

HUDSON RIVER FOSSILS OF JEFFERSON COUNTY, INDIANA. By GEO. C. HUBBARD.

In the Geological Report of Indiana for 1874, there appeared a list of Hudson River fossils prepared by Dr. W. J. S. Cornett, containing the names of seventy-six species and varieties. They were classified as *plantæ*, *encrinites*, *parasitic corals*, *univalves*, *orthis* and *trilobites*. Among the "orthis" were *modiolopsis modiolaris*, a lamellibranch, and *streptelasma coniculum*, a cup coral. *Tetradium fibratum*, a columnar coral, was placed under "univalves." Young and old of the same species were sometimes classed as two species. *Strophomena nutans*, which has never been found in Indiana, was included in the list. These and similar errors, together with the incompleteness of the list, call for a second attempt.

The species included in this second list have been collected chiefly by myself in the vicinity of Madison. Most of the crinoids, however, were named from Mr. Jno. Hammel's extensive collection.

The list, which is too long for an abstract, contains:

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|-----------------------------|------------|
| Plantæ . . . . .            | 8 species. |
| Porifera . . . . .          | 6 "        |
| Anthozoa . . . . .          | 25 "       |
| Crinoidea . . . . .         | 28 "       |
| Stellerida . . . . .        | 6 "        |
| Bryozoa . . . . .           | 14 "       |
| Brachiopoda . . . . .       | 32 "       |
| Pteropoda . . . . .         | 3 "        |
| Gasteropoda . . . . .       | 20 "       |
| Cephalopoda . . . . .       | 18 "       |
| Lamellibranchiata . . . . . | 26 "       |
| Annelida . . . . .          | 4 "        |
| Crustacea . . . . .         | 8 "        |
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| Total . . . . .             | 198        |

Among these some ten or twelve are believed to be undescribed species.

THE UPPER LIMIT OF THE LOWER SILURIAN AT MADISON, IND.—By GEORGE C. HUBBARD.

The upper strata of the bluffs along the Ohio river belong to the Niagara group, and the lower to the Hudson river or Cincinnati group; but the exact line of demarcation between them has long been an unsettled question. The importance of this parting is recognized when we remember

that it exists wherever the silurian rocks are exposed, and that here in an altitude of more than 20,000 feet of the earth's crust, representing a period of untold ages, the greatest break in animal life occurred; but one-fourth of the genera represented in the lower silurian being found in the upper silurian, while the species are almost entirely new.

In Ripley county, along Graham creek, this parting is easily determined by means of the abundant and well preserved fossils, but at Madison this is not the case. Fossils are easily found from the level of the river to a height of 300 feet, where the *favistella stillata* bed outcrops. Above this for seventy-five feet the strata are nearly non-fossiliferous. At three hundred seventy-five feet above the Ohio the "cliff rock" outcrops, which contains characteristic Niagara fossils.

In 1859 Prof. Richard Owen, after a hasty examination, stated the *favistella* reef to be the limit. A few years later Prof. Eaton discovered *tetradium fibratum*, a Hudson river fossil, six feet higher. Subsequently, Dr. W. J. S. Cornett claimed that he had discovered a 10 inch stratum about fifty feet above the *favistella* reef containing *orthis occidentalis* and other Hudson river fossils, and announced this stratum as the last of the lower silurian.

In 1889 I commenced collecting fossils, being unacquainted with what has been stated just above. Occasionally at the head of ravines I found fossils in fallen rocks which were undescribed in any of my books on palæontology. Some were sent to S. A. Miller, of Cincinnati, who returned them, saying they were new species. This made me eager to ascertain the position from which the rock bearing them came. Mr. John Hammel and I commenced an investigation and discovered that it is situated near the summit of the precipices forming the various falls west of Madison. Immediately above we found a hard, durable salmon-colored stone which, on account of its greater resistance to decomposition, shielded and concealed the stratum beneath. The upper stratum was found to contain certain Niagara fossils, and later investigation has shown that there is an abrupt palæontological break between the two strata, corresponding to the cycles of time when the lower silurian rocks were elevated above the surface of the ocean and subjected to the disintegrating action of the elements.

By comparing the upper stratum, according to our determination, with that selected by Dr. Cornett at the stone quarry near his residence, they were found to be identical. Hence, to this gentleman belongs the honor of the discovery, our labors simply confirming his conclusion.

The only facts which militate against the validity of the limit assigned are that a survey of the two strata up and down the river for several miles shows them to be conformable; but as stated above, in Ripley county the fifty feet of non-fossiliferous rock is absent, proving non-conformability, and that the fossils, with few exceptions, are unlike others found in the Hudson river group.

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THE KANKAKEE RIVER AND PURE WATER FOR NORTHWESTERN INDIANA AND CHICAGO—By J. L. CAMPBELL.

The Kankakee river is the unsolved engineering problem of Indiana.

How to secure the proper drainage of the vast basin known as the Kankakee marshes is a question which has not had a practical answer—chiefly on account of the expense necessary to carry out any of the proposed plans. A new interest in this question may be developed in connection with the problem of an adequate supply of pure water for the new cities in northwestern Indiana and of Chicago, beyond our borders.

The fact exists, although vigorously denied by citizens of Chicago, that pure water has not been obtained by the tunnel system into Lake Michigan, and it is more than probable that further extension of the system will fail to furnish pure water, and after the most costly experiments or repeated disappointments the city will seek its water supply from other sources.

The effort to keep the lake water pure by artificial drainage of the city into the Illinois river may be partially successful—but even this is doubtful—and at best changes will be enormously expensive,—literally an up-hill business.

It will not be denied that a vast territory around Chicago cannot be included in the artificial drainage system, and this territory will continue to be drained into Lake Michigan.

The mouth of the tunnel, whether located two or ten miles from the shore, is the source of an artificial stream toward which currents must tend from all directions. Into these currents the impure drainage of the city will be carried, and the water supply will be contaminated.

The extension of the tunnels doubtless will furnish less impure water, but certainly not the pure supply necessary for the health of a great city.

The practical questions connected with the question of the water supply of a great city are:—