SUBMARINE PHONOTELEMETRY

The following letter has been received from the Commissioner of Lighthouses of the United States of America :

DEPARTMENT OF COMMERCE.
Bureau of Lighthouses.

Washington, June 26, 1928.

Referring to pamphlet Submarine Phonotelemetry, published by the International Hydrographic Bureau in 1928, it is noted that on page 30 it is stated that the radio acoustic method of navigation "is described for the first time (subject to contradiction) by J. JOLY in 1918 (Proceedings of the Royal Society, N° A. 664, August, 1918)."

It appears that in this statement the fact has been overlooked that the United States Government made tests to determine the value of this system of navigation in 1911. On September 10, 1911, the United States Naval vessel "*Washington*" made tests of determining the distance by simultaneous signals, submarine and radio, from Nantucket Lightship, and the results of this test were published in Supplement of the Pilot Charts.

(Signed): G. R. PUTNAM
Commissioner of Lighthouses.

The following is extracted from Supplement to the Pilot Chart of the North Atlantic Ocean, 1911, which has been sent to this Bureau by the Commissioner of Lighthouses.

DETERMINING DISTANCE FROM A WIRELESS STATION EQUIPPED WITH SOUND SIGNALS.

Experiments carried out on board the U. S. S. Washington in the vicinity of the Nantucket Shoals Lightship for the purpose of demonstrating the practicability of determining distance from a source of simultaneous wireless-telegraphic and sound waves as a means of facilitating navigation in foggy weather.

The morning of September 10, 1911 during which the experiments were made, was very hazy, but the Nantucket Shoals Lightship could be seen from a distance of about 5 miles. There were light airs from the west-northwestward. The sea was calm.

Starting near the lightship, a course was steered to the westward for a distance of 8 miles, and then, proceeding east-southeastwardly, the lightship was passed on the port beam at about 3,450 yards, and so on for several distances backwards and forwards finally to pass near the lightship.

The track of the Washington was determined by range-finder readings, compass bearings, and distances run, after making careful allowance for the tidal currents that were found setting generally to the northward during the course of the experiments.

The preconcerted signals from the lightship consisted of simultaneous signals from the wireless telegraph apparatus and the submarine-bell at the instants when the steam fog-whistle gave a blast.

The results of the experiments have been reproduced on a graphic ; the locus of the distance of the observing vessel from the lightship, as determined by the distance travelled by sound *in water*, between the time of arrival of the Hertzian waves and the signals from the submarine signal-bell, and the locus determined by the distance travelled by sound *in air*, between the times of arrival of the Hertzian waves and the signals from the steam fog-whistle have been laid down on the chart.

The distances to the light-vessel have varied by from 3,000 to 15,000 metres, the positions obtained by echo-sounding in the air and in the water are to a very great extent in agreement and have never differed by more than 810 metres from the true position.

The times of arrival of the wireless-telegraphic signals and the fog-whistle signals were noted by means of a Hack chronometer, and the times of arrival of those from the submarine bell by a stop watch. The same observer noted both the wireless tick and the submarine-bell signal.

The temperatures of the air and the water were recorded in the course of the experiments.

For the purpose of computing the distances to be shown on the graphic from the observed intervals of time, the velocity of sound in air at a temperature of 68 ½° Fahrenheit was deduced as 1.132 feet per second, and Dorsing's determination of the velocity of sound in water as 4.794 feet per second at 19° centigrade or 66° Fahrenheit was adopted, both values being derived from the fifth revised edition of the Smithsonian Physical Tables.