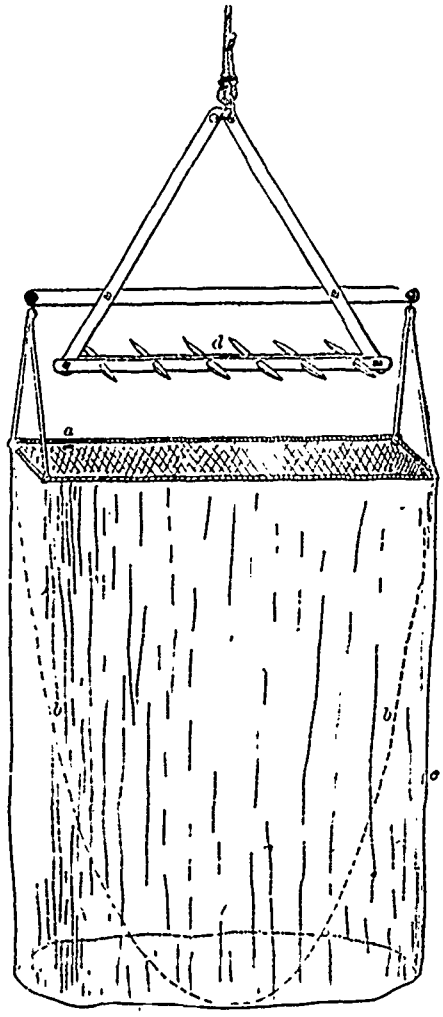

FIG. 2.—The rake-dredge rigged for use. The iron frame carrying the teeth, *d*, is about 3 feet wide; the teeth, about a foot long. The frame, *a*; carrying the net, *b*, is 4 feet long; *c* is a canvas bag to protect the net.

many respects than most other vessels engaged in such work have had. Each year new improvements have been made. The 'trawl-wings,' first introduced by us in 1881, have been used with great success; for they have brought up numerous free-swimming animals from close to the bottom, which would not otherwise have been taken. The use of steel wire for sounding, and of wire rope for dredging, has enabled us to obtain a *much greater number* of dredgings and temperature observations than would have been possible under the old system of using rope, employed even on the Challenger. The use of steel-wire rope for dredging, first invented by Mr. A. Agassiz, and very successfully employed by him on the Blake, has proved to be an improvement of very great value in deep water. But its use there is an immense saving of time, and consequently a great increase in the value of the results. As an *illustration of the rapidity with which dredging has been done* by the Fish Hawk by using the wire rope reeled upon a large drum, I give here memoranda of the time required to make a very successful haul. In 640 fathoms, at station No. 1124, the large trawl was put over at 4.29 P M; it was at the bottom at 4.44, with 830 fathoms of rope out, commenced heaving in at 5.17; it was on dock at 5.44 P.M., total time for the haul, 1 hour and 15 minutes. The net contained several barrels of specimens, including a great number and large variety of fishes, as well as of all classes of invertebrata,—probably more than 150 species altogether, many of them new.

At all the localities that we have examined, the temperature of the water, both at the bottom and surface, was taken, as well as that of the air. In many cases, series of temperatures at various depths were also taken. Many other physical observations have also been made and recorded. Lists of the animals from each haul have been made with care, and arranged in tables, so far as the species have been determined up to date.

South of New England the bottom slopes very gradually from the shore to near the 100-fathom line, which is situated from 80 to 100 miles from the main land. This broad, shallow belt forms, therefore, a nearly level, submarine plateau, with a *gentle slope seaward. Beyond the 100-fathom line the bottom* descends rapidly to more than 1,200 fathoms into the great ocean-basin, thus forming a rapidly sloping bank, usually as steep as the slope of large mountains, and about as high as Mount Washington, New Hampshire. This is well shown by diagram 1, which illustrates the relative slope at several lines of dredging, and the *actual* slope *n'-o'* along the line *n o*. We call this the Gulf Stream slope, because it underlies the inner portion of the Gulf Stream all along our coast, from Cape Hatteras to Nova Scotia. In our explorations a change of position of less than 10 miles, transverse to the slope, sometimes made a difference of more than 3,500 feet in depth.

(To be continued).

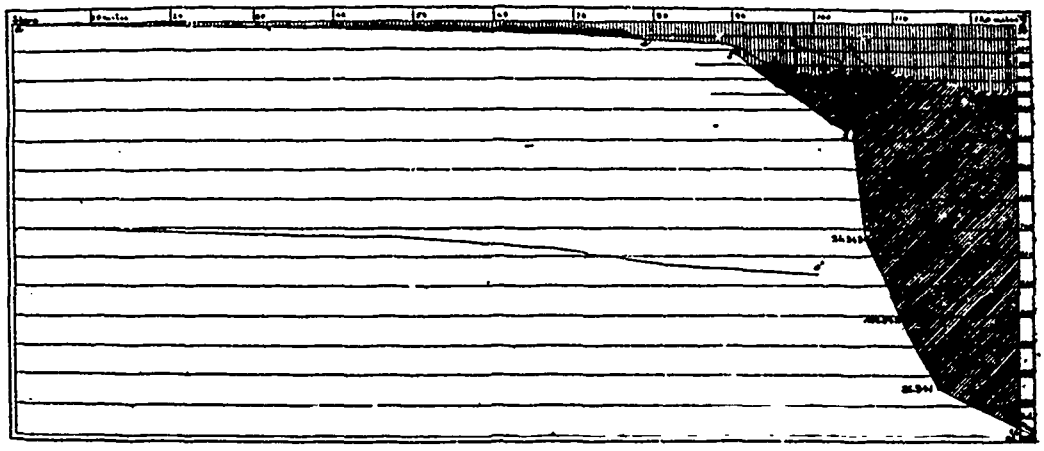

DIAGRAM 1.—To illustrate the relative slope or profile of the bottom, from the shore to the Gulf Stream slope, and across portions of the slope in several lines. Vertical to horizontal scale, 1: 300. The line *n'-o'* shows the actual slope along the line *n-o*. The vertical shading indicates the position of the comparatively warm water, both of the surface and of the Gulf Stream; oblique shading to the right indicates the cold water of the shallow plateau; oblique to the left, the cold water of the greater depths.