away with this by publishing their time-tables to twenty-four hours. But the great obstacle lies in the dials of our watches and clocks; for until the hour-hands are made to revolve once in twenty-four hours, either on a separate dial, like most astronomical clocks, or with a separate twenty-four-hour division, and numbers on the main dial, people will naturally cling to the twelve-hour period. There is also the additional obstacle, that, if clocks are to strike to twenty-four, these large-numbered hours would seem interminably long; but the change in the striking arrangements would not be of so much importance.

It seems unfortunate that Mr. Allen's resolution for local times, differing by whole hours from the universal time, was not recommended; for this would seem to be by all odds the simplest way of connecting local and universal times. It is already in almost universal use in this country.

The sixth resolution of the conference, recommending that the nautical and astronomical days correspond with the civil, is open to discussion. The two naturally go together. And to the navigator it is of little moment: he would simply change his chronometer-reckoning twelve hours, buy a new ephemeris, which the astronomer would have computed for him, make the proper entry in the log, and go on as before. With the astronomer it is a more important matter. The ephemerides are issued, and the computations projected, so far ahead, that five years at least would elapse before the change could be made, even if agreed upon to-day. But with the astronomer there is the same reason for changing date at noon as for changing the civil date at midnight. While the rest of the world is sleeping, he is at work.

The seventh resolution of the conference, which would seem to be a rather poor translation of a French original, contains a suggestion as important as any thing it did. We believe that all systems of weighing, measuring, dividing, and reckoning any thing whatever, should be the same as the system of numeration in use; and, as long as this is so universally decimal, such should be the system for all these. No doubt, an octaval system of numeration, with its possible subdivision, 8, 4, 2, 1, would have been originally better; but there is no sufficient reason for a change now.

NORTH-ATLANTIC CURRENTS.

From time to time the great iron sea-buoys set to mark shoals, or to indicate entrances to channels, are forced from their moorings, and go adrift.

These buoys are of several types. The nun-buoys are pear-shaped; and the largest of them are twelve feet long, and eight feet across in the widest, and about two in the narrowest, part. The can-buoy is like the nun-buoy, except that it is wider at the top: both are widest at the line of flotation. In the oval bottom a steel loop is cast, to which is appended two fathoms of an inch-and-a-half stud chain, to which is fastened a solid iron ballast-ball of a thousand pounds weight, with two loops cast in it at opposite sides. To the ball is hung from fifteen to twenty fathoms of the

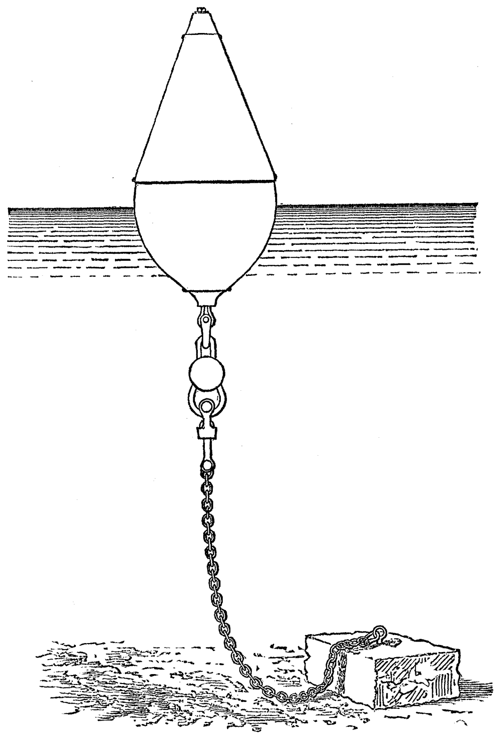

Fig. 1.—Iron nun-buoy.

same-sized chain, to which is attached, in some cases, a three-thousand-pound mushroom anchor, which is shaped like an open inverted umbrella, and in many cases a stone-sinker, as shown in the cut. The buoy is separated by diaphragms into several water-tight compartments, so that one of them may be punctured without sinking the buoy. They are made of boiler-iron, and are tested by hydrostatic pressure before being placed in the water, and they will stand much hard usage.

When these buoys are lifted from their assigned positions by ice, they carry their moorings with them, and, when left by the ice, have sufficient buoyancy to float these accessories, though under such circumstances they are sunk somewhat below their ordinary line of flotation. They show a surface, at most, of eight by six feet above water, while the mushroom anchor it is dragging must be fully one hundred feet below water. Hence the winds can have little effect on the motion of the buoys, in comparison with the ocean-currents.

The whistling-buoy differs from the ordinary sea-buoy in having a hollow tube from eighteen to forty-five feet long thrust through it and down into the still water, while it is surmounted by a steamboat-whistle. As the

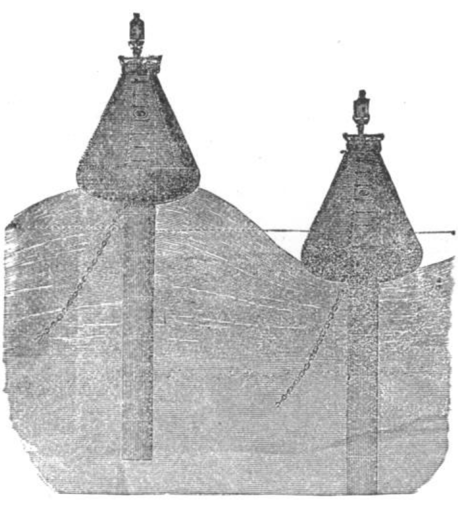

FIG. 2. — COURTENAY'S WHISTLING-BUOY.

buoy rises, the air is received into the tube through a set of ingeniously arranged valves. As it sinks, the air is forced out through the whistle.

The lighted or gas buoy is filled with compressed illuminating-gas, and is surmounted by a protected burner. It will burn from three to six months, according to its size, without being refilled.

As the government pays those who pick up any stray buoy a reasonable price for their trouble, they are often brought into port.

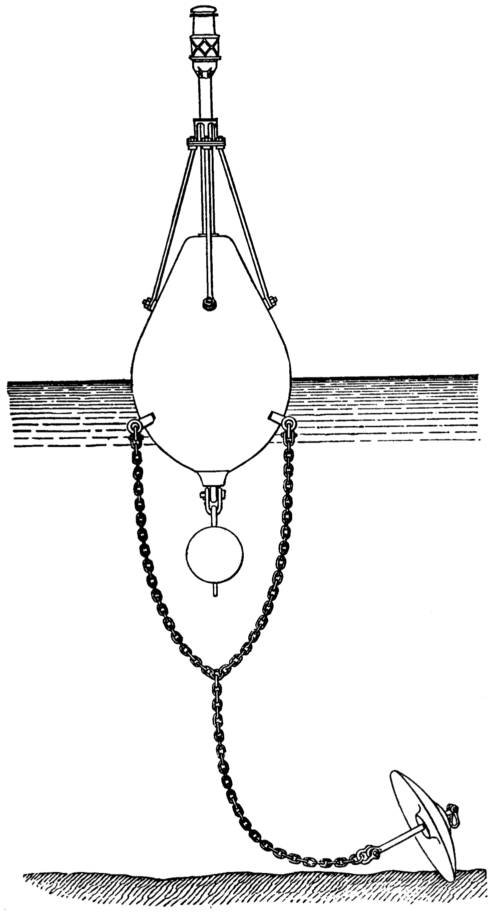

FIG. 3. — PINTSCH GAS-BUOY.

The position of each of the stray buoys so far reported, and the prevailing currents so far as known, are shown on the accompanying chart. The buoys are plotted and numbered to correspond to the paragraph below, which gives such history of the buoy as could be obtained from official sources. The buoys are not numbered consecutively, but in the order in which the writer heard of each being sighted.

1. Whistling-buoy, recently adrift, as the paint was still fresh when it was sighted, May 17, 1881.
2. Sighted June 15, 1884. Same as No. 19.
3. Can-buoy of the largest size, picked up March 17, 1881, near Bermuda; supposed to have come from New-York Bay.

4. Large iron sea-buoy, which had hanging to it about thirty feet of heavy chain. It came from Sandy-Hook bar, in New-York Bay.

5. One of the largest of the iron nun-buoys. There was hanging to it some twelve feet of stud-link two-and-a-quarter-inch chain, from which dangled a thousand-pound ballast-ball. It was picked up about the middle of July last, some twenty-five miles south-west from Montauk Point, in good condition except that its lower compartment was filled with water. It was evident that it had come from some part of our southern coast.

6. Large red buoy, with tower and lantern on top. It was discovered June 11, 1884, and would have been picked up but for the bad weather. Same as No. 7.

7. Picked up June 21, 1884, about four hundred and eighty miles due east of New York. Same as No. 6. This buoy went adrift from its station on Hatteras Shoal, off Cape Hatteras, between May 24 and June 4, 1884. It had made over twenty miles a day in a north-east course. It is of this buoy that *Science* said (No. 77, p. 92) that it was unfortunately picked up. If it had only been sighted and reported by each passing vessel, we might have had a record of its curious voyage, and known something more of the currents by which it was impelled.

8. Iron buoy of the largest size. It was picked up on the west coast of Ireland in the spring of 1871.

9. Iron nun-buoy of the largest size, with a heavy chain and ballast-ball attached. Went ashore in Pendeen Cove, Penzance Bay, on the south-west extremity of the English coast, about March 1, 1884. It probably left New-York Bay during the preceding winter.

10. Iron sea-buoy, picked up by the Norwegian bark Vance in March, 1871.

10½. Large nun-buoy painted red, passed July 20, 1884.

11. Iron sea-buoy, picked up on Aug. 30, 1883, on the eastern side of Teneriffe, with a thousand-pound ballast-ball and a forty-two-foot chain attached.

12. Second-class iron sea-buoy, was picked up on Oct. 20, 1883, about fifteen miles from the east side of Teneriffe, and had attached to it a fifteen-inch seven-hundred-and-fifty-pound ballast-ball, and about thirty feet of chain-cable.

13. Iron sea-buoy, picked up June 5, 1882.

14. Picked up Aug. 22, 1883. It was one of the largest iron buoys, and had attached to it a thousand-pound ballast-ball, forty-eight feet of heavy chain-cable, and a three-thousand-pound mushroom anchor. It was recognized as one of those carried to sea from New York Bay by the ice in December, 1880.

15. Iron sea-buoy, which went ashore in February, 1881, on one of the quays near Turk's Island; sent home.

16. Whistling-buoy, passed June 24, 1884.

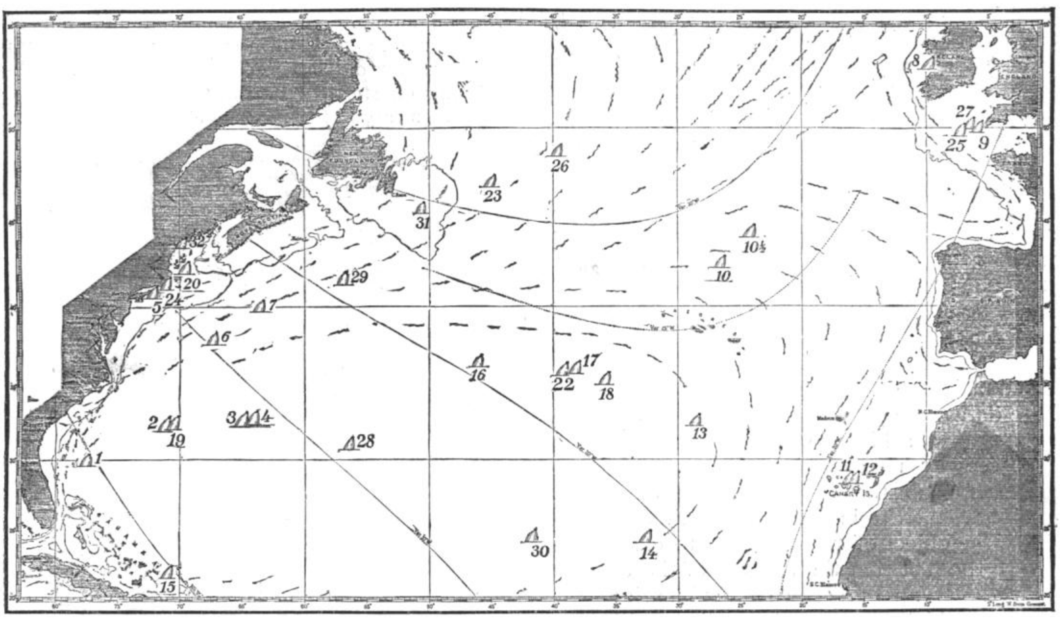

FIG. 4. — CHART OF STRAY BUOYS IN THE NORTH ATLANTIC.

17. This is doubtless the same buoy as that numbered 18 and 22 on the chart. It was sighted June 29, 1884, and described as 'a large buoy, painted red, with patent fog-horn.'

18. A whistling-buoy. It stood about twelve feet out of water. It was passed June 29, 1884. The same buoy is plotted as No. 17, and also as No. 22, reported by two other ships.

19. Whistling-buoy, passed July 14, 1884. The same buoy is plotted as No. 2 on the map, and was seen a month before by another ship.

20. Second-class red whistling-buoy, picked up April 30, 1884, twenty-five miles off Cape Cod, which had broken adrift from Lurcher Shoal, Nova Scotia. This is the only case where a buoy is known to have drifted at once to the southward.

21. After the other buoys were plotted, it was found that No. 21 and No. 6 were the same buoy, it having been twice reported by the same ship : so it has only been plotted as No. 6.

22. Passed June 22, 1884; also plotted on the chart as Nos. 17 and 18 in the positions in which it was reported by two other vessels.
23. Iron can-buoy, run into by a British bark June 17, 1884, about twelve miles from the Flemish Cap, on the banks of Newfoundland.
24. Large iron buoy, passed June 22, 1884, 'sixteen miles south-west from Gay Head,' Martha's Vineyard.
25. Large iron conical-shaped buoy, passed June 24, 1884, forty miles west of Bishop, Scilly Isles, off the west coast of England.
26. Black barrel-buoy, passed June 29, 1884.
27. Large red iron buoy, floating upright, passed July 7, 1884, seven miles from Bishop Rock, Scilly Isles.
28. Very large red iron buoy, passed Aug. 4, 1884.
29. Large conical-shaped iron buoy, passed Aug. 1, 1884.
30. Large iron can-buoy, which from appearances had been floating a very long time; passed Aug. 4, 1884.
31. Second-class can-buoy, picked up on the banks of Newfoundland, August, 1884.
32. Second-class can-buoy, picked up about twenty-five miles from Cape Elizabeth, Me., in August, 1884.

It would almost seem as if the buoys shown on this chart had attempted a system of circle-sailing, and as if several of them had nearly gotten round to their moorings after having circumnavigated the North-Atlantic Ocean. How else shall we account for the position of those picked up off the Canaries, those sighted in the Sargasso Sea, those found off Turk's Island and the Bermudas? When some of these data were presented to the Philosophical society at Washington, and the matter was discussed by naval, coast-survey, and light house officers, the weight of the expressed opinion seemed to be in favor of this theory.

But the object of this paper is to call attention to the fact that the voyages of these buoys show the trend of surface or submarine currents, of which we as yet know little, either as to their direction, force, or times of flow. The current indications on this chart show the approximate sum of our present knowledge on the subject. It is evident that it would be greatly to our advantage to know more. *Science* said a short time ago that it was unfortunate that the gas-buoy (No. 6) was picked up. Would it not be in the interests of science, of commerce, and of navigation, if some such object as that buoy, drawing as much water, floating as lightly, showing as little surface to the wind, and offering as little resistance to colliding vessels, were allowed to float, and were carefully watched until it should have gone ashore? And why could not some slow-sailing vessel be detailed for such duty? At any rate, if such an object were set afloat and reported by every vessel which sighted it, its voyage might add much to what we know of the ocean-currents; and if such objects were set adrift simultaneously, from, say, Nantucket, Penzance, Teneriffe, the Cape de Verde and Turk's Island, or the Bermudas, we might learn much more on this interesting subject.

A. B. Johnson.

DRUMLINS.

The arched hills of glacial drift that have been called drumlins by the Irish geologists are among the most peculiar results of the action of land ice-sheets. They are composed of closely-packed bowlder-clay, or till, distinctly unstratified, and containing well-scratched stones. They rest on a foundation of glaciated rock, and rise in a smoothly rounded mass from fifty to two or three hundred feet in height, reaching from a quarter of a mile to two miles in length. Their bases vary in form from a circle to a long, nar

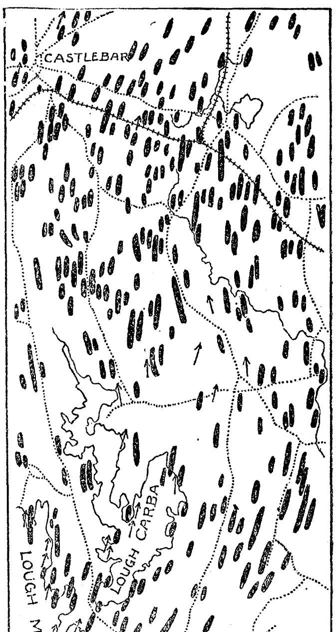

Fig. 1.

row oval; and, when elongated, their major axes are closely parallel to the direction of former local glacial motion. They are therefore easily distinguished in form and structure from the rolling hills of terminal moraines, and from the ridges and mounds of osar and kames. Although they form pronounced features in a landscape, their distribution is as yet