at the horizon in the south loomed up, but not so bright as the first, nor had it any of the upper characteristics of the first, nor did it last over five minutes. When this second light faded a third loomed up in the north, quite as bright at the horizon as the first, but it was obscured or cut off from our view by a stratus cloud. This cloud was about 10° above the horizon, at its under side (which, by the way, was its most northern limit). This limit, I judge from my frequent observation of clouds, was fully twenty-five miles north of us. We could see the light through one hole in the cloud near its bottom (or distant) side, and also through several thin places, but could not determine its upper shape. This third light (counting the southwestern light as the first) lasted about five minutes, when a fourth light loomed up in the north-west, and, very bright at the horizon, reached upward about 15°, lasted a few minutes, and faded out as did the others. Then one appeared in the north-east, in the direction of Rockville; but we were so near the town we were sure it was the new electric light (we had been gone a week), but on entering the town found the old gasoline lamps still doing service.

On the first appearance of these lights at the horizon, I thought I saw a flash of light, not as a blaze, but as if a mirror had been turned so as to flash the light into my face, then away so quick I could not be certain what I saw. Young McIntosh thought he saw the same flashes of light when the great lights first made their appearance.

I saw this same electrical storm (if that is what it is) in the summer of 1884, from the town of Clinton, Indiana, and in July, I think. It had all the features I have given of this, except the one in the south-west with its three lights and dark segment, herein described. The Clinton display was watched by apparently the whole population of the place, and was described by the Clinton *Argus* at the time. I reported it to the U. S. Signal Office at the time, as I was then making voluntary observations for that office.

The small light I have described as seen in the south-west, in the first light last Saturday night, is a new feature, so far as I know or can learn from my authorities. These lights occurred from about half past nine to half past ten o'clock at night.

I wish to hear from others who may have seen these lights, by letter or paper containing published account of them.

Rockville, Ind., July 17. JOHN T. CAMPBELL.

## BOOK-REVIEWS.

*Geological Survey of New Jersey. Annual Report of the State Geologist for the year* 1891. Trenton, 1892. Maps and plates.

To this report Professor R. D. Salisbury contributes a paper called "A preliminary paper on drift or Pleistocene formations of New Jersey." The title is somewhat misleading, inasmuch as there are few statements in it concerning the New Jersey formations. It embraces mainly an account of the nature of the drift, the formation and movements of glacial ice, the work effected by ice, and a summary of the development, movements, and work accomplished by the ice-sheet of North America. New Jersey is incidentally mentioned, and the only new contribution made is the statement concerning the discovery of the remains of a once extensive drift-deposit south of the terminal moraine. It is concluded that this was deposited by an ice-sheet previous to the formation of the great moraine; and that "the interval which elapsed between the first and the last glacial formations of New Jersey was several times as long as that which has elapsed since the last." Assistant Geologist C. W. Coman contributes an interesting paper on the oak and pine lands of southern New Jersey. The topographical survey showed that in 1888 there were only 430,730 acres of cleared land in the southern counties, against 1,326,000 acres of forest. The proportion has not been greatly altered since. Both uplands and swamps are heavily covered with timber, much of which is valuable for various purposes. "From a little distance a cedar swamp presents the appearance of a solid mass of dark green, while even when in the midst of it the eye can penetrate but a few yards among the thickly clustering, smooth, gray trunks. The gum and maple swamps are scarcely less dense, and are even more difficult to penetrate, because of the abundance of underbrush, amid which the poison sumac, *Rhus venenata*, is sure to be encountered by the unwary. The trees are often very large, exceeding 100 feet in height. The demand for white cedar for shingles, siding, planking for boats, and such other purposes as require great durability under exposure to the weather, far exceeds the supply." Much of the uncleared land is well adapted for fruit raising and "truck" gardening, and there is still room for a large addition to the permanent population of the State.

Mr. C. C. Vermeule, the consulting engineer and topographer of the survey, gives a comprehensive review of the water supply and water power of the State, with tables of rain-fall and evaporation, and accounts of the guaging of numerous rivers. A table is also given of all the water powers, with mention of the owner, kind of mill, fall, and horse-power. It is the intention to publish the full report on water power in the State as Volume III. of the final report some time during the present year. Finally, notes are given by other hands on artesian wells, on the Passaic River drainage and the active iron mines in the State. The information given cannot fail to be of value to the inhabitants of the commonwealth. JOSEPH F. JAMES.

*Nature Readers — Seaside and Wayside, No.* 4. By JULIA MCNAIR WRIGHT. Boston, D. C. Heath & Co. 1892. 8°. 361 p. 70 cents.

This volume is one of a series of reading-books written, the author tells us, "to direct the minds of our youth in their first studies to the pleasant ways of Natural Science." The earlier numbers of the series were devoted to lessons on the habits of animals and plants, but the present volume deals with a much wider range of subjects. The book begins with a lesson on the origin and structure of the globe and passes on to the consideration of the geological epochs and of the animals and plants that characterize them. It is, in fact, a collection of brief essays on important topics in astronomy, geology, palæontology, and zoology. The diversity of topics would seem calculated to cause confusion in the mind of a child; but this is, perhaps, an evil inseparable from the modern system of education.

Though the facts are presented in a somewhat too fanciful dress, the information is for the most part accurate, and the author has taken great pains to point out that there are exceptions to many of the general statements. She has included, so far as possible, the results of the latest investigations.

A few noticeable errors should be corrected. For example, the pig is made to figure as a typical odd-toed ungulate (p. 349). On page 300 the sperm whale is mentioned as the "Greenland sperm whale," which is, of course, misleading, as this animal is only very rarely found in Arctic waters. In another place (p. 148) the author refers to the squirrels and rats as being the first mammals to appear on the globe, a statement which no palæontologist would accept. We notice again (p. 320) that the vampire bats are described as "very large bats given to blood-sucking." This is quite erroneous, as the true vampires, *Desmodus* and *Diphylla*, are small bats, remarkable chiefly in the modification of their teeth and digestive organs.

The influence of English text-books is apparent in different parts of the volume. The common mole, for example, is described under the name of the European genus *Talpa;* although as the book is presumably intended for American children, it would have been better to mention *Scalops* or *Scapanus*, to which genera the commonest American moles belong. We can hardly find fault with our author in this instance, however, seeing that no general treatise on American mammals has been published for nearly half a century.

In the illustrations, with which the book is well supplied, artistic effect has been aimed at rather than strict accuracy; a number of them are entirely fanciful and represent only creatures of the imagination. They could be replaced to advantage, in our opinion, by figures of some of the real wonders of animate nature.

In spite of these defects the book is a good representative of its class, and the lessons will doubtless be read by children with interest and profit. F. W. T.