

AN IGY CRUISE FROM TEXAS A. & M. (*)

by Hugh J. McLELLAN

IHB Note. — Dr. Hugh John McLellan was born in Sydney, Nova Scotia on March 16, 1921. He studied at Dalhousie University in Halifax, Nova Scotia and at the University of California, Scripps Institution of Oceanography, receiving his Ph. D. degree in Physical Oceanography in 1956. During the period 1947-1957, Dr. McLellan was employed by the Fisheries Research Board of Canada. In 1957 he joined the Department of Oceanography and Meteorology at the A. & M. College of Texas. He is a member of the American Geophysical Union, the Nova Scotian Institute of Science, the Canadian Association of Physicists and the American Society of Limnology and Oceanography. He is listed in *American Men of Science*, 9th edition, Volume 1 and *An International Directory of Oceanographers*, 1955.

The Department of Oceanography and Meteorology of the Agricultural and Mechanical College of Texas has, since 1950, been carrying out an active program of research in all phases of oceanography. The cruise program, up to 1958, has been confined mostly to observations within the Gulf of Mexico.

In January 1958 a new research vessel, the *Hidalgo*, was obtained, and in the IGY cruise carried out in the summer of 1958 covered a considerable area in the Northwest Atlantic, Caribbean, and Gulf of Mexico.

The 136-foot wooden vessel (fig. 2) originally built for the U.S. Navy as a « P.C.S. » has proved quite satisfactory as a research vehicle. A large laboratory on the main deck serves for hydrographic and chemical work and has additional laboratory and stowage space immediately below. An air-conditioned laboratory on the boat deck immediately aft of the wheel house contains most of the electronic equipment. The main oceanographic winch, capable of spooling up to 8 000 metres of 5/32" wire, is located on the main deck between the stack and the deck laboratory and utilizes a boom over the starboard side.

The outfitting of the vessel was completed during the month of April and the first part of May. The ship sailed from Galveston on May 13, 1958 and returned on June 29, 1958. The track followed and positions at which observations were made are shown in figure 1. In all, 90 hydrographic stations were occupied, most of these including observations close to the

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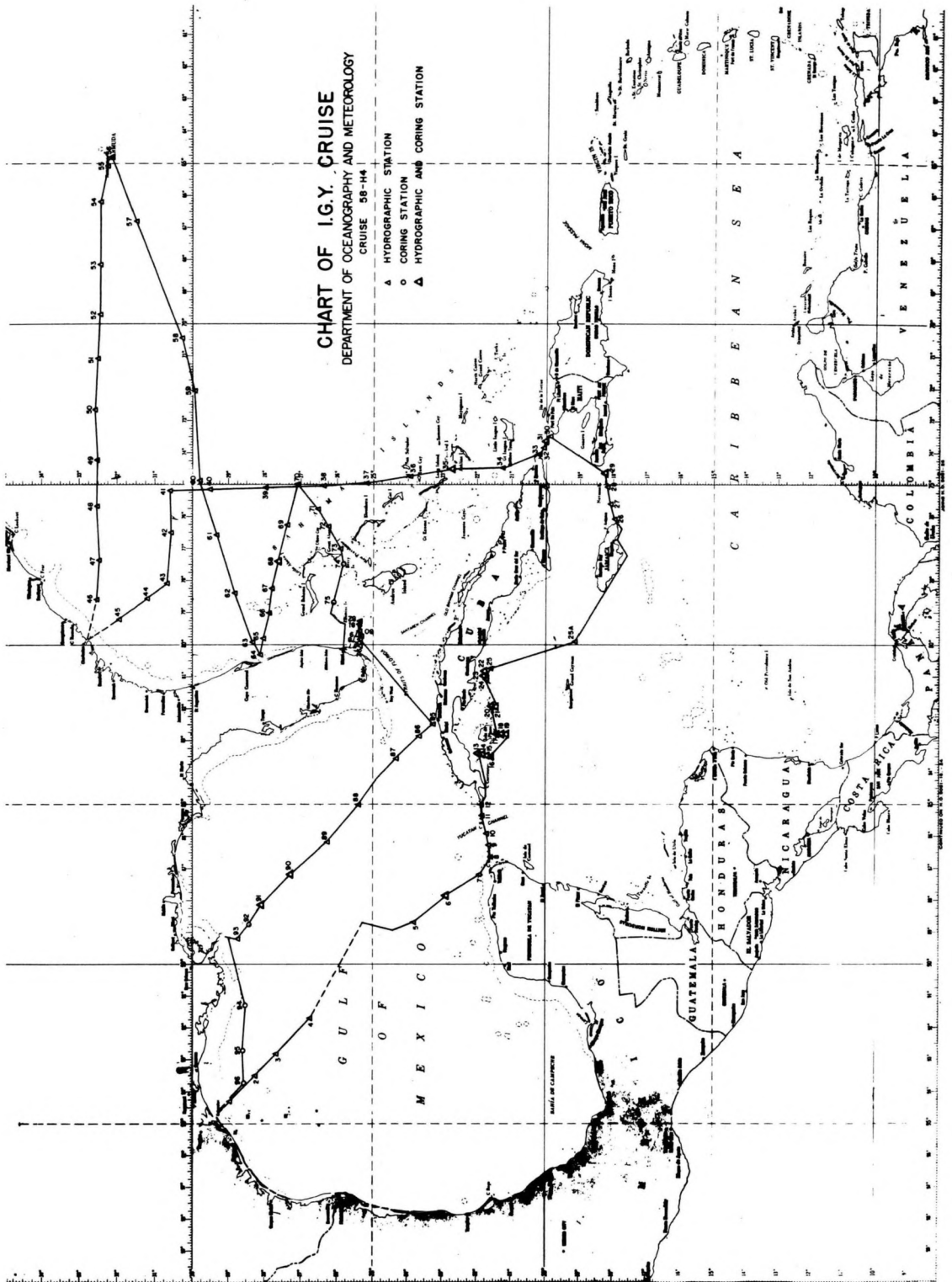


FIG. 1

sea bed. 28 bottom cores were taken and 410 B. T. observations made. At all stations temperature, salinity, dissolved oxygen, pH and alkalinity were observed at each depth, and at the majority of stations phosphate, nitrate and nitrite samples were taken. A new method of analyzing for boron in sea water was tried out on samples from a few selected stations.



FIG. 2

At eight stations, samples for trace metal analysis were collected in non-metallic sampling bottles of a special design. These samples were taken from the maximum depth, a depth just below the permanent thermocline and from the surface layer.

Throughout the cruise continuous recordings of temperature and conductivity of the surface waters were made.

Measurements were made throughout the cruise of the carbon dioxide content of the air and the surface waters. At stations, vertical profiles of CO_2 content to 200 feet were observed.

During the latter part of the cruise a La Coste & Romberg gravity meter was carried. The manufacturers had developed an instrument which they hoped would be capable of making accurate gravity measurements at sea from a small vessel with no special equipment. Few successful measurements were obtained between Charleston and Bermuda or between Bermuda and Miami but a great many observations were recorded from Miami

to Galveston. Evaluation of these data has led to a reasonable confidence in the meter. The instrument as used was operable in slight or moderate seas where the wave patterns were not too complex. On the basis of the experience gained slight modifications have been made which greatly increased the range of conditions under which observations can be made.

Parts of the cruise were coordinated with the oceanography program of the University of Miami's Marine Laboratory. The crossing of the Yucatan Channel was timed to coincide with a period when the transport of the Florida Current was monitored by cable from Key West to Habana and when the University of Miami ship occupied a section from Miami to Cat Cay. Later the vessel *Gerda* made observations in the Florida Current while the *Hidalgo* worked in the Antilles Current and, following that, the two ships combined in a study of the short term fluctuations of the Florida Current using G.E.K.'s.

Processing of the data from this 5 450-mile cruise has been completed and a data report submitted to IGY Data Centers. Analysis of the results is under way.