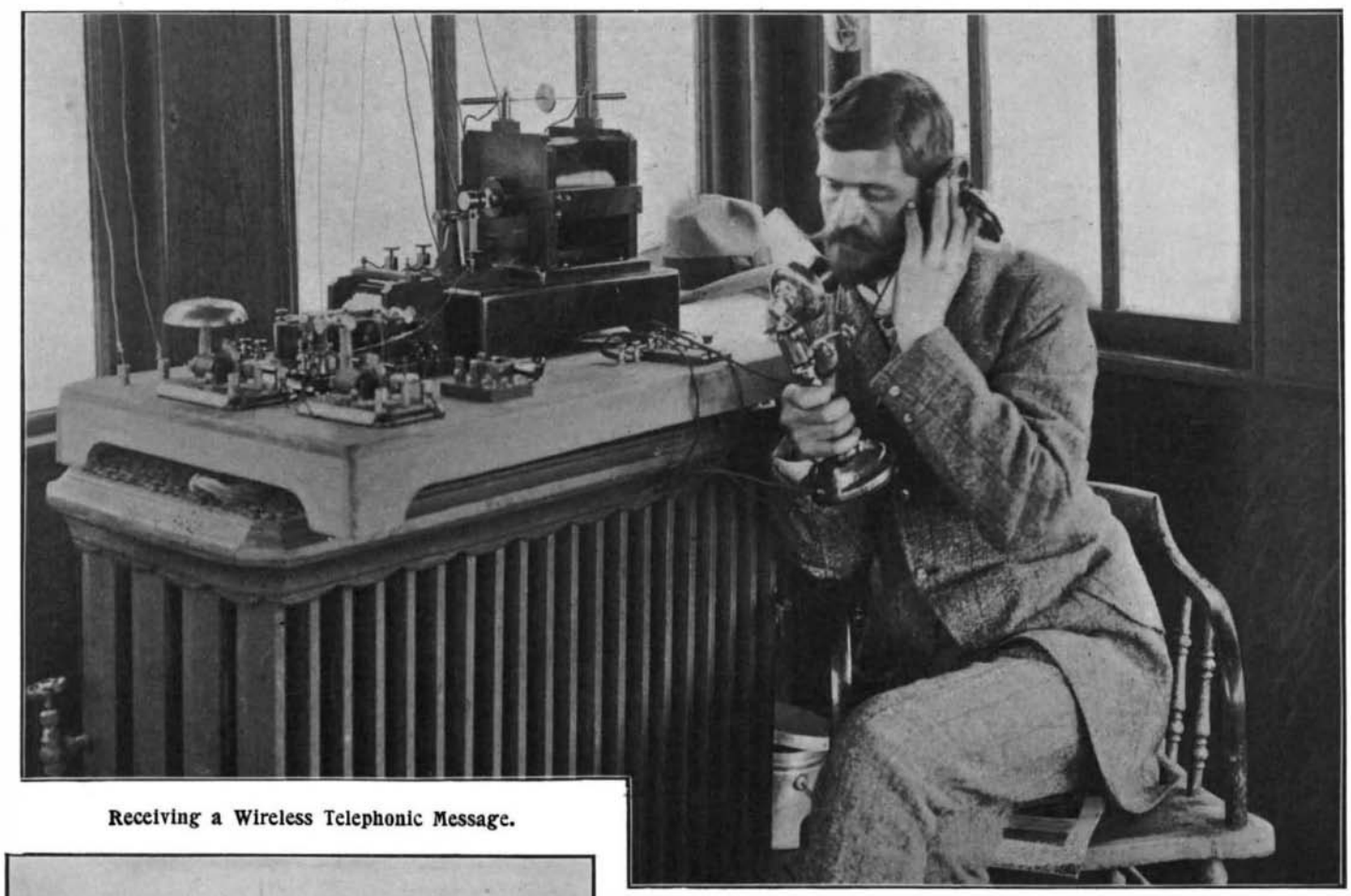
WIRELESS TELEPHONIC COMMUNICATION BETWEEN MOVING FERRY BOATS.

BY DR. T. BYARD COLLINS.

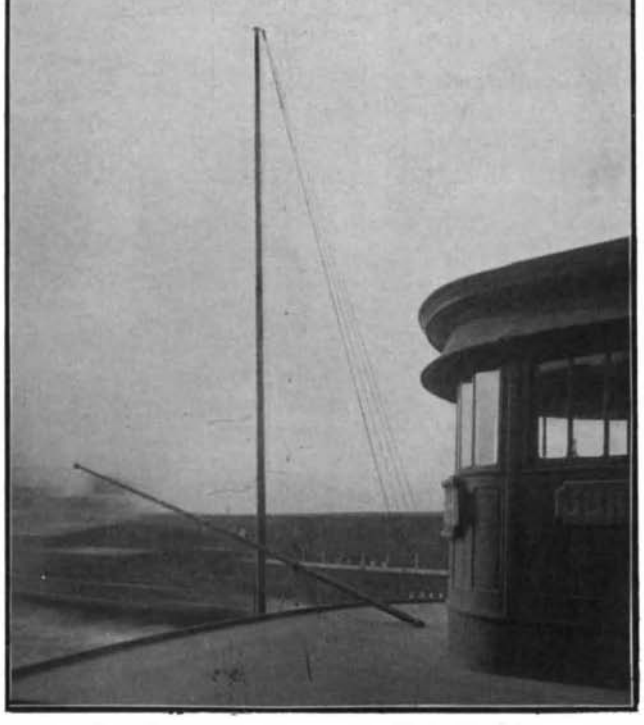
The electrical transmission of speech to a distance without the intervention of wires was given a commercial test last week when Mr. A. Frederick Collins telephoned between two ferry boats which were moving in opposite directions on the North River between Jersey City and New York.

The test was the culmination of a long series of experiments begun three years ago at Narberth, Pa., and continued to the present time. During the past summer Congers and Rockland Lake, N. Y., served as a proving ground, but during the winter Mr. Collins transferred the scenes of his activity to this city. In April, he proposed to the officials of the Erie R. R. to apply his system to the boats of their ferry. Mr. Collins was given every facility to carry out his plans. He made a beginning by carefully studying the needs of the service in this regard and by thoroughly inspecting the conditions under which he would have to work. He learned that there were, as regards the ferry boats at least, two kinds of bottoms, iron and wooden; but the wooden bottoms, while rendering it easy to attach the contact plates which are a part of the system, were surrounded at the water line by a continuous sheathing of copper 36 inches wide. Deeming it possible that the lines of force might be carried around this conductor instead of being propagated as the successful working of the apparatus requires, he decided to use the iron bottoms, though this would involve the use of other means of contact than the securing of the plates to the boats' hulls. There was also an uncertainty as to what effect this immense mass of metal would have in deflecting the current from the desired direction. Mr. Collins was working under absolutely new conditions. Experience proved that the iron bottoms held no inherent difficulties for wireless telephony; but an unexpected difficulty arose indirectly on their account. In Mr. Collins' system the contact with the water should be made by means of copper or zinc plates each having a surface of several square feet. It being impractical to have the boats laid up in drydock for the purpose of attaching such plates to the boats' bottoms, it was at first thought feasible to attach the plates to their wires and throw them overboard; but greatly to the surprise of everybody concerned, though the plates weighed ten pounds apiece, they were prevented from sinking by the rapid movement of the boat. In consequence, the contact pieces were finally replaced by a few inches of heavy copper tubing which was let down the rain pipes to the water. The tubes danced upon the surface of the water as the plates had done, the circuit was repeatedly broken, and at no time did they make a really satisfactory contact with the element.

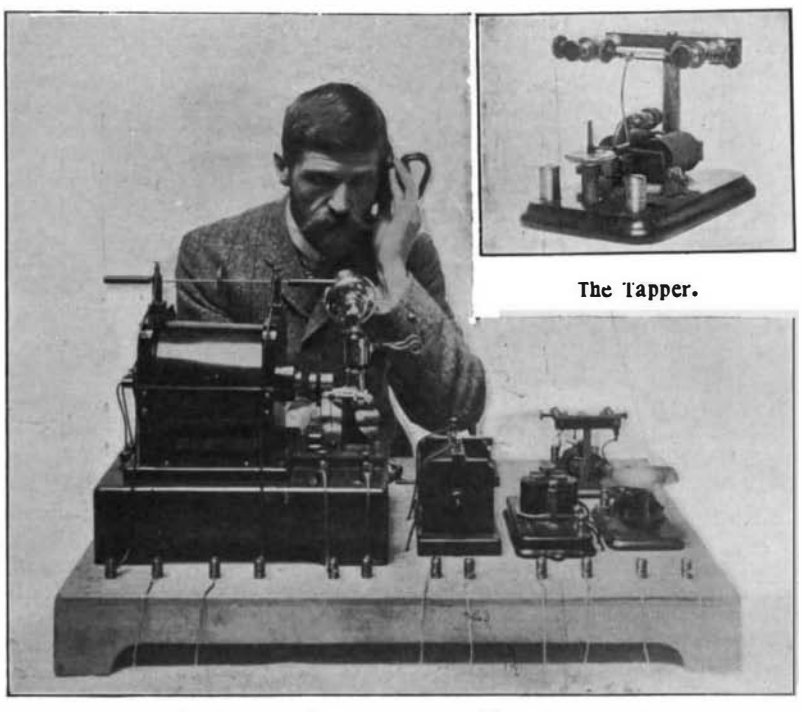
In general it may be said that the system consists in antennæ as in wireless telegraphy, earth plates—i. e., water contacts—the transmitting apparatus and the receiving instruments, all of which have been carefully written up by Mr. Collins himself and published in the SCIENTIFIC AMERICAN of July 18, 1902. The flagstaffs at the vessels' prows served admirably as masts for the antennæ and the steam radiators in the pilot houses answered for tables upon which to place the sending and receiving instruments. A battery of fifty cells, placed just outside the pilot house, furnished the current.



Receiving a Wireless Telephonic Message.



The Pilot-House Deck, Showing the Flagstaff Used as a Mast for Antennae.



The Tapper.

General View of the Transmitting Apparatus.

MR. A. F. COLLINS' WIRELESS TELEPHONE EXPERIMENTS.

On Friday, May 8, everything was in readiness. Mr. Collins took his stand in the pilot house of the "John G. McCullah," where the transmitting instruments were installed. The writer and several other gentlemen were in the corresponding location on the "Ridgewood" with the receiving device. As the boats approached within five hundred feet of each other the voice of Mr. Collins was distinctly heard. "Hello, hello. This is the Collins wireless telephone. Do you hear what I say? One, two, three, four, five. That's all. Good-bye." The following day—the 9th—the first public demonstration was given and amid the usual harbor and river sounds—the tug and other whistles, the swish of waters, etc.—the articulations of Mr. Collins' voice came over distinctly from the "McCullah" to the "Ridgewood."

The contact with the water, as before mentioned, was neither sufficient nor constant and the current used was inadequate. In permanent installations there will be no difficulty in attaching the plates to the hulls. Where a strip of copper surrounds the boat a vertical slit would be made through the copper on either side and then each half would serve as a contact plate, it being necessary in such case only to make the proper connection.

For current, the cells would be discarded. Either a transformer employed in connection with the boat's dynamo or a motor generator set will be used.

Two or three questions suggested themselves to those who witnessed the performance. "How far can you telephone by this system?" "Why isn't the wireless telegraph better for this purpose?"

When the experiments were being conducted at Congers the writer heard articulate speech distinctly over a distance of 6,000 feet. In the harbor, where the conditions are all different, Mr. Collins will only state at present that he can cover 1,000 feet. But as he and others have pointed out, for harbor and river purposes it is not great distances which are called for. Boats do not ram each other at great distances. In the uncertainties of a blinding snowstorm or during a dense fog when the pilot cannot see the prow of his own boat, if he could telephone the vessel nearest to him, though he could only learn her name and the direction in which she was going he would be greatly assisted; but when he might learn also where she stood by the compass, the one could steer a few points to the right, the other a few points to the left, and the sickening disasters with their losses of human life which occur time and again in every harbor would be largely avoided. The wireless telegraph has its place but it is not on harbor and river craft. Like any other telegraph, the wireless needs an operator. That means that an extra man would have to be employed and placed in the pilot house, which, with what it already contains, is none too large. Moreover, in the terrible uncertainties of thick weather there is no time to wait for the translation of messages—the pilot has no time for second-hand communications.

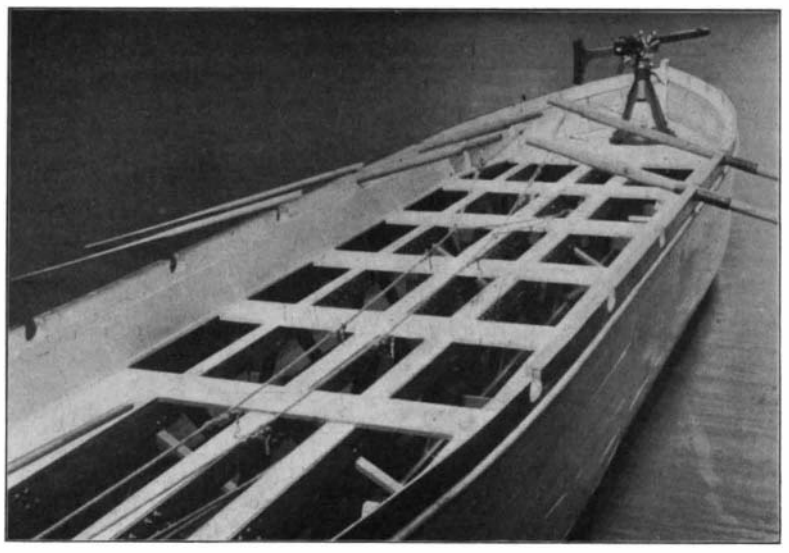
As yet, the instruments of the wireless telephone are not synchronized, but neither are they in wireless telegraphy. Besides, the telephone for ferries and other harbor craft is not for social purposes; it is for exigencies. Secrecy is of no importance here. The steam whistle is not synchronized, but its sounds have been of incalculable service, notwithstanding.

Captains of tug, ferry and other boats point out many uses for the wireless telephone which one un-

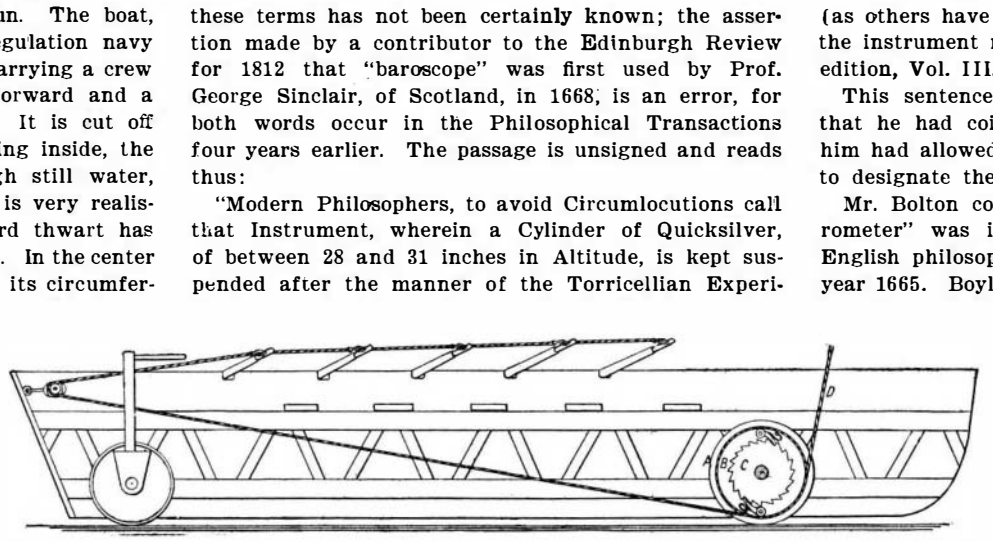
familiar with the river and harbor service would never think of, and all are enthusiastic over its advent as a time saver, a money maker and a relief of the terrible responsibility for the precious lives entrusted to them in heavy weather.

A LAND BOAT FOR ARMORY USE.

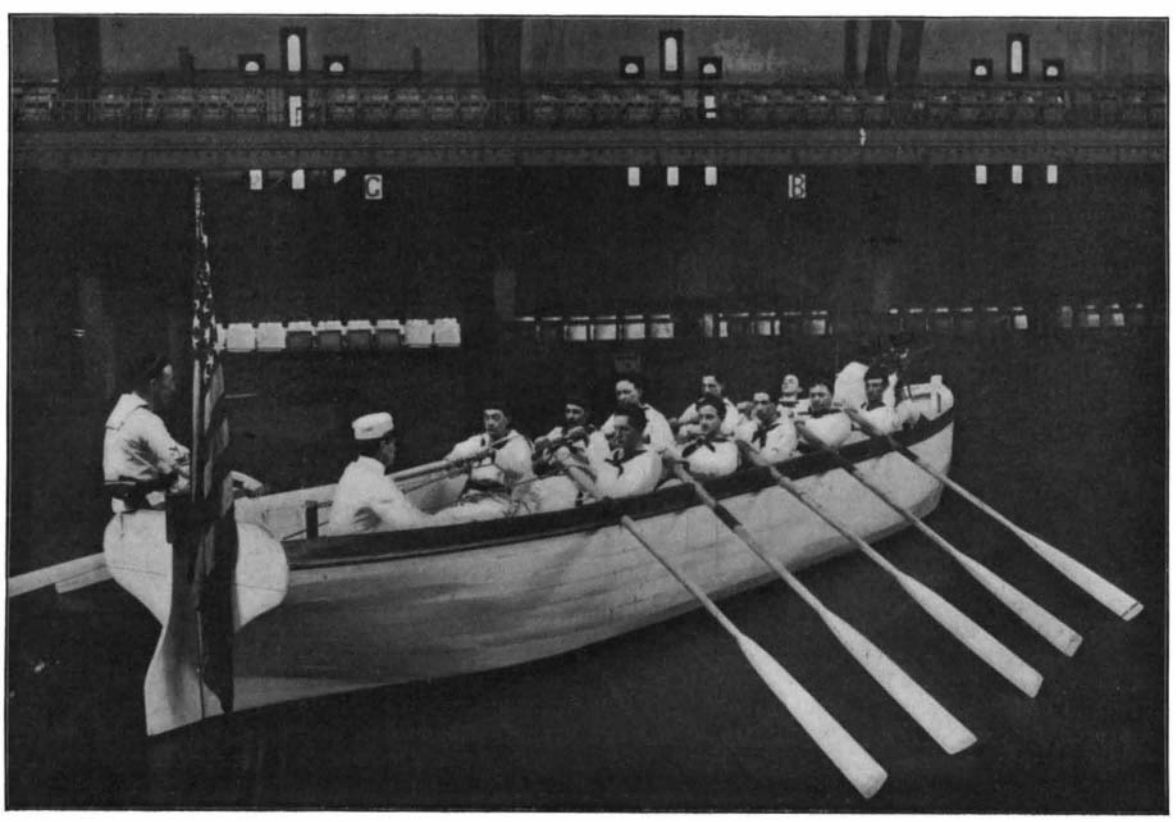
In the exhibition drill given at the Armory of the Thirteenth Regiment, N. G. N. Y., following the review by Lt.-Col. Spicer, U. S. M. C., of a battalion composed of a battery from the Second Battalion, Naval Militia, New York, and Company D of the regiment, a novel form of boat was used. A fort had been constructed around the 8-inch disappearing gun used by the regiment, and a range station was built on the parapet. In the opposite corner of the armory, the bow of a battleship projected out onto the floor. The armory being darkened, a boat appeared from behind the ship and dashed across the floor, containing a landing party, who were to attack and destroy the range station. Being discovered by an alert sentry, a searchlight was turned on and the alarm given. The long roll called the artillerymen to their posts, but before they could locate the attack, the boat had landed its party, the wall had been scaled, and a bomb placed in the station and the boat regained, the dead and wounded being carried off on the shoulders of the survivors. The fire of the sentries during the attack was answered by a one-pounder mounted in the bow of the cutter. After the boat disappeared in the darkness, the battleship was discovered by the searchlight, and its magazine reached by a well-directed shot from the 8-inch gun. The boat, which is modeled on the lines of a regulation navy cutter, is 30 feet long and 6 feet beam, carrying a crew of ten men at the oars, a gun crew forward and a coxswain and commissioned officer aft. It is cut off at the waterline, and all mechanism being inside, the effect is that of a boat gliding through still water, and under the beam of the searchlight, is very realistic. A 2½-inch shaft under the forward thwart has an iron wheel, *A*, keyed to it on either end. In the center is keyed a drum, *C*, with ratchet teeth on its circumference, and engaging these teeth is a pawl carried by a sleeve which turns on the drum. Around the sleeve, and leading clear aft through a snatchblock back to the handles of the oars, is a manila line. When the men give way, the line turns the sleeve, the pawl engages the teeth on the drum, the shaft and with it the wheels turn, and the boat goes ahead. On recovering from the stroke, a line, *D*, leading from the oars forward returns the ratchet to position, and the operation is repeated indefinitely. As far aft as it could be placed without interfering with the lines of the boat, is placed a single wheel, and a rudder post rising from this controls the steering, the whole method of support and steering being similar to an iceboat. The weight of the gun, boat, and crew, amounting to about two tons, is carried by four wooden trusses running fore and aft, two close together and two as near the sides as they could be placed. The thwarts, gunwale, rowlocks, etc., are standard. The hauling line is equipped with snaphooks and the oars with screw-eyes, so the line can be quickly detached from the oars. The men toss, boat the oars, up oars, let fall, give way, etc. just as they would afloat, and the Second Naval Battalion will use the boat for winter indoor instruction in their new armory, foot of 52d Street, Brooklyn. The boat was designed by Lieut. Kingsley L. Martin, commanding the second division of the battalion, and was built under his direction by Chief Gunner's Mate William H. Free.



DETAIL SHOWING ROPES AND OARS.



PROPELLING MECHANISM OF DRILL BOAT.



A LAND BOAT FOR ARMORY DRILL.

The Irish course for the Gordon Bennett motor car race measures 368 miles 765 yards, of which 221 miles are straight road, which will compare favorably with the course of last year in France.

Origin of the Word "Barometer."

The instrument familiar to us all as the barometer, says Henry Carrington Bolton in Science, was first universally known by the name of its inventor as "Torricelli's tube;" de Guericke, the inventor of the air-pump, called his huge water barometer "Semper Vivum," also "Weather Mannikin," with the Latin form "Anemoscopium."

Soon after the year 1665 the words "baroscope" and "barometer" came into general use in England, but the person to whom the credit belongs for originating these terms has not been certainly known; the assertion made by a contributor to the Edinburgh Review for 1812 that "baroscope" was first used by Prof. George Sinclair, of Scotland, in 1668, is an error, for both words occur in the Philosophical Transactions four years earlier. The passage is unsigned and reads thus:

"Modern Philosophers, to avoid Circumlocutions call that Instrument, wherein a Cylinder of Quicksilver, of between 28 and 31 inches in Altitude, is kept suspended after the manner of the Torricellian Experiment, a Barometer or Baroscope, first made publick by that Noble Searcher of Nature, Mr. Boyle, and imployed by him and others to detect all the minut variations in the Pressure and Weight of the Air."

The mention of the words in connection with the name of Robert Boyle has led Mr. Bolton to make a close examination of his voluminous and prolix writings. In Boyle's first publication, "New Experiments Physico-Mechanical touching the Spring and Weight of the Air," dated 1660, the words baroscope and barometer do not occur; he uses the common term "tube," and often writes of the "mercurial cylinder." Nor are these words used by him in his "Defense of the Doctrine touching the Spring and the Weight of the Air . . . against the objections of Franciscus Linus," a paper published in 1662.

Their use by the anonymous writer to the Philosophical Transactions in 1665 has been shown, and the question arises, who was this person who modestly concealed his name? Mr. Bolton believes it was Boyle himself. This eminent man, who was so devoid of personal ambition that he declined a peerage, had a habit of writing about himself and his scientific labors in the third person, and often spoke of himself by fanciful, fictitious names, such as "Philaretus" (in his fragmentary autobiography) and "Carneades" (in the "Sceptical Chymist"). That he should send an unsigned communication to a journal was not surprising, particularly as he had occasion to mention himself.

Be this as it may, my claim that Boyle originated the word barometer does not rest on such slender conjectures as these. One year later than the communication in the Philosophical Transactions, Boyle wrote to this journal (dated April 2, 1666) and said, "barometrical observations" (as for brevity's sake Mr. Bolton calls them), using the personal pronoun this time. Elsewhere in the same paper are found the terms barometer, baroscope, and baroscopical observations.

In his "Continuation of New Experiments Physico-Mechanical," . . . of which the preface is dated 1667, occurs the following phrase: "But though about the barometer (as others have by their imitation allowed me to call the instrument mentioned)." (Boyle's Works, Birch's edition, Vol. III., p. 219, London, 1744.)

This sentence is virtually an admission by Boyle that he had coined the word, since others imitating him had allowed and encouraged him to use the term to designate the tube of Torricelli.

Mr. Bolton concludes, therefore, that the word "barometer" was introduced into our language by the English philosopher, the Hon. Robert Boyle, about the year 1665. Boyle, by the way, was a scholar, and able to use Greek in forming an English word. Examination of Murray's, Skeat's and other standard English dictionaries throws no light on the origin of the word; they merely refer to the Philosophical Transactions and give its obvious etymology.

New York City as a "Spa."

There are, undoubtedly, thousands of residents of upper New York who do not know that there is a water cure or "Spa" conducted within the limits of Central Park. Yet, if the visitor passes through the Seventy-second Street gate on the west side, he will find a number of people walking toward a pavilion not far from the entrance. He will also doubtless be surprised to learn that the majority of these people are acting on the advice of their physicians. Between the hours of five and ten A. M., from five hundred to eight hundred people are served with mineral waters, the greater number visiting the pavilion about half past six. The busiest season is from the first of May until the fifteenth of June. The pavilion was erected in 1867 at the request of numerous physicians who felt that here was an opportunity of combining a mineral water cure with exercise in the open air. The doctors prescribe the kind, strength, temperature and quantity of water, and the amount of exercise to be taken. The attendants follow these instructions with the greatest care. The waters are of two kinds; first the natural mineral waters from all the famous springs at home and abroad, and second mineral waters prepared artificially and scientifically, thus ensuring a definite chemical composition at all times. The double and quadruple Carlsbad seems to be the favorite, and it is mixed with varying proportions of distilled water, and the nat-