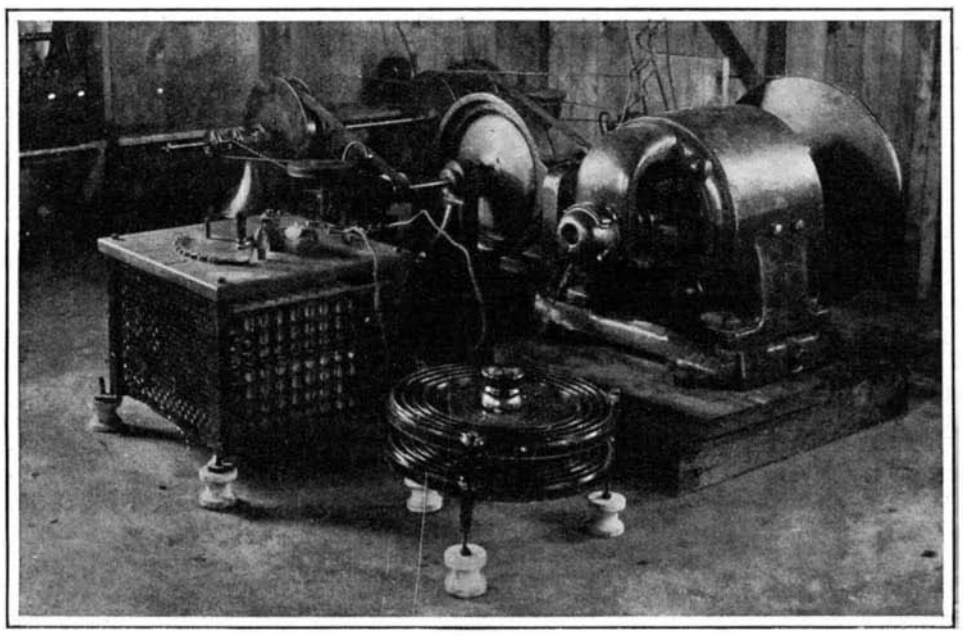
RECENT PROGRESS IN WIRELESS TELEPHONY.

BY REGINALD A. FESSENDEN.

A public demonstration of its latest form of wireless telephone apparatus was given by the National Electric Signaling Company at its Brant Rock and Plymouth stations, approximately eleven miles apart, on December 21. Invitations had been issued to a number of prominent electrical companies and electricians. Among those present were Prof. Elihu Thomson, Mr. Pickard, the well-known wireless and telephone expert, representing the Bell Telephone Company, representatives from the technical press, and others.



Dynamo Giving 80,000 Alternations per Second.

The National Electric Signaling Company transmitted speech wirelessly for the first time in the summer of 1900, by the method disclosed in U. S. patent 706,747. While the speech transmitted could be understood, there was a great deal of extraneous noise in the telephone, and various devices were devised for eliminating this. Among other methods the arc gap method shown in Fig. 1 (see U. S. patent 730,753) was used. This is an improvement on the original Elihu Thomson singing arc method, recently rediscovered by Poulsen and others, but which was used by the National Electric Signaling Company in 1901 and patented in 1902.

The extraneous noise had been sufficiently eliminated by 1904 to render it possible to put the wireless telephone on the market, and the National Electric Signaling Company consequently in that year began to advertise sets guaranteed to transmit speech up to 25 and 100 miles.

Though sufficient for most practical purposes, a certain amount of extraneous noise still remained, but some six months ago this was entirely removed, so as to permit of even faint whispers and the noise of breathing being transmitted. In addition a new telephone relay was invented, which permitted of talking from one local exchange and receiving messages at another local exchange, the message being transmitted over a wireless trunk line, thus enabling passengers, for example, on a steamer to converse with friends at a local exchange on shore.

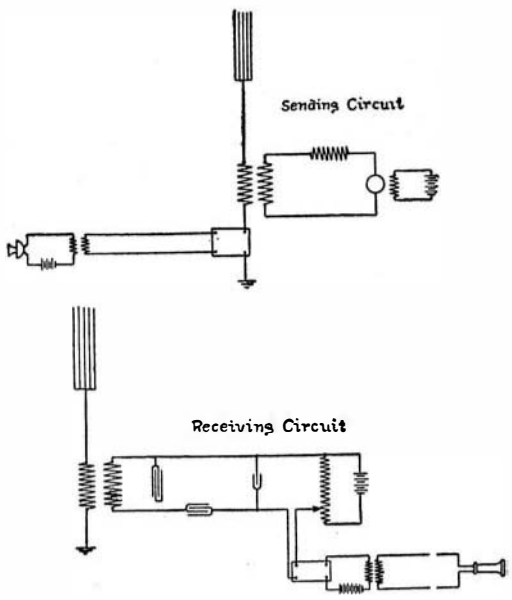


Fig. 3.—Connections for Relay System.

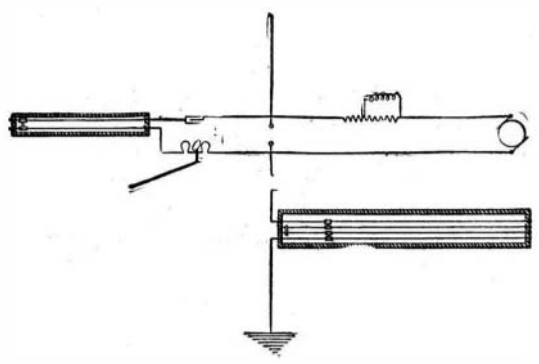
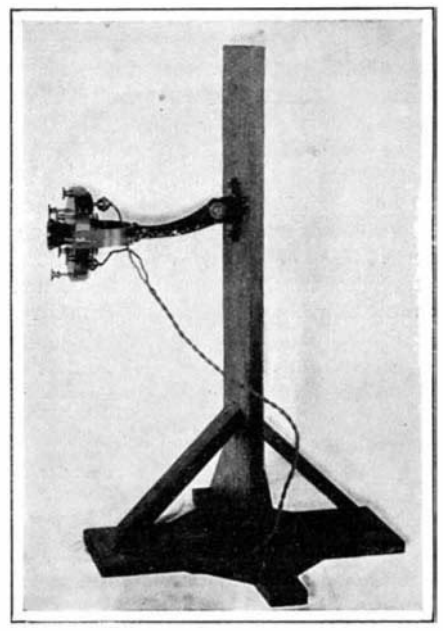


Fig. 1.—Diagram of Arc Method of Transmission.

During the past summer a great many experiments were carried on between the Brant Rock station and a small schooner having a mast 70 feet high, and communication was easily maintained up to distances of ten miles from shore with an expenditure of less energy than is required to operate a 16-candle-power lamp. A station at Plymouth was constructed to permit of work being carried on during the winter, when it was too rough to permit of the use of the schooner. It was between this station and the Brant Rock station that the recent tests were made. Fig. 2 shows the connections used for talking directly from one station to the other, and Fig. 3 the connections using telephonic relay for talking from one local exchange to another exchange.



Wireless Telephone Transmitter.

The illustrations show a form of transmitter, and the method of testing the sensitiveness of the various transmitters by a phonograph talking record and a dynamo used with one form of apparatus, capable of giving 80,000 alternations per second, but generally run at from 50,000 to 60,000. This dynamo, while of the general type described in U. S. patent 706,737, nevertheless required for its construction a very great amount of engineering skill. To the engineers of the General Electric Company, who constructed it, more particularly Messrs. Alexanderson Reist, Dempster, and Geisenhoner, is due the credit of this remarkable engineering feat. During the test not only speech but phonographic talking records and music were transmitted, all being received with perfect clearness and distinctness, the transmission being about equivalent to a thirty-mile cable. No extraneous noises of any kind were heard in the receiver, the wireless telephone being in this respect markedly in advance over the regular wire lines. As developed at present, the system is capable of maintaining communication between ships 100 to 150 miles apart, and there is little doubt

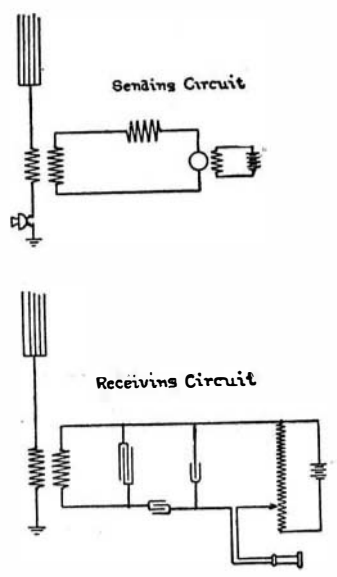
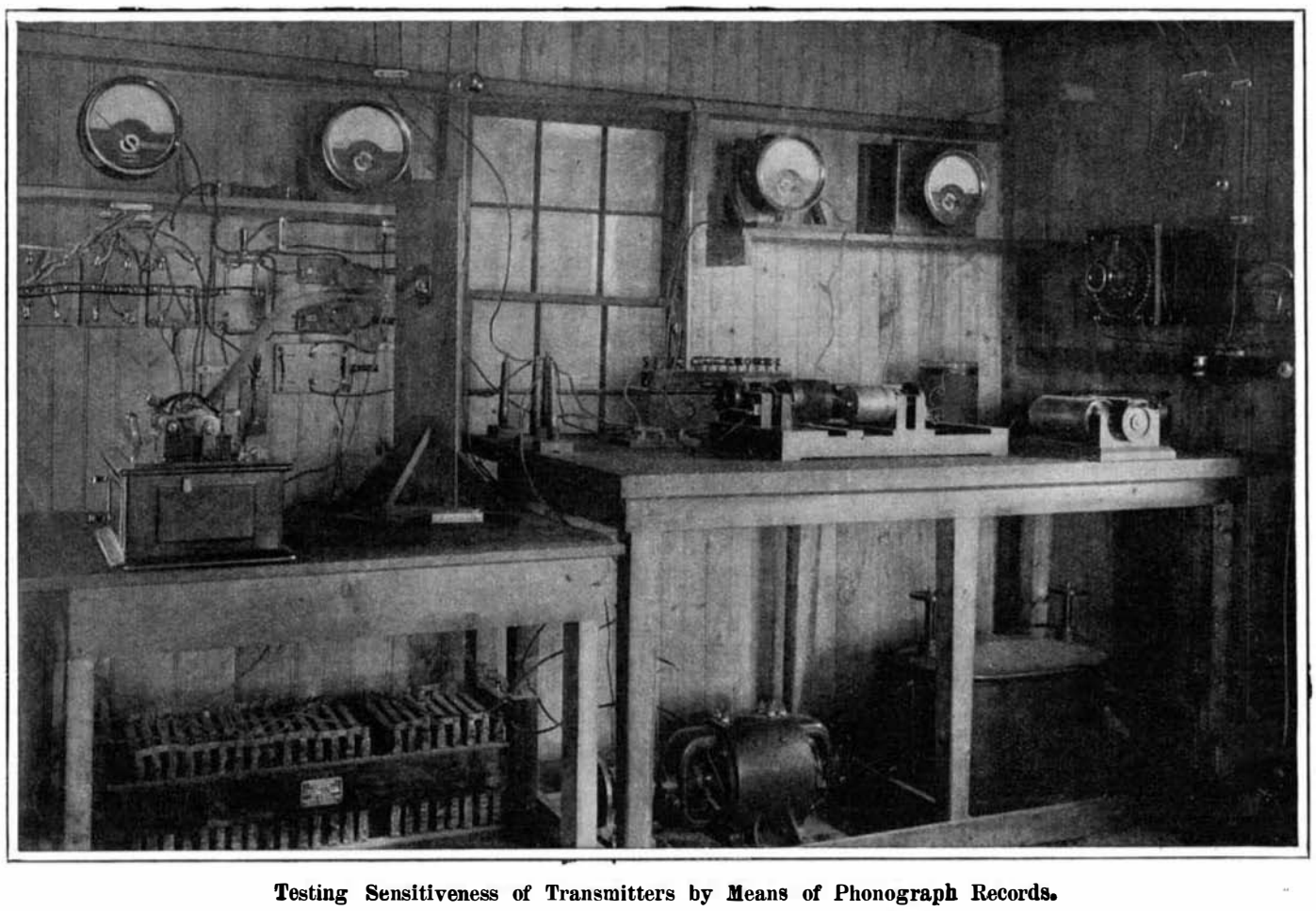


Fig. 2.—Connections for Direct System.



Testing Sensitiveness of Transmitters by Means of Phonograph Records.

that much longer distances will be covered in the near future.

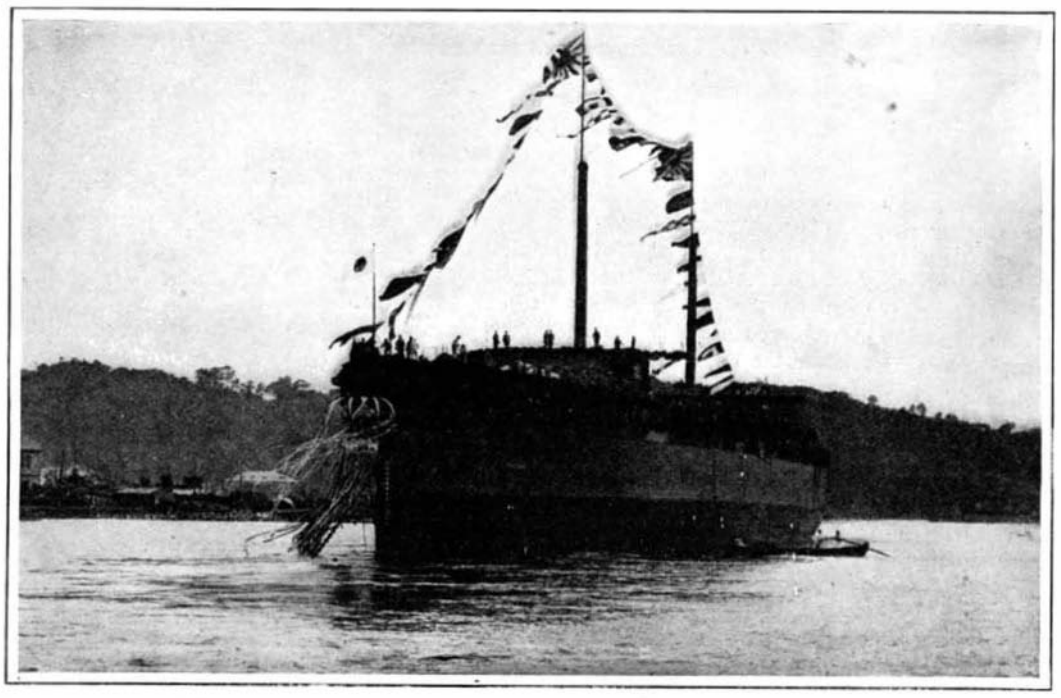
A method has now been put in use whereby messages can be printed on receipt at the receiving station (the messages being transmitted by typewriter).

THE LAUNCH OF THE "SATSUMA."

To the Editor of the SCIENTIFIC AMERICAN:

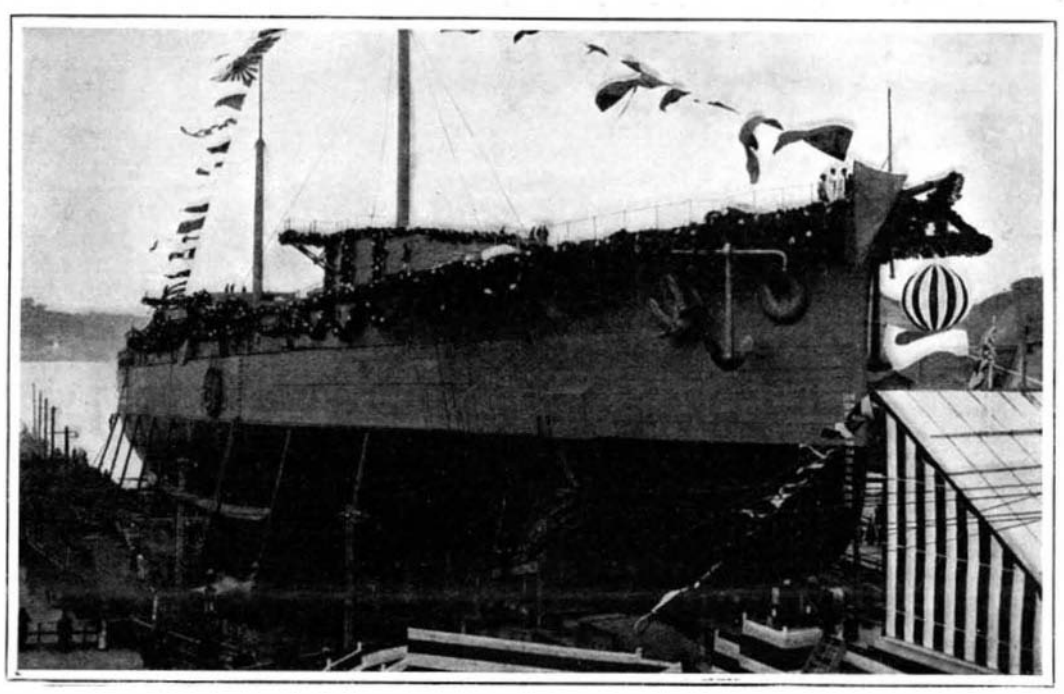
One year and one month after the peace of Portsmouth, which was brought about by the noble efforts of your great President, the launch of the largest battleship afloat took place in the presence of H. M. the Emperor, the Crown Prince, many princes and princesses, and a huge number of all classes of people, at the Yokosuka navy yard, which is but five miles from Uraga, where the monument to Commodore Perry stands.

The battleship "Satsuma," the construction of which began in the midst of the Russo-Japanese war, is 482 feet in length, 83 feet 6 inches in beam, of 19,200 tons displacement and 18,000 horse-power. Her armament is not yet officially declared, and will be kept secret until completion. But the authorities, it is said, at first intended to provide four 12-inch guns, twelve 10-inch guns, twelve 4.7-inch guns, and five torpedo tubes. Thus it will be seen that Japan has not dispensed with intermediate armament, as is the case with the "Dreadnought." Incessant progress in naval matters, however, calls for some new alterations and improvements to be introduced to the armament; and the "Satsuma" will, it is believed, be finally found to be more powerfully equipped than was originally intended. Her armor belt of Krupp steel ranges from 5 to 9 (or 9½) inches, and her intended speed is 19 knots. The ram bow has been dispensed with in her, as in the two armored cruisers, "Tsukuba" and "Ikoma," just built respectively at Kure and Yokosuka. She has a very handsome semi-fiddle bow. Over a year ago, Admiral Sir Cyprian Bridge said it would be interesting to see how long the ram bow would be a feature of warship design. So far as the Japanese are concerned, the day of the ram has passed away, and will not be revived in our future warships, unless some development, as yet undiscovered, is made hereafter in naval warfare. When the "Satsuma" is fully equipped she will also be without the fighting tops so common in modern warships. Compared with our latest battleship, "Kashima," she has a larger displacement by 2,600 tons, and in armament has eight more 10-inch guns. Not only is the "Satsuma" much superior to the "Kashima" in her exterior design, but the difference in her interior design is incomparably greater, owing to the fact that in the construction of the "Satsuma" every available experience obtained from the late war has been turned to account. The new battleship has a larger displacement than the "Dreadnought" by 1,300 tons, though she is inferior in point of speed; and there is a question as to the comparative strength of the two battleships' armaments. The "Satsuma" has four 12-inch and twelve 10-inch guns against the "Dreadnought's" ten 12-inch, so that in fire the latter opposes six 12-inch to the former ship's twelve 10-inch. The allied nations are to be congratulated upon their possession of the two most powerful battleships in the world. In the construction of warships, the most valuable of all experiences are undoubtedly those derived from the tests of actual engagements. A battleship, designed by the experts of a country which has had various experiences of modern naval warfare, cannot fail to have many characteristics peculiar to itself; though the public are yet in the dark as to the details of those characteristics.



The "Satsuma" After the Launch.

The striped ball hanging at the bow was opened at the launch, liberating a flock of pigeons.



Length, 482 feet. **Beam,** 83½ feet. **Displacement,** 19,200 tons. **Horse-power,** 18,000. **Speed,** 20 knots. **Armor:** Belt, 9½ inches. **Armament:** Four 45-caliber 12-inch; twelve 45-caliber 10-inch; twelve 50-caliber 4.7-inch. **Torpedo tubes,** 5.

LAUNCH OF THE JAPANESE BATTLESHIP "SATSUMA," THE LARGEST BATTLESHIP AFLOAT.

On November 15, when the launch had been arranged to take place, His Majesty entered the imperial stand at about 2 P. M., which faced the stem of the ship. Preparations for the launch were soon commenced. The shores supporting both sides of the hull, the wedges, etc., were removed in accordance with signal orders Nos. 1 to 14. The Minister of the Navy, Vice-Admiral Saito, then proceeded before the throne and read the following document: "On the 15th day of May in the 38th year of Meiji (1905) the construction of the battleship numbered B was commenced, and the hull having now been completed, His Majesty is pleased to name her 'Satsuma.'" The Minister handed the document to Vice-Admiral Kamimura, commander of the Yokosuka naval station, and the latter immediately instructed the superintendent of the arsenal, Vice-Admiral Ito, to launch the ship. As soon as the cord was cut by Vice-Admiral Ito, the hull began sliding. As the "Satsuma" was smoothly going down toward the water, a ball hanging from her bow, as shown in one of the photographs, was automatically broken, scattering pieces of colored paper, cloth, flowers, etc., from among which several pigeons flew away. The thunderous *Banzai* and applause continued for a time. The ship was entirely afloat at 2:25 P. M. It may be added that the "Satsuma" has been built entirely by Japanese experts, and there is no truth whatever in the reports circulated in Europe as to a number of foreign engineers having been employed.

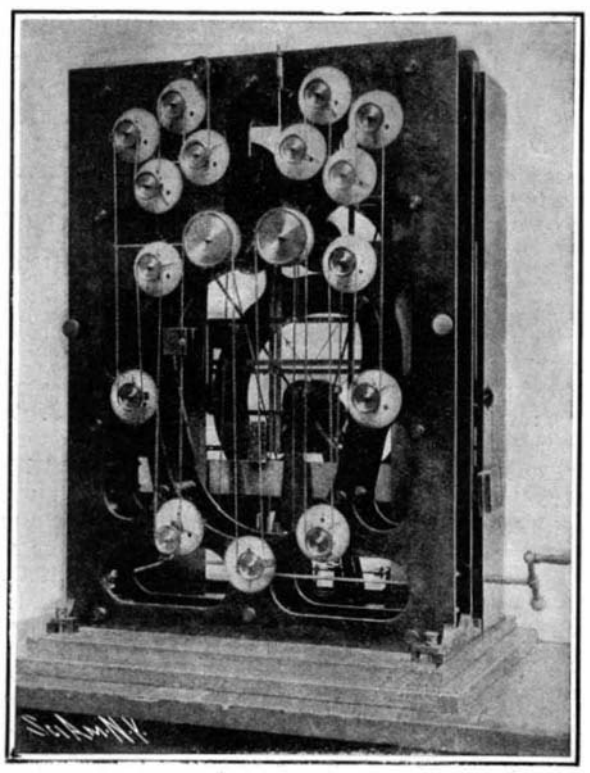
SAITO TSUNETARO.

The Imperial Fisheries Institute, Etchujima, Tokio, November 23, 1906.

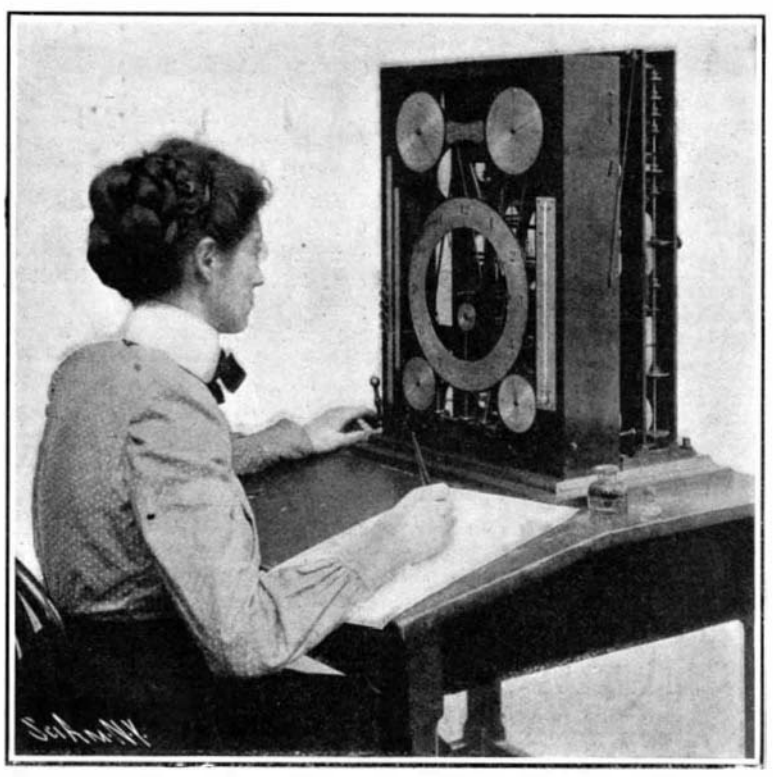
A MACHINE THAT PREDICTS TIDES.

BY D. A. WILLEY.

One of the most interesting devices utilized in connection with the United States Coast and Geodetic Survey is the mechanism by which the state of the tide at a certain seaport can be closely determined a year or more ahead. While with the machine are used tide tables which have been computed for a period of years, the automatic computation which the tide predictor performs is really wonderful in its accuracy. As the illustrations



Rear View of the Machine, Showing the Arrangement of Mechanical Elements.



Operator Turning Indices to Determine the Height and Time of the Tide at a Future Date.

A MACHINE THAT PREDICTS TIDES.