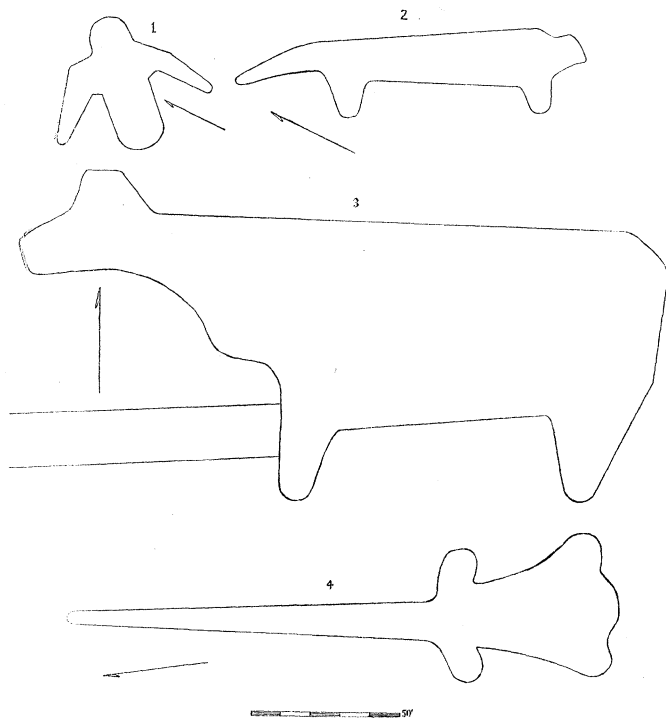


connecting point, it is very evident that the animal was constructed last. This overlapping of mounds is by no means uncommon in the North-West, and probably may account for the 'amalgamation mounds' of some writers. Besides the animal, there are in the same group twenty-three round mounds and ten embankments, as well as four other round mounds which have 'approaches,' or a low embankment, running from each.



A much less bulky animal (4) is on the S.E. $\frac{1}{4}$ of Sec. 13, T. 27, R. 9, E., some ten miles east of Freeport, Stephenson County, and on the north side of Pecatonica River. Its greatest length in an air line is 116 $\frac{1}{2}$ feet, and the average height of the body 1 $\frac{1}{4}$ feet. In the same group with it there is one embankment and seven round mounds, three of which are partially demolished. In one of the latter a fine hematite 'plumb-bob' was unearthed, in connection with a human skeleton which was badly decayed. Hematite relics in this region, and especially plumb-bobs, are exceedingly rare.

Near these mounds, but at the foot of the slope, there is a fine boiling spring of pure cold water.

Very few of these Illinois effigy mounds are in a good state of preservation; but I looked around long enough to find ten of them worth surveying, of which the four now given are the best suited for publication as types.

In surveying mounds of this class it has been a special object to get their true outlines as near as possible, without any preconceived ideas or fanciful imaginings as to what animal or other object they were intended to represent. To do this it is necessary to determine where the artificial ground ends on the natural surface. It is hardly possible, however, for the reader, even with the aid of faithful diagrams, to form an adequate idea of the beauty and symmetry of the effigies as they appear to the eye when in their undisturbed state.

T. H. LEWIS.

St. Paul, Minn., July 31.

The Coal-Measures of Kansas.

THE drilling of a 2,000-foot well at Emporia, Kan., has furnished an excellent section of the coal-measures of this State. The location of the section, unfortunately, can be given but approximately. Beginning somewhere in the upper half of the upper coal-measures, it ends in the lower third of the lower coal-measures. The section is very interesting, however, independently of its position in the formations.

In the depth of nearly 2,000 feet there are 112 strata with an average thickness of nearly 18 feet. Of these strata, 50 are shale,

50 limestone, and 12 sandstone. The limestone strata average 9 $\frac{1}{2}$ feet in thickness; the shale, 25 feet; and the sandstone, 24 feet. In the upper thousand feet are $\frac{1}{4}$ of the shale strata, $\frac{1}{10}$ of the limestone, and $\frac{5}{12}$ of the sandstone strata; but in the first thousand feet are $\frac{7}{12}$ of the shale, nearly $\frac{1}{2}$ of the limestone, and $\frac{1}{4}$ of the sandstone. The total thickness of the shale is 1,242 feet, limestone 465 feet, and sandstone 286 feet. Mingled with the shale are three beds of coal in the first 500 feet, and one bed in the last 500. The thicknesses average less than one foot.

The section teaches that the conditions under which the coal-measures were deposited were exceedingly variable, and that the tracing of the strata through eastern Kansas will not be a holiday task.

These deposits, even including the limestone, are mostly shallow-water accumulations, and are quite rich in fossils, especially the limestone. Incrusting corals, crinoid joints, and brachiopod and conchifer shells are especially abundant. Trilobites are rare.

L. C. WOOSTER.

Eureka, Kan., Aug. 31.

Radiant Energy.

IN your issue, Aug. 17, Prof. S. P. Langley, in his presidential address at the late meeting of the American Association for the Advancement of Science, puts his case a little too strongly in favor of Draper, I think, when referring to Melloni's statement of the relation between light and heat forms of radiant energy, made in 1843. He says, —

"So far as I know, no physicist of eminence re-asserted Melloni's principle till J. W. Draper, in 1872. Only sixteen years ago, or in 1872, it was almost universally believed that there were three different entities in the spectrum, represented by actinic, luminous, and thermal rays."

As a student at Dalhousie University, Halifax, Nova Scotia, before Draper's publication of 1872, I found Melloni's principle not only "re-asserted," but accepted. I fail to understand how it could be otherwise in the United States, when Tyndall's lectures and demonstrations in the Royal Institution were published in 1863, a quarter of a century ago; when the Smithsonian Report of 1868, twenty years ago, published Tyndall's Rede Lecture before the University of Cambridge in 1865, with translations of articles by Cazin and Magrini bearing on the same subject. But, more than that, Tyndall's lectures were published in a neat volume of some five or six hundred pages, by D. Appleton & Co. of New York, in 1870, two years before Draper's publication. I thought Professor Langley might have eminent "American physicists" in his mind; but his reference to the English cyclopædia of 1867 immediately before, suggests no such limit to his statement.

A. H. MACKAY.

Pictou Academy, Nova Scotia, Aug. 22.

[Mr. MacKay's letter may elicit more information on an interesting point, but attention should be drawn to the fact that he offers no evidence (i.e., cites no passages) to show that the lectures he mentions *do* quote any "physicist of eminence" in plain support of the doctrine in question. A statement as explicit as Melloni's or Draper's is what is wanted. Statements which might mean this (or any thing else) are plenty. —ED.]

The Laws of Corrasion.

UPON opening my copy of *Science* this morning, I am greeted with your note on Major Powell's "first formal announcement of a new law in the hydraulics of rivers" upon the relation between their corradng power and sedimentary load. I think you will find this principle fully stated by Major Powell in his 'Report on the Geology of the Uinta Mountains' (Government Printing-Office, 1876); but my object in writing is to draw your attention to the recognition of this "new law" in Chapter XVI., and especially p. 226, of the new 'Physical Geography' of Van Antwerp, Bragg, & Co. The law as enunciated in the first paragraph of *Science* (No. 290) is only true within certain limits, for the sedimentary load of a stream may become so great that it requires all the energy of the current to simply transport it, and hence there is little or no corrasion. The rivers of the Great Plains, — as Platte, Republican, Arkansas,