observatories were afforded to all investigators who desired to make standardization comparisons of their instruments; and in response to numerous requests information, or observational data, was furnished for practical application or for use in special investigations of terrestrial magnetism and allied phenomena.

Appendix No. 6, constituting the concluding portion of a manual of tides, treats of the flow of water, of river tides, tidal currents, permanent currents, annual inequality, lake tides, seiches, and miscellaneous tidal matters.

Charts of concurrent lines are given for the principal marginal waters along the Atlantic Coast of the United States. The numbers upon these lines show the times of the maximum flood current.

The dependence of the permanent ocean currents and the annual height in equality upon the prevailing winds is briefly pointed out. Seiches are shown to exist in harbors and other tongues of water, as well as in lakes; but their character is fundamentally different in some respects.

The analyses of observations upon the tides of Lake Superior show that they follow closely the equilibrium theory although the range is only 1½ inches at Duluth and one third inch at Marquette.

In Appendix No. 7 is given a detailed description with appropriate illustrations of the Long Wire Drag, a device for detecting erratic obstructions of small extent in navigable waters. The method of operating can be understood from the simple statement that the drag is a wire varying in length from 480 to 1,400 feet, supported at suitable intervals and maintained at any desired depth below the surface of the water. This drag is towed over any given area by launches, and in the area so searched no elevation of the bottom above the depth at which the wire is suspended can escape detection. Buoys floating at regular intervals above the drag indicate to observers in the launches when and where an obstruction is touched, and the spot so indicated is then accurately determined.

This method of sweeping has proved a sure means of detecting pinnacle rocks and similar erratic obstructions which heretofore have eluded the hydrographic surveyor, since it is almost impossible to discover them by lines of soundings with the lead. Only the navigator in whose hands rest many lives and much property can realize the relief from mental strain that comes from knowing that the water in which he is sailing is absolutely free from hidden dangers or that every menace is charted. The device has proved very satisfactory under widely varying conditions and marks a decided advance in marine surveying.

This report, or any one of the Appendices, numbered 3 to 7, may be obtained by interested persons, free of charge, upon application to the Superintendent of the Coast and Geodetic Survey, Washington, D. C.

BERMUDA BIOLOGICAL STATION FOR RESEARCH

By arrangement with the Bermuda Natural History Society, the Station for Research at Agar's Island will be open for about seven weeks this summer. There are accommodations for a limited number of instructors or research students in either zoology or botany.

Members of the expedition will sail from New York on the steamer *Bermudian* (Quebec Steamship Co.) at 11 A.M., on Tuesday, June 16, arriving in Bermuda, June 18, and will return on August 5, reaching New York August 7. Those who can not sail on June 16, may do so two weeks later, June 30.

The expense will be $110 for first-class passage from New York to Bermuda and return, and for board and lodging at the islands six weeks and six days. For the shorter time—four weeks and six days—the expense will be $90. Payments are to be made to the undersigned, fifty dollars on or before June 1, the balance on arriving in Bermuda.

For further information apply to

E. L. Mark

109 Irving Street,
Cambridge, Mass.

CONFERENCE ON THE CONSERVATION OF NATURAL RESOURCES

In a sense the federal and state scientific work to date culminates in the Conference on

the Conservation of Natural Resources, in the White House, May 13–15. Through the operation of state and federal geological surveys, supplemented by collateral research in higher institutions of learning, the extent of coal, iron ore, and other mineral deposits, in all parts of the United States has been determined or estimated with a fair degree of accuracy; so that it is now possible to say that the original stock of coal of fairly high grade was somewhere in the neighborhood of 2,000,000,000,000 tons, and the original stock of readily workable iron ore approximately 10,000,000,000 tons—while the rates of consumption and waste also are fairly known. Through the operations of the federal forest service, with the aid of antecedent agencies and state bureaus, the rates of forest growth and consumption and destruction have been ascertained with a fair degree of accuracy; so that it is possible to estimate the duration of the timber supply of the country. Through the operations of the U. S. Weather Bureau, with antecedent agencies, the quantity and distribution of rainfall, on which the habitability of the country depends, has been measured approximately; so that the capability for development of different sections of the country is known in at least a general way. Through the operations of the Bureau of Soils, with antecedent and adjunct agencies, the crop producing capacity of the different sections of the country, together with the benefits of improved cultivation and the losses through soil-erosion, have been ascertained in at least a preliminary way; while contemporary bureaus in the federal Department of Agriculture and numerous state instrumentalities have indicated the leading principles involved in that crop production on which national prosperity primarily depends. Thus the state and federal work to date has served to establish the nature, and in some measure the extent of the natural resources of the country.

Through the operations of scientific agencies the habit of definite thought has become fixed; so that experts habitually think and speak or write in quantitative terms. In earlier years a coal deposit, or iron ore body, or pine forest, was vaguely thought inexhaustible; of late the first duty of the expert is to estimate the quantity, the rate of production and the duration of the supply. The habit of definite thought in terms of quantity is now extending to soil, to water-supply, to productivity of the land in forests or other crops, and with this extension there has arisen a realization that none of the natural resources of the country can be considered illimitable or inexhaustible, and that all should be viewed as national assets, to be guarded in the interests of the country.

In connection with the assembling of facts and the development of definite thought (which are among the immediate results of scientific work), the habit and the faculty of prevision have grown up. Prevision has aptly been styled the essential factor of science; and its growth throughout the country as the result first of observation and then of definite arrangement of the facts relating to resources can only be regarded as a typical illustration of the scientific method, notable especially for its magnitude—extending as it does virtually to an entire people.

The natural outcome is the idea of conservation as a public duty, which originated chiefly in the forest service and the geological survey; and it is significant that the idea has taken form more or less independently also in the minds not only of scientific men, including engineering and other experts, but also in the minds of statesmen in every part of the country. President Roosevelt was early impressed; Secretaries Wilson and Garfield were soon in sympathy; and when the president and a score of governors met on the Mississippi last October, it was found that a number of the state executives had fully grasped the same idea. The plan for the Conference, first definitely suggested by the Inland Waterways Commission, was announced by the President at Memphis, October 4; and the interest has steadily increased. The four great engineering associations have contributed effectively by separate and joint meetings; and commercial and

civic organizations have been active, as have been a number of scientific bodies, beginning with the American Association for the Advancement of Science, which appointed a strong committee at the Chicago meeting, and whose president is a leading speaker at the conference.

The conferees with the president include the governors of the states and territories, each with three advisors; the justices of the Supreme Court; the members of the Cabinet; the senators and representatives in the Sixtieth Congress; the Inland Waterways Commission; the presidents of leading national and interstate scientific, technical and industrial organizations dealing with natural resources; together with a limited number of special guests, representatives of the press, etc.

While no formal program was framed in advance, the preliminary calendar was as follows:

CALENDAR

May 12, 7:30 P.M.—Meeting of the Governors and special guests with the President at dinner in the White House.

May 13, 10:00 A.M.—Assembling of Governors and their advisors with otner conferees in the East Room.

11:00 A.M.—Address by the President: "Conservation as a National Duty."

2:30 P.M.—Session on Mineral Resources.

Opening statements:

"The Conservation of Ores and Related Minerals," by Andrew Carnegie.

"The Waste of Our Fuel Resources," by Dr. I. C. White.

General discussion—opened by John Mitchell.

7:30 P.M.—Meeting of the President and Governors as Guests of the Washington Board of Trade at dinner in the New Willard Hotel.

May 14, 10:00 A.M.—Session on Land Resources.

Opening statements:

"The Natural Wealth of the Land and its Conservation," by James J. Hill.

"Soil Wastage," by Professor T. C. Chamberlin.

"Forest Conservation," by R. A. Long.

"Conservation of Life and Health by Improved Water Supply," by Dr. George M. Kober.

General discussion.

2:30 P.M.—Session on Land Resources.

Opening statements:

"Interdependence of Resources, Illustrated by California's Rivers and Forests," by Ex-Governor George C. Pardee.

"Grazing and Stock Raising," by Hon. H. A. Jastro.

General discussion.

9:00 P.M.—Reception to meet the Governors and the Inland Waterways Commission at the residence of Mr. Gifford Pinchot.

May 15, 10:00 A.M.—Session on Water Resources.

Opening statements:

"The Public Lands and Land Tenure," by Ex-Senator Joseph M. Carey.

"Navigation Resources of American Waterways," by Professor Emory R. Johnson.

"The Conservation of Power Resources," by H. S. Putnam.

General discussion.

2:30 P.M.—General Session.

4:30 P.M.—General meeting of the conferees with ladies accompanying them, as guests of Mrs. Roosevelt, in the White House Grounds.

7:30 P.M.—Any session thought desirable by the Governors.

SCIENTIFIC NOTES AND NEWS

In the place of Professor Dr. Max Verworn, professor of physiology at Göttingen, who was unable to accept, Dr. Albrecht F. K. Penck, professor of geography at Berlin, has been appointed by the Prussian Ministry of Education to serve as Kaiser Wilhelm professor for 1908–9 in this country, and has been assigned to a seat in the Columbia University faculties of pure and political science. He will give courses in historical and physical geography.

President Eliot returned from his trip through the middle west on the morning of April 27, after having been absent from Cambridge since March 31. During his absence he delivered, in addition to the six lectures on university organization on the Harris foundation at Northwestern University, no less than twenty-eight other addresses and speeches.

At the annual meeting of the Society of the Sigma Xi of the University of Pennsylvania held at Randal Morgan Laboratory on May 5, Dr. A. W. Goodspeed was elected president; Dr. John W. Harshberger, vice-president; J.