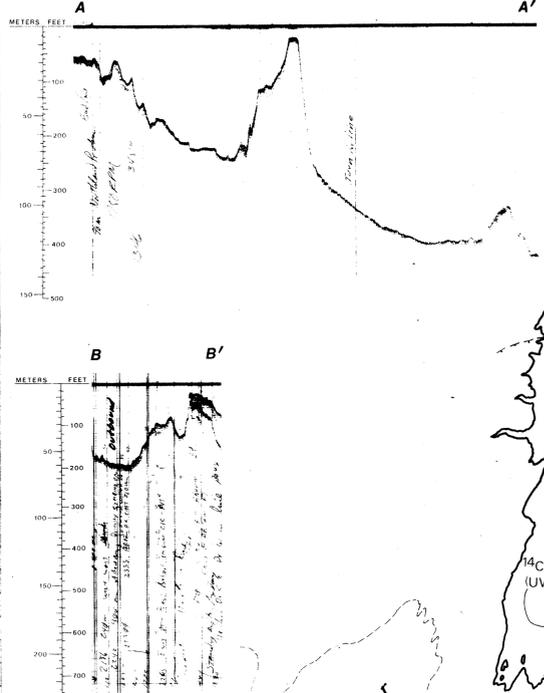


Neoglaciation Advance and Retreat

A reconnaissance of the bathymetry of Blackstone Bay found few deposits of till or outwash formed by the glacial advance of the glaciers. A small till deposit at the mouth of the stream draining Concordia Glacier (sheet 1) was searched without finding any evidence of forest vegetation. Hence the time of the neoglaciation advance is uncertain, but from advances of other Alaskan tidewater glaciers, this probably occurred about 2000 to 4000 years. Climax forests mantle the slopes of the mountains of Blackstone Bay, but the southern part is relatively free of trees, although brush thickets are present. This led some early investigators to conclude that the retreat of the glaciers from Willard Island had occurred within a period of two (Tarr and Martin, 1914, p. 360, 361). Isolated groups of trees in western Alaska and tree-ring count disclose that the bay south of Willard Island had been free of ice for at least 480 years, and the lack of trees was interpreted to be due to the biological effects of the nearby icefield (Cooper, 1942, p. 164). A peat sample obtained from the base of a small peat bog on Badger Point by C. J. Heusser in 1978 has a carbon-14 age of 380±55 years before present (B.P.). The glaciers that had advanced to the head of the bay before 1850 and suggest a retreat from the present positions at the head of the bay, but as late as 1935 the Beloit Glacier ended on the sharp-crested moraine south of Willard Island. The age of the moraine in this area is unknown, but the absence of vegetation on the shores and in retracted, stable positions at the head of the bay, and the 1935 positions of the ice fronts in 1935 are determined from Map B, sheet 1, of Tarr and Martin (1914, p. 361), the glaciers shown here ending on the 1935 positions of the ice fronts. The retreat has continued to retreat slowly.

Holocene Sediments

Depth curves shown on sheet 1. These curves were compiled from the hydrographic surveys shown on sheet 1. They show a well-defined basin more than 1120 ft (333 m) below sea level in the northern part of the bay, (b) and (c) neoglaciation terminal-moraine shoals east and west of Willard Island, and basins south of the terminal moraine with a maximum water depth of 200 ft (60 m) on the east and 200 ft (60 m) on the west of Willard Island, and (d) the tidewater Blackstone and Beloit Glaciers at the head of the bay. Although the thickness data are unavailable, the northern part of the bay doubtless contains deep deposits which have been accumulating since the retreat of the glaciers. The maximum sediment thickness may exceed 1000 ft (300 m) in places. South of the terminal-moraine shoals, on Willard Island, and in the basins, the sediments probably do not exceed 100 ft (30 m) in thickness, implying a relatively brief interval.



Explanation

- Approximate position of dated glacier terminus position or trimline; heavy line where glacier terminated in water.
- Approximate areas of thick sediment deposits
- Exposure of preneoglaciation forest debris
- ¹⁴C (carbon-14) dated preneoglaciation forest debris

Profiles

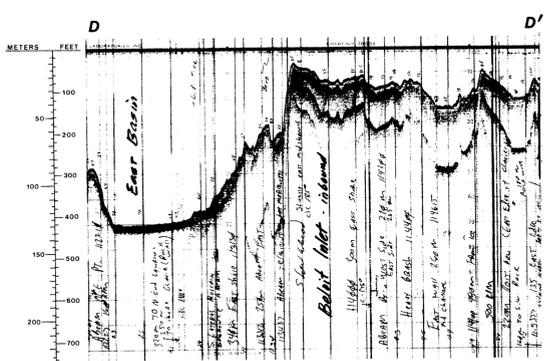
The profiles are photographic copies of original depth-recorder charts which are scaled in meters (Ross 51, 6002) or fathoms (Ross 4029). The scales for meters and fathoms are shown at the left of each profile have been adjusted to correct for trial errors. Hand-written notes on charts are generally navigation data.

Profile A The rough, irregular bottom with little or no sediment accumulation in the basin south of the terminal-moraine shoal is in striking contrast to the relatively smooth bottom north of the moraine. The sediments north of the moraine have been accumulated since the Pleistocene glaciers retreated, while the absence of sediments south of the moraine suggests the neoglaciation advance stripped the early Holocene sediments which in part make up the present terminal-moraine shoal. Retreat of the moraine shoal was evidently rapid and recent enough that very little sediment had accumulated.

Profile B The irregular bottom shown in this profile indicates the recently deglaciated nature of this basin, where practically no sediments have accumulated despite the Blackstone Glacier's discharging debris into the head of the inlet.

Profile C This profile shows a small area of ponded sediments south of the terminal-moraine shoal east of Willard Island. The profile then abruptly rises to the depths of the moraine and plunges at the angle of repose to the depths of northern Blackstone Bay. Irregular bottom near the base of the moraine is interpreted as slump deposits of materials discharged over the moraine when the glacier retreated on the shoal. The extreme northern end of the profile extends over some of the nearly level surface of the thick, ponded sediments which fill the northern part of Blackstone Bay.

Profile D This profile crosses the largest sediment deposit (relatively level area) in the basin east of Willard Island then rises with an irregular bottom, judged to be due to a shoal interpreted to be a terminal moraine (questioned on map), then south along the approximate centerline of Beloit Inlet. An abrupt rise, also interpreted to be a terminal moraine, crosses the inlet in the area where the glacier terminated between 1935 and 1952. The rough, rocky bottom of Beloit Inlet indicates little sediment accumulation.



Acknowledgments

This study was aided by instruments, charts, and data provided by the National Ocean Survey, National Oceanic and Atmospheric Administration. The U.S. Coast Guard provided personnel and logistical assistance. The Office of Marine Geology, Geologic Division, provided field assistance and scientific equipment. Dr. Calvin J. Heusser, New York University, collected pollen and carbon-14 samples. Carbon-14 dating was done by the University of Washington, Seattle, Wash.

References

Cooper, W. S., 1942, Vegetation of the Prince William Sound region, Alaska; with a brief excursion into post-pleistocene climatic history: Ecological Monographs, v. 12, no. 1, p. 1-22.

Field, W. O., 1937, Observations on Alaskan coastal glaciers in 1935: Geographical Review, v. 27, no. 1, p. 63-81.

Grant, U. S. and Higgins, D. F., 1913, Coastal glaciers of Prince William Sound and Kenai Peninsula, Alaska: U. S. Geological Survey Bulletin 526, p. 41-45.

Tarr, R. F., and Martin, R. S., 1914, Alaskan Glacier studies: Washington, D.C., National Geographic Society, p. 355-361.

PRELIMINARY BATHYMETRY OF BLACKSTONE BAY AND NEOGLACIAL CHANGES OF BLACKSTONE GLACIERS, ALASKA

Scale 1:20,000

DEPTH CURVES IN FEET. DATUM IS APPROXIMATE MEAN LOWER LOW WATER. WORKING SHEET REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER. THE MEAN RANGE OF TIDE IS APPROXIMATELY 10 FEET.

MAP NOT FOR USE IN NAVIGATION

By
Austin Post
1980