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Addendum to United States Research in the Convention Area During 1958

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Hydrography

Hydrographic research by the U.S.A. in the convention area was carried out by four agencies during 1958: the U.S. Coast Guard, U.S. Coast and Geodetic Survey, the Bureau of Commercial Fisheries and the Woods Hole Oceanographic Institution.

A. The U.S. Coast Guard, as the agency operating the International Ice Patrol, examined the temperature and salinity distribution from the surface to 1500 meters in 3 net work surveys in the Grand Bank region. The first survey, 3-15 April, covered waters over and immediately seaward of the southern and eastern slopes of the Grand Bank from just westward of the Tail of the Bank northward to the latitude of Flemish Cap. The second survey, 27 April-5 May, covered the area immediately seaward of the northeastern slope of the Grand Bank from Flemish Cap northwestward and included the Bonavista triangle. The third survey, 23 May-5 June, covered an area similar to the first but with the addition of a southward section, to 3000 meters, along 50°15'W long. across the Atlantic Current to 37°30'N lat. The post season cruise, 27 June-6 July, occupied the Bonavista triangle and the Labrador-Cape Farewell section to within 7½ miles of Cape Farewell.

The abnormal amount of onshore winds along the Labrador coast during the first three months of 1958 resulted in an alteration of the usual thermo-haline structure of the Labrador current; the minimum observed temperature was about a degree warmer than usual, but extended to abnormal depth. The warm water found was not as warm as usual, but was of normal geographic extent; the salinities at intermediate depths were lower than usual.

The report in toto will be published in U.S. Coast Guard Bulletin No. 44.

B. "In August 1958 the Coast and Geodetic Survey anchored a Roberts radio current buoy in 42 fathoms and one in 104 fathoms at the outer edge of the continental shelf near Georges Bank, 155 miles east of Cape Cod. Half-hourly observations of current speed and direction were made for four days from current meters suspended near the surface and bottom in 42 fathoms and near the surface, mid-depth and bottom in 104 fathoms. Nansen bottle casts were made at each station at time of planting and recovery, and a BT was obtained at each station every six hours. Velocities up to 1.8 knots were encountered, the currents were predominantly tidal and rotary, at least to 290 feet. The meter at 590 feet, near the bottom at the break in the slope, became inoperative after one day and the data were insufficient to attempt a rotary reduction. However, for the 18 simultaneous observations at 590 and 290 feet, the currents averaged 0.1 knots stronger at the bottom.

"Profiles of temperature-with-depth plotted against time show internal waves with heights up to 100 feet and suggest periods of tidal magnitude, although the data on the latter are not conclusive. These were most pronounced in a layer of warm water at about

425 feet, where the temperature was some 6° above that at 200 feet." (Quoted from abstract by H.B. Stewart, Jr., G.G. Salsman and A.J. Goodheart in Program, Fortieth Annual Meeting, American Geophysical Union.)

The Coast Survey has noted that sand ridges on Georges Shoal in 10 fathoms of water, which rise to within 2 fathoms of the surface have migrated 900 feet to the westward since 1931. During the summer of 1958 these ridges were studied by underwater swimmers, photographed, and sampled to evaluate the processes affecting sediment movement.

C. The Bureau of Commercial Fisheries has collected a limited amount of temperature (bathythermograph) and salinity data in Area 5 (including hydrographic sections across Browns and Georges Banks in April and September).

In concert with the Fisheries Research Board of Canada 7600 drift bottles were released in Area 5 with 5% returns. It is now possible to deduce the circulation pattern in Area 5 year-round.

D. The twelve lightship stations from Maine to Georgia equipped, at the end of 1955 by the Woods Hole Oceanographic Institution under contract with the Fish and Wildlife Service, as observation posts to collect surface temperature and salinity observations daily, bathythermograph drops daily and bottom water samples weekly, have continued in operation. The data for 1956 were reported in Special Scientific Report--Fisheries No. 233, for 1957 in Special Scientific Report--Fisheries No. 282.

The Institution conducted monthly cruises from May through September in the area of the cold wedge south from Martha's Vineyard and Nantucket, to investigate variations in the position and morphology of the temperature and salinity gradients between the coastal and slope water. Closely spaced hydrographic stations and bathythermograph lowerings indicate maximum gradients of 1.0 °/oo per 5 meters, and 10°F. per 5 feet. The volume of cold coastal water decreases with the advancing season , being in September about 1/5 of that in May. In June and July the cold coastal water extends relatively far southward into the slope water, indicating that bubbles of cold coastal water calving into the slope water may be quite large in early summer. (Excerped from part of abstract by G.M. Cresswell in Program for International Oceanographic Congress.)

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