

ovaries. The final change of this type is the crowding together of the blossoms on an axis, to gain more complete fertilization.

In consequence of this crowding, the blossoms of the wheat have become very much distorted. The author carefully traces every detail of the flower in the wheat and shows its lily ancestry. The reason, for its distortion are also given.

The reader of this book besides having a deep interest in the subject cannot fail to feel that there is a bond of sympathy established between himself and the author. On every page the author's keen observation and sympathy with Nature are displayed. He lays before those who have never given any thought to the beauties of Nature a broad field of investigation. After once having had our interest aroused to the sources of pleasure around us, how is it possible to lapse into indifference! And why pass we Nature's beauties unobserved?

A. W. B.

FORMS OF WATER.

BY JOHN TYNDALL.

John Tyndall, LL. D., author of "Forms of Water," was born in Ireland in 1820, and though he had but few early educational advantages, he has become one of the noted men of the scientific world. It was while a teacher of Natural Philosophy, early in life, at Queenwood College that he began his observations, which have since added much to our knowledge of science, as well as made him the distinguished philosopher he is. Not in one line only did he pursue his study, but in many, as shown by the results, found in his works on "Radiation," "Absorption of Heat by Gases and Vapors," "Reflection of Electric Light," "Properties of Ice," and several volumes on "Glaciers." He is famous as a lecturer because of his extensive knowledge and happy mode of illustrations.

At one time while at the Royal Institute, he was asked to give to the young people of the village a course of lectures upon Glaciers. That they might be more interesting as well as more instructive, he prepared a series of condensed outlines to be distributed. Although these outlines were intended for his audience alone, he was persuaded to enlarge them, and afterward combined them into the book, "Forms of Water." This was the first one of the "International Scientific Series," but as it was written quite hastily, and while other heavy work was being

done, it is not complete as are the others of the "Series."

Professor Tyndall is said to be one of the greatest living authorities upon the subject of glaciers. In this book the subject is treated of in a novel manner, for instead of giving mere facts, the author prepares the reader for ideal rambles among the glaciers. At the beginning of this preparation, we trace a river from the sea back to its source; first to the streamlets, then to rain, clouds, vapor, and finally to the real source—the sun. Even those rivers rising in glaciers instead of streams, we trace to the same unexpected source. We next study the wave theory of light and heat, then the cause and production of clouds, rain, snow, and ice. In order that every step may be thoroughly understood, each chapter containing any new theories, is followed by one of illustrative experiments. Further aid to clearness is found in the diagrams and pictures presented.

Having thus prepared us for the journey, with the author as our guide, in imagination we climb the glaciers and look into the deep crevasses of the Arveiron, one of the branches of the Arve which rises in the Alps.

As with all good teachers, he gives us some friendly advice as to being attentive, careful, and observant. Then proceeding to our first lesson out upon the glacier, we learn that different parts of it have different names, as, "Glacier de Bois, and Mer de Glace." It is then noticed that glaciers must move for the following reasons: it is observed that at the source of glaciers much snow falls; this snow is changed to ice which does not melt, nor does it accumulate there. Hence it must move on. Further observation of this phenomenon is made in the fact that bodies have been found at long distances from their place of disappearance. We, however, under his instruction note it by measurements. In making this observation, we use the theodolite, an instrument for sighting, containing a telescope and several graduated circles. By its means, stakes across the glaciers are placed in line with those on the shore. After a few hours those on the glacier have changed position. In like manner, it is proved that the motion resembles that of a river as the center moves faster than the sides, the top than the bottom, and one side than the other in moving through an irregular valley. We next discover the different kinds of crevasses, their cause, and the danger to travelers; the formation of icicles; the cause of glacier, tables and ridges, and of rivers flowing down deep in ice