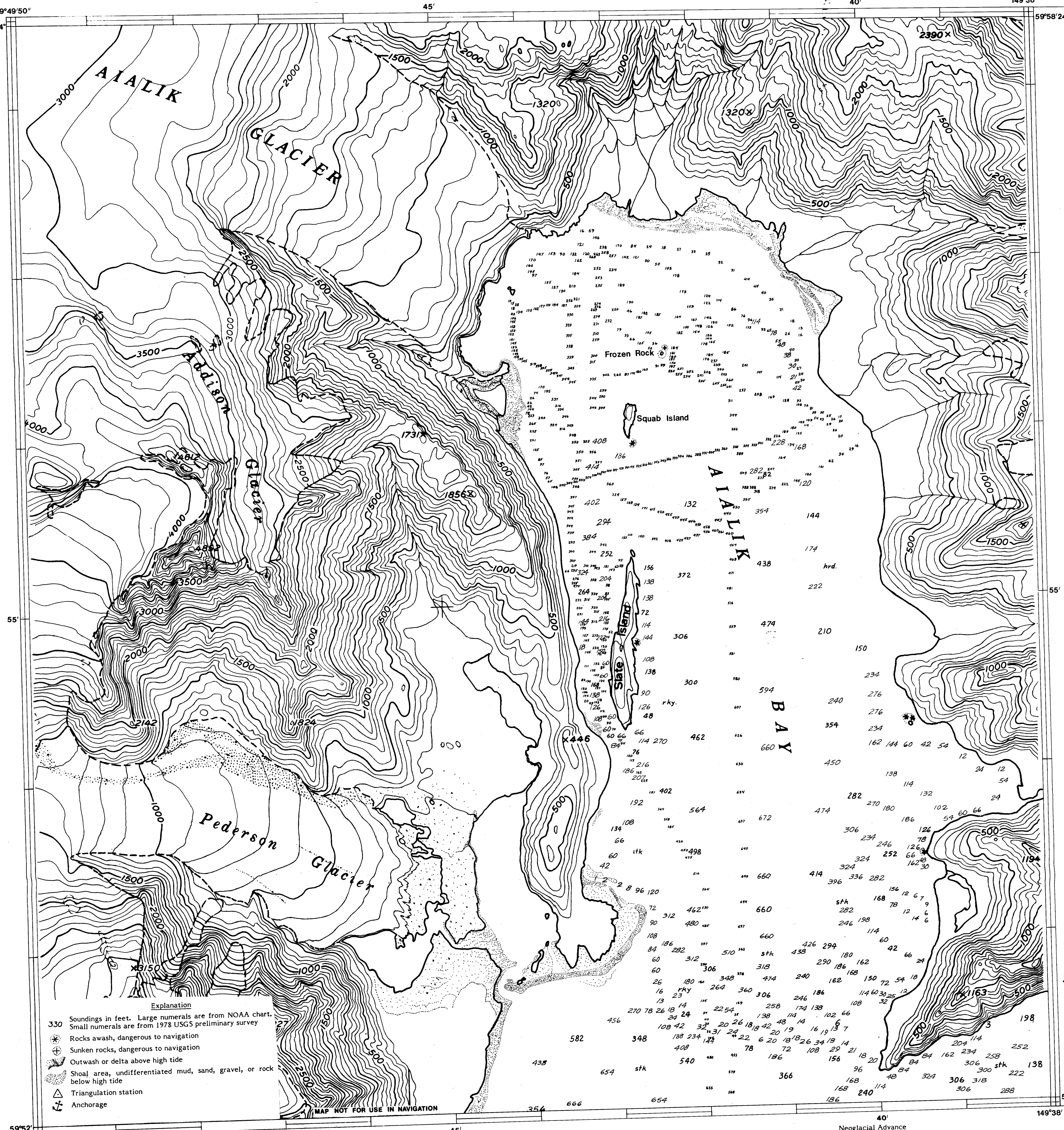


FIGURE 1
PRELIMINARY BATHYMETRY



Base enlarged from Blying Sound D-8 1:63,360 quadrangle. Shorelines were adjusted from 1977 and 1978 air photography changes in the coastline due to the 1964 Alaskan earthquake. Changes in the coastline due to the 1964 Alaskan earthquake. Changes in the coastline due to the 1964 Alaskan earthquake. Changes in the coastline due to the 1964 Alaskan earthquake.

Aialik Bay is a beautiful inlet situated on the coast of the Gulf of Alaska southwest of Seward, Alaska. The shores of the bay are very irregular being indented by numerous small bays and coves which represent old glacial channels. The bay is approximately 10 miles long and 2 miles wide. The bay is approximately 10 miles long and 2 miles wide. The bay is approximately 10 miles long and 2 miles wide.

Aialik Bay was surveyed by the U.S. Coast and Geodetic Survey (now National Oceanic and Atmospheric Administration-NOAA) Survey Register No. 14-3412, Oceanic and Atmospheric Administration-NOAA, Survey Register No. 14-3412, Oceanic and Atmospheric Administration-NOAA, Survey Register No. 14-3412.

In June 1978, the U.S. Geological Survey 40-Ft Research Vessel *Gowler*, while collecting data on drastically calving glaciers, spent two days in Aialik Bay with a collecting data on drastically calving glaciers, spent two days in Aialik Bay with a collecting data on drastically calving glaciers, spent two days in Aialik Bay with a collecting data on drastically calving glaciers.

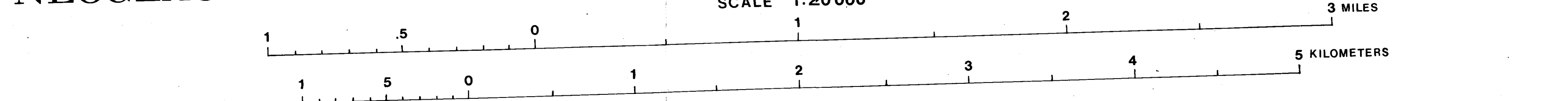
*The use of brand names or model numbers in this report does not imply endorsement by the U.S. Geological Survey.

A terminal-moraine shoal crosses the head of Aialik Bay 5 mi (8 km) from the glacier. This marks the glacier's greatest neoglaciated extent (hooked line dated 1800?) profiles A-A' and B-B', fig. 2. Although the slopes of the bay are thickly covered with dense brush thickets, the absence of forest gives the illusion that the glacier ended on the moraine quite recently. Close inspection, however, reveals that there are very few large trees anywhere in the northern part of the bay and that the few scattered trees or groups of trees present are situated both within and outside the moraine limit. The absence of forest is evidently due to local climatological effects similar in nature to those in unfloated areas in Blackstone Bay and College Fjord (Cooper, 1942, p. 11, 16).

A faint lateral trimline or lateral moraine on the east side of the bay rises slowly in a northerly direction from the terminal-moraine bar. This feature appears to be recent, and an attempt was made in 1978, without success, to detect some changes in vegetation where a stream crossed the moraine line. An unsuccessful search was also made for preneoglaciated forest debris in the same stream channel and in a small till deposit west of the south end of Slate Island. A more extensive search may reveal data from this advance may be dated.

It is presumed, with little direct proof, that Aialik Glacier began advancing in tidewater between 2000 to 4000 years ago, which is a period of glacier advance in nearby Fiords (Post, 1979a; 1979b).

PRELIMINARY BATHYMETRY OF AIALIK BAY AND NEOGLACIAL CHANGES OF AIALIK AND PEDERSON GLACIERS, ALASKA



NEOGLACIAL RETREAT

Grant and Higgins estimated in 1909 that Aialik Glacier terminated on the moraine several centuries ago (1913, p. 28). In 1978 a fragment of a stump, judged to be from shrubbery similar to living alders growing on the slopes above, was found in a stream channel on the south side of Aialik Glacier. This wood had a carbon-14 date of 1454±65 years before present (B.P.). This provides a minimum date since the glacier retreated to near its present position. If the retreat from the terminal moraine was rapid, as all observed tidal glacier retreats in similar situations, the retreat could have begun as recently as 1800 A.D.

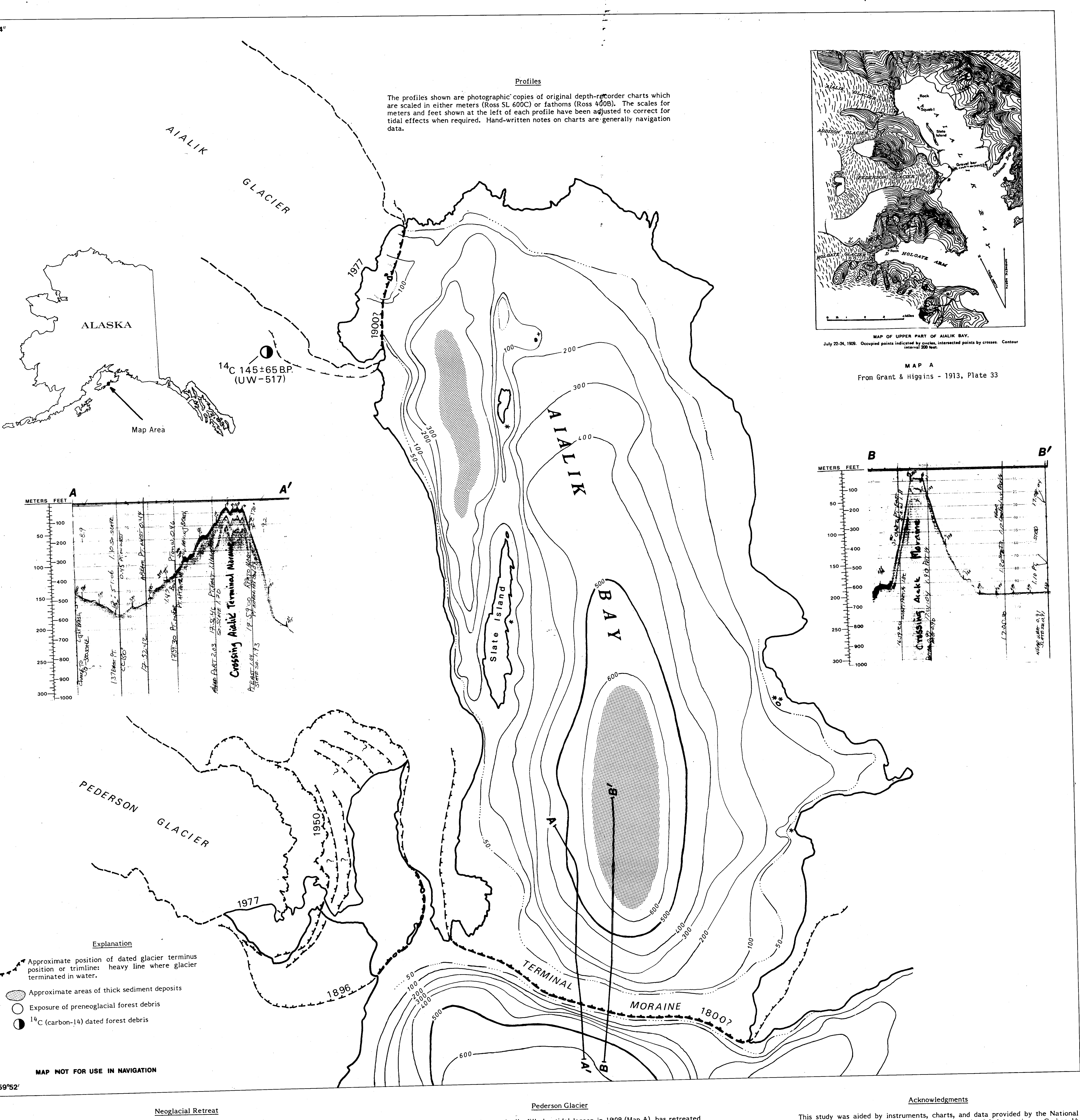
Grant and Higgins noted a recent "maximum position" moraine and trimline about 0.25 mi (0.4 km) in front of Aialik Glacier, from which the glacier had retreated about 10 years earlier (hooked line dated 1907?, fig. 2). Since 1909 the glacier has retreated slightly from rocks near the center of the ice cliff; an embayment apparently opens and closes on the south side during some years, but overall the change in position is minor. Clearly the glacier terminates at the head of tidewater at a retracted, stable position. Major advance can occur only when this build a terminal-moraine barrier which will greatly reduce calving losses. This apparently will take a much longer time for this glacier than for debris-laden glaciers such as the Grand Pacific or Johns Hopkins Glaciers in Glacier Bay, which have advanced over 1 km since their drastic retreats which ended only about 30 years ago.

SEDIMENT ACCUMULATION

Although the construction of a terminal-moraine barrier in front of the present Aialik Glacier is evidently a slow process, the deposit of fine rock debris which can flow to, and pond in, the deepest basins, is clearly taking place. Flat, featureless bottom is present at a depth of about 350 ft (107 m) north-northwest of Slate Island. The 1912 Coast and Geodetic Survey Hydrographic Survey H-3421 shows soundings of 414 ft (126 m). This difference is sufficiently large that it would be unlikely to be due to errors in measurement of the two surveys. If figures are correct, sediment accumulation in this relatively small basin approaches 1 ft (0.3 m) per year. This basin presumably traps the present fine debris discharged from Aialik Glacier.

East of Slate Island is a much larger flat-floored basin (shown in part in profile B-B') with present depth of 640 ft (195 m) when in 1912 the depth was 660 ft (201 m). These figures suggest similar accumulation but at a much slower rate than the west basin.

FIGURE 2
NEOGLACIAL CHANGES



Grant and Higgins estimated in 1909 that Aialik Glacier terminated on the moraine several centuries ago (1913, p. 28). In 1978 a fragment of a stump, judged to be from shrubbery similar to living alders growing on the slopes above, was found in a stream channel on the south side of Aialik Glacier. This wood had a carbon-14 date of 1454±65 years before present (B.P.). This provides a minimum date since the glacier retreated to near its present position. If the retreat from the terminal moraine was rapid, as all observed tidal glacier retreats in similar situations, the retreat could have begun as recently as 1800 A.D.

Grant and Higgins noted a recent "maximum position" moraine and trimline about 0.25 mi (0.4 km) in front of Aialik Glacier, from which the glacier had retreated about 10 years earlier (hooked line dated 1907?, fig. 2). Since 1909 the glacier has retreated slightly from rocks near the center of the ice cliff; an embayment apparently opens and closes on the south side during some years, but overall the change in position is minor. Clearly the glacier terminates at the head of tidewater at a retracted, stable position. Major advance can occur only when this build a terminal-moraine barrier which will greatly reduce calving losses. This apparently will take a much longer time for this glacier than for debris-laden glaciers such as the Grand Pacific or Johns Hopkins Glaciers in Glacier Bay, which have advanced over 1 km since their drastic retreats which ended only about 30 years ago.

Although the construction of a terminal-moraine barrier in front of the present Aialik Glacier is evidently a slow process, the deposit of fine rock debris which can flow to, and pond in, the deepest basins, is clearly taking place. Flat, featureless bottom is present at a depth of about 350 ft (107 m) north-northwest of Slate Island. The 1912 Coast and Geodetic Survey Hydrographic Survey H-3421 shows soundings of 414 ft (126 m). This difference is sufficiently large that it would be unlikely to be due to errors in measurement of the two surveys. If figures are correct, sediment accumulation in this relatively small basin approaches 1 ft (0.3 m) per year. This basin presumably traps the present fine debris discharged from Aialik Glacier.

East of Slate Island is a much larger flat-floored basin (shown in part in profile B-B') with present depth of 640 ft (195 m) when in 1912 the depth was 660 ft (201 m). These figures suggest similar accumulation but at a much slower rate than the west basin.

NEOGLACIAL RETREAT

Grant and Higgins estimated in 1909 that Aialik Glacier terminated on the moraine several centuries ago (1913, p. 28). In 1978 a fragment of a stump, judged to be from shrubbery similar to living alders growing on the slopes above, was found in a stream channel on the south side of Aialik Glacier. This wood had a carbon-14 date of 1454±65 years before present (B.P.). This provides a minimum date since the glacier retreated to near its present position. If the retreat from the terminal moraine was rapid, as all observed tidal glacier retreats in similar situations, the retreat could have begun as recently as 1800 A.D.

SEDIMENT ACCUMULATION

Although the construction of a terminal-moraine barrier in front of the present Aialik Glacier is evidently a slow process, the deposit of fine rock debris which can flow to, and pond in, the deepest basins, is clearly taking place. Flat, featureless bottom is present at a depth of about 350 ft (107 m) north-northwest of Slate Island. The 1912 Coast and Geodetic Survey Hydrographic Survey H-3421 shows soundings of 414 ft (126 m). This difference is sufficiently large that it would be unlikely to be due to errors in measurement of the two surveys. If figures are correct, sediment accumulation in this relatively small basin approaches 1 ft (0.3 m) per year. This basin presumably traps the present fine debris discharged from Aialik Glacier.

Profiles

The profiles shown are photographic copies of original depth-recorder charts which are scaled in either meters (Ross SL 600C) or fathoms (Ross 400B). The scales for meters and feet shown at the left of each profile have been adjusted to correct for tidal effects when required. Hand-written notes on charts are generally navigation data.



From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33

From Grant & Higgins - 1913, Plate 33