

XXIX.—LISTS OF THE DREDGING STATIONS OF THE U. S. FISH COMMISSION, THE U. S. COAST SURVEY, AND THE BRITISH STEAMER CHALLENGER, IN NORTH AMERICAN WATERS, FROM 1867 TO 1887, TOGETHER WITH THOSE OF THE PRINCIPAL EUROPEAN GOVERNMENT EXPEDITIONS IN THE ATLANTIC AND ARCTIC OCEANS.

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PREFACE.

The records of the dredgings and trawlings executed by the U. S. Fish Commission from 1871 to 1879 were published in the Fish Commission Report for 1879 by the author and Mr. Richard Rathbun; those of the *Fish Hawk* from 1880 to 1882 in the Bulletin of U. S. Fish Commission for 1882, by Mr. Richard Rathbun; those of the *Albatross* from 1883 to 1886 in various volumes of the Fish Commission reports. The dredgings of the *Fish Hawk* from 1883 to 1887 and of the *Albatross* in 1887 have not yet been published.

Although separate copies were printed of the lists from 1871 to 1882, the scattered manner in which most of these lists appeared in various publications and associated with great masses of other material has rendered it very difficult to bring together a complete series of them.

The completion of the accompanying series of charts, on which all the dredging positions of the U. S. Fish Commission, the U. S. Coast Survey, and the British steamer *Challenger* in North American waters are laid down, has rendered it desirable to bring together and complete all these scattered lists, together with those of the Coast Survey and the *Challenger*. The opportunity has at the same time been taken to collect together the records of the dredging operations undertaken by the British, French, Italian, Norwegian, Swedish, and other European Governments in the Atlantic and Arctic, the results of which are of almost as much importance to us as of those carried on upon our own coasts. These are scattered through a great number of works in various languages, and many of them very difficult to find, and have in many cases never been reduced into the form of tables; so that the task of bringing them together and putting them into shape has been a somewhat

laborious one. It has been endeavored to present as nearly complete a set of these records as possible, but no doubt some will be found to have been omitted which ought to have been included. Excepting in the Arctic seas series consisting mainly of shallow-water dredgings, such as those in the Baltic, have not been included. Of other expeditions which have made important dredgings no lists, so far as is known, have ever been published. It will be noticed, also, that the amount of detailed information given in these lists varies very much, some giving only the position, depth, and kind of bottom, whilst others contain full particulars of temperature of air, surface, and bottom, drift, etc. They are here presented essentially as originally published, with some slight changes of arrangement for the sake of uniformity, and with foreign measures or temperatures accompanied with their American equivalents. The sources from which they were derived are, as a rule, stated, but with some exceptions.

A large part of the dredging positions of the Coast Survey were published by Professor Agassiz in the Bulletin of the Museum of Comparative Zoology at Cambridge, Mass. Those of 1867, 1868, and 1869 made by Count Pourtales have, however, been rendered definite by reference to the original charts and records in the Coast Survey Office; those of 1872, made by Dr. William Stimpson, have been added from the same sources, and a few other additions and corrections have been made.

The prefatory notes attached to each, both of the American and foreign lists, will render unnecessary any further explanation of their sources or peculiarities here.

The five large charts accompanying these lists require but little explanation. They relate only to the work of the Fish Commission, Coast Survey, and *Challenger* on and near our Atlantic coast, as it was not found practicable to publish at present charts illustrating the dredgings in other parts of the Atlantic and Arctic, although such have been prepared.

Every dredging made by the Fish Commission or the Coast Survey has been placed upon one or the other of these charts, except where the scale compels their omission or where the position was originally so indefinitely stated as to render it impossible to place it accurately. Of both these classes special lists are given on the charts, pointing out the nearest station which is placed on the chart.

A few words may be added to explain the special objects of the four small charts and sections placed upon the chart of the Caribbean Sea. The little chart of the Gulf of Mexico and the northwestern part of the Caribbean Sea serves to show parts of the Gulf not included on any of the large charts, to give additional contour lines, and to direct attention to the remarkable regions of deep water existing in both seas, and especially to that one marked as the Sigsbee Deep in the Gulf of Mexico. The bottom of this is almost a perfect plain, varying in depth over a

very large area only from 2,000 to 2,050 fathoms, as is shown by the east and west section across the Gulf, which is also given.

The three sections, from the Cultivator Shoal, or George's Bank, from Hatteras, and from Charleston, illustrate the general fact of the very gentle slope of the sea bottom along our eastern coast until the depth of about 100 fathoms is reached and of its very abrupt descent beyond that line, whilst they show the very different distances from shore at which this line is found.

The two sections showing the temperatures in the Mediterranean and the Caribbean Sea illustrate the fact that in a deep basin closed by a barrier of shallower soundings no change of temperature occurs from a depth corresponding with that of the barrier to the very greatest depths. In the Mediterranean the temperature found at a depth of about 120 fathoms, that of the Straits of Gibraltar, is about $57\frac{1}{2}^{\circ}$ Fahr. and does not vary to a depth of more than 2,000 fathoms, whilst in the Caribbean and Gulf of Mexico the deepest channel communicating with the ocean appears to be about 800 fathoms, corresponding to a temperature of $39\frac{1}{2}^{\circ}$ Fahr., and below this depth this temperature is invariably found down to 2,000 fathoms and more. The temperatures marked upon the section of the Gulf of Mexico illustrate this fact more fully.

The other temperature sections show the very rapid diminution of temperature from the surface and the very low temperatures reached in great depths.

As, after the preparation of the chart of the Caribbean Sea, the sections illustrating depths and temperatures were found, when reduced, to be too small for convenient use, enlarged copies of them are given as separate plates, numbered 5a, 5b, and 5c.

The tables of serial temperatures, taken by the *Speedwell*, *Fish Hawk*, and *Albatross*, afford the means of studying these changes of temperature in greater detail. These tables, like those of positions, have been scattered through numerous volumes, and, as requiring the aid of charts for their intelligent use, it has been considered best to bring them together in connection with these.

The hydrographic stations of the *Albatross* having been published for the most part by the Hydrographic Office as well as in the Fish Commission reports, and requiring only very rarely to be referred to by their serial numbers, the lists of them have not been reprinted.