cleaning lamp-chimneys. In this ball a number of roots also emerged from the lower side of the ball, but only to re-enter it again, as in the other cases. In no. 7 stems and roots came out together indiscriminately, and from all sides of the ball; the roots, however, after protruding from half an inch to an inch, re-entering the ball or withering. This experiment was twice repeated. In the first case more stems appeared from the side of the ball away from the face of the clock, and the greater number of roots made their appearance on the opposite side of the ball. It was observed in this case, however, that the spindle slanted about two degrees toward the clock. In the next experiment the spindle was made horizontal, and no difference as to place of emerging of root and stem was observed.

These experiments in combination appear to show with clearness the influence of moisture and gravitation in determining the course of the root, and to suggest that the influence of moisture is the stronger of the two.

The emergence of the sensitive tips of the primary roots from the damp ball into the dry atmosphere I suppose Darwin would have explained as the result of the persistence of the impressions in the root behind. The horizontally extending roots in the damp atmosphere, both dark and light, suggest that the response to gravitation in both cases was *nil*. May it not be true that the diageotropism of roots is such in no other sense than that of direction of growth? that it is in reality simply a growing toward the proper amount of moisture? This would appear to explain the oblique direction of secondary branches, and the largely indifferent direction of tertiary ones. The balls in the jars placed in the horizontal attitudes indicate that the stem does not grow simply in a direction opposite to that of the principal root, for they were turned toward each other through an angle of nearly ninety degrees. The two inverted jars show that the stems did not seek a dry atmosphere, for in both cases they grew up into that which was more moist. The inverted dark jar shows that the effect of the impact or absorption of light on the lower half of the ball, and the absence of these effects upon the upper half, did not produce a sufficient contrast to guide the stem into the light; but since, of the two jars placed in the horizontal attitude, only the ball in the mouth of the glass one sent stems into the jar, it seems possible, since other conditions were alike, that light may exert a small influence in guiding the stems from the ground.

F. H. KING.

River Falls, Wisconsin, May 17, 1883.

SOME GLACIAL ACTION IN INDIANA.

WITH members of my class in geology, I have been examining the glacial deposits in this vicinity (Montgomery county). Our chief water-course is what is called Sugar Creek, a tributary of the Wabash River, which occupies a valley with a general south-westerly bearing, virtually the same trend which the Wabash has across the state before it makes its sharp bend to the south. Along the valleys of the Wabash and Sugar Creek, there are abundant evidences of a glacier which moved in the direction of the valleys, and is known as the Lake Erie glacier, as it advanced in the direction of the axis of that lake, and so up the Maumee, and across the low divide at Fort Wayne, into the Wabash. Sugar Creek itself has been compelled to bend sharply to the south a few miles to the west of us by the deposits of this old glacier, and has cut its new channel through the soft subcarboniferous sandstone. At one place in this county, where the creek still occupies its preglacial valley, it cuts through what we formerly considered a large terminal moraine, which lies squarely across the valley. Recent floods have swept away some of this moraine, and laid bare the country rock. This rock is found to be smoothly planed, and absolutely covered with glacial scratches all trending N. 20° W., or almost at right angles to the valley of the creek and the course of the former glacier. These scratches of the second glacier are now found in many places throughout the county; and our old terminal moraine proves to be a medial moraine, and bears upon its back a line of huge bowlders with the same northwesterly trend. These facts are recorded here in the hope that they may be of some use in the consideration of a much-vexed question.

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THE UNITED STATES FISH-COMMISSION STEAMER ALBATROSS.

I.

PROBABLY no department of scientific investigation has made greater progress in its methods of work during the past ten years than that of deep-sea research. The successful introduction of steel piano-wire for sounding, and of wire rope for dredging purposes, marks a new era in this class of exploration, for which credit is mainly due to American skill and energy. While claiming so much in behalf of our own country, we frankly acknowledge that the only feasible method of using sound-