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magnetic declination, dip, and intensity at stations in Idaho; and verification of the northern boundary of Wyoming Territory.

Special investigations relative to tidal action and the tidal theory, with other mathematical and physical researches, were prosecuted in England and in Europe; determinations of the magnetic declination, dip, and intensity were made at a number of stations on the northeastern coast of America.

II.—OFFICE-WORK.

In the work of the Coast and Geodetic Survey Office the progress made has been commensurate with that of the field-work. All records of field-work pass into the office for reduction, discussion, and preparation for publication; these records may relate to reconnaissance for triangulation; to astronomical and magnetic observations; to base measurements, to the several classes of triangulation, to tidal observations, and to topographic and hydrographic surveys in the form of field sheets. In the office operations are included the drawing and engraving of charts from reduced copies of the original topographic and hydrographic maps; the electrotyping of engraved plates, the printing and issue of charts, and the maintenance of the instruments used in the Survey.

Tide-tables of the principal ports of the United States for the year 1883 have been published; the drawings of fifty-one charts have been in progress, and of this number fourteen have been finished, including eleven charts for publication by photolithography. Four copper-plate engravings of charts, and twenty-one of sketches and illustrations have been begun; one hundred and thirty-two plates of charts have received corrections; the engraving of twenty-four plates of charts has been continued; the plates of twenty-eight charts and twenty-three sketches and illustrations have been completed. An aggregate of twenty-nine thousand and forty-nine charts has been issued; in this number were included fifteen thousand seven hundred and three sent to sale-agents, and seven thousand seven hundred and eighty-three supplied for the use of the several Departments of the Government. Twelve hundred and fifty copies of the Annual Report of the Superintendent, and eight hundred and fifty-five divisions of the Atlantic Coast Pilot, including sub-divisions, have been distributed. A second edition of Division B of this work, "Boston to New York," a third edition of Sub-division 3, "Penobscot Bay and Tributaries," and the first edition of Sub-division 14, "New York to Delaware Entrance," have been published.

III.—MISCELLANEOUS SCIENTIFIC WORK.

FIGURE OF THE EARTH.

In a geodetic survey, extending over an area so large as that of the United States, the question of the size and figure of the earth becomes one of great importance. The results already reached in the regular progress of the survey, and brought out by the comparisons of astronomical and geodetic latitudes, longitudes, and azimuths are of sufficient interest to stimulate further research. These determinations give the direction of the force of gravity; on the other hand and supplementary to these, pendulum experiments will determine the intensity of this force.

With regard to the utility of pendulum work in its bearing upon the figure and density of the earth, no question can now arise. It is fully shown by the resumption of this work in recent years in the leading Government surveys conducted in India, Europe, and America. And although different opinions have hitherto been held, and are still held, as to the best and most economical modes of prosecuting gravity experiments, all geodesists agree that widely distributed pendulum stations, made strictly comparable by comparison of instruments and by adherence to uniform methods, will give results of the utmost value to geodesy and geology.

The views on this subject submitted by Assistants Charles A. Schott and C. S. Peirce at a meeting held at this office in May, 1882, for an informal conference on gravity observations, will be found stated at length in Appendix No. 22, together with the propositions formulated as the results of the conference and unanimously adopted by the participants. In another paper Assistant Peirce communicates results obtained by him for force of gravity. [Appendix No. 23.]