

OCEANOGRAPHIC OBSERVATIONS
ON THE
"E. W. SCRIPPS" CRUISES OF 1940

BY
H. U. SVERDRUP AND THE STAFF
OF THE
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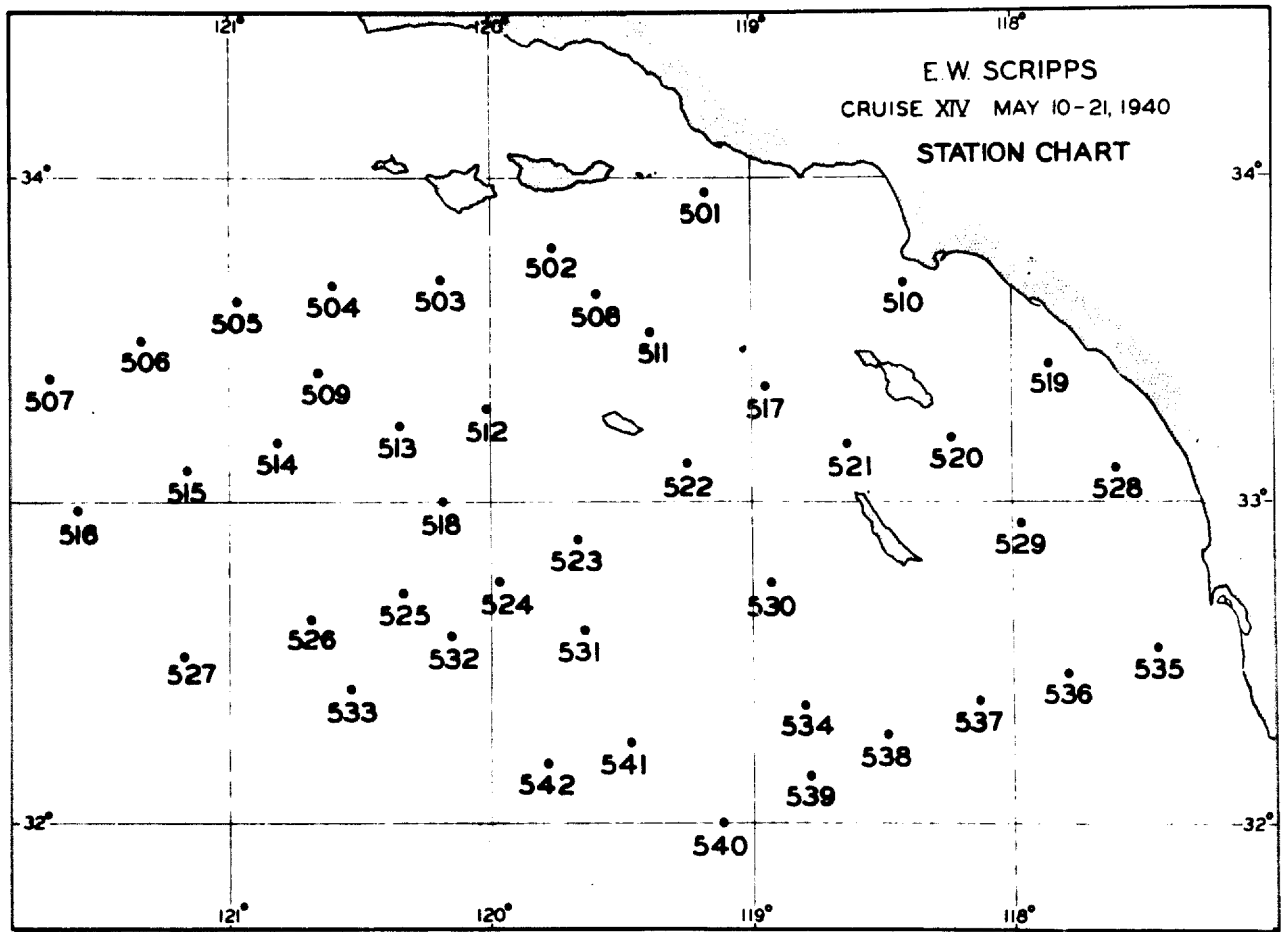


Fig. 1.--Station plan of the "E. W. Scripps" cruises, 1940.

OCEANOGRAPHIC OBSERVATIONS ON THE "E. W. SCRIPPS" CRUISES OF 1940

CRUISES X-XVI

By

H. U. SVERDRUP and STAFF

In 1940 seven cruises, numbered X to XVI, were completed. The present report gives the observations on the first six cruises but does not include observations on cruise XVI.

Cruise XVI was a second cruise to the Gulf of California made possible by a grant from the Geological Society of America and undertaken primarily for the purpose of examining further a number of problems in submarine geology which had been touched upon during the first cruise to the Gulf in 1939. In 1940 intensive work was carried out in the central part of the Gulf where numerous soundings and bottom samples were procured. Close networks of soundings were also obtained from areas farther south, and in several localities the geological features of the coasts were examined. A few hydrographic stations were occupied, and current measurements were made from the anchored vessel. All data were accumulated for the study of geological problems including the submarine topography, the bottom sediments, and the processes of sedimentation. The data and the results will be presented in papers by Messrs. C. A. Anderson, R. R. Revelle, and F. P. Shepard, who conducted different phases of the field work. The reports will appear in the publications of the Geological Society of America, but some will be delayed owing to the war.

Cruises X to XV were undertaken in cooperation with the South Pacific investigations of the U.S. Fish and Wildlife Service for the purpose of studying the hydrographic conditions and the distribution of sardine eggs and larvae off southern California during the spawning season. The ultimate goal of these studies, which were planned to continue over a number of years, is to determine the factors which influence the success of the spawning. During the cruises, members of the staff of the Scripps Institution of Oceanography conducted the standard hydrographic observations and made collections of phytoplankton, while net hauls for sardine eggs and larvae were taken by members of the Fish and Wildlife Service. After the sardine eggs and larvae had been separated, the latter samples were turned over to the Scripps Institution for examination of the zoöplankton.

The plan of the investigation called for

closely spaced stations, which had to be occupied in the shortest possible time interval in order to obtain a nearly simultaneous picture of the distributions. It also called for repetition of cruises at intervals of about three weeks in order to permit an examination of the time changes. For the accomplishment of these objects a smaller area was selected than that covered during the cruises in 1937 and 1938. Within this area, which is shown in figure 1, observations were to be taken at 40 localities, but later on 2 were added, bringing the maximum number of stations up to 42. The locations of these stations which were all occupied on cruise XIV are shown in figure 1. On all other cruises a few stations had to be omitted because of bad weather.

The hydrographic observations were made, when possible, at fifteen standard depths: 0, 10, 20, 30, 40, 50, 75, 100, 150, 200, 250, 300, 400, 500, and 600 meters, but owing to wind and currents the depths of observations occasionally differed as much as 20 per cent from those listed. The depths of observations were, as usual, determined by wire angle and unprotected thermometers. The data are reported in table 1 as interpolated values at standard depths. Besides interpolated values of temperature, salinity, oxygen content, and phosphorus content, the table contains computed values of σ_t and of anomalies of specific volume and dynamic depth.

Table 2 gives the observations of plankton diatoms. Five-liter water samples obtained from different depths by means of the Allen closing-bottle were filtered through a small net no. 25 bolting silk, and the concentrated sample was conserved in a small glass bottle for subsequent microscopic examination. The table contains the total number of diatoms per liter and the percentage of specimens in poor condition.

The general character of the currents and the distributions of temperature, salinity, oxygen, and diatoms correspond to those observed in the same areas in 1937 and 1938. No discussion of results is included, nor are any charts given, because a comprehensive analysis of the data is being prepared by R. B. Tibby.

The successful completion in scheduled time of the six cruises is to a great extent to be credited to the conscientious planning of the master

of the "E. W. Scripps," Captain E. D. Hammond, and to the whole-hearted coöperation of the crew.

Staff members of the Scripps Institution who took part in the cruise and the

working-up of the data were W. E. Allen, R. H. Fleming, J. Y. Gilbert, M. W. Johnson, E. C. La Fond, John Lyman, E. G. Moberg, Sydney Rittenberg, H. U. Sverdrup, and R. B. Tibby.