shedding new light on this most important topic. The editor of the *Revue*, M. Ch. Richet, the well-known physiologist and psychologist, requests that all who have facts to present will send them to him. His address is 111 Boulevard Saint-Germain, Paris, France.

— Harper & Brothers have just ready "The Correspondence of John Lothrop Motley," edited by George William Curtis. Mr. Motley's daughters have collected these letters, chiefly addressed to the writer's family and to Oliver Wendell Holmes. They contain the autobiography of one of the most striking figures in American literary history. The author of "The Rise of the Dutch Republic," "History of the United Netherlands," and "The Life and Death of John of Barneveld," studied the history of liberty in an essentially American spirit. Wendell Phillips was his school chum, Bismarck his fellow-student at Göttingen; and as United States minister to London, Holland, and Austria, he made personal friends of all the literary and political celebrities of his day. Few lives have been so full of incident of universal interest. The work is in two volumes, and has a portrait.

— The Leonard Scott Publication Company (New York, 29 Park Row) has reprinted the famous Bismarck Dynasty article from the *Contemporary Review* for February (price 15 cents), a large special edition of that number having been exhausted on the day of publication. The authorship of the article continues to be the theme of much speculation in England. The Empress Frederick has thought it necessary to disclaim it, and so has Sir Morell Mackenzie. Many of those who claim to know, attribute it to Mr. Stead, the editor of the *Pall Mall Gazette*. Mr. Labouchere says he almost knows it was Mr. Stead, and sundry characteristics can be pointed out which lend color to this view. In the mean time eight editions of the *Review* have been called for in England.

— A novel feature in magazine literature was introduced in the *Nineteenth Century* for February. The editor has invited a number of his friends to send him from time to time, in the shape of letters to himself, remarks upon any books which in the ordinary and natural course of their reading may strike them as being worth special attention. He has suggested to them, that, whenever a book is thus met with, a letter about it should be written to him, giving the same advice as to a friend, and in much the same sort of easy fashion. He hopes in this way to obtain fresher and more spontaneous criticism than can possibly be always produced under the prevailing system of "noticing" books "sent for review." The first instalment of this series consists of a notice of Margaret Lee's novel "Divorce," by Mr. Gladstone; of the "Lyrics," and "A Village Tragedy" by Margaret Woods, by Frederick Harrison; Dean Burgon's "Lives of Twelve Good Men," by P. E. Prothero; Sir George Young's "Sophocles," in English, by W. S. Lilly; "Notes of Conversations with the Duke of Wellington," by Augustine Birrell; Miss Rives's "The Quick or the Dead?" and "Virginia of Virginia," by Hamilton Aide; M. Jusserand's "Wayfaring Life," by the Rev. Dr. Jessopp; and George Pellew's "In Castle and Cabin," by John Morley.

— The New England Publishing Company have just published "One Hundred Lessons in Composition," by W. H. Huston of Toronto, which contains 400 practical exercises in composition, and is the sixth volume in their library of Teachers' Help Manuals. It will shortly be followed by "Manual of Rhymes, Selections, and Phrases," by Oscar Fay Adams; "Forty Friday Afternoons," by forty prominent masters, each giving what he considered his best exercises for a Friday afternoon; and "Common-Sense Exercises in Geography," a book of exercises — not questions — adapted to all grades and to the best American text-books. They have also just ready "School Music," by W. S. Tilden, of the State Normal School, Framingham, Mass., a series of papers from the *American Teacher*.

— The *Critic* observed the seventieth anniversary of the birth of Mr. Lowell, which occurred on Feb. 22, by printing seventy letters and poems from American and English men and women of letters, among whom are Tennyson, Whittier, Gladstone, Holmes, and Stedman.

— Mrs. Frank Leslie has sold to W. J. Arkell, of *Judge*, her *Frank Leslie's Illustrated Newspaper*, both English and German, the transfers to be made May 1. Mrs. Leslie will retain and personally direct her other publications.

— Emin Pacha forms the subject of a paper by Elbridge S. Brooks in the February *Wide Awake*.

LETTERS TO THE EDITOR.

**** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

The Soaring of Birds

MAY I ask space for a few comments on Professor W. H. Pickering's letter on the above subject, in *Science* of Feb. 22?

Professor Pickering holds that a bird which is moving with motionless wings in a horizontal wind is acted upon by three forces: (1) its weight; (2) a force "due to the excess of the velocity of the wind over the velocity of the bird," by which, since it is represented as horizontal and to leeward in his diagram, I suppose he means the friction between bird and wind; and (3) a force "due to the resistance of the air acting on the wings of the bird," which I take to mean the force derived from the impact of the air particles on the wings. This third force he assumes to have a direction opposite to that of the resultant of forces (1) and (2), and therefore to have one component vertically upward, and another to windward. This assumption seems to me to be erroneous. The horizontal component of such a force must surely be to leeward, as was pointed out by Hubert Airy in *Nature*, xxvii. p. 336; and the inaccuracy of this fundamental assumption of Professor Pickering would seem to invalidate his whole argument.

But let us follow it further. Force (3), he says, depends on the velocities of bird and wind, and he assumes first that these velocities are such that it is equal to the resultant of forces (1) and (2). In that case he says the forces acting on the bird will be in equilibrium. They would be, certainly, if the above assumption were true. "The bird," he then says, "will therefore continue to revolve about its mean position." How can a body which is in equilibrium revolve about a mean position? It must surely move with a uniform velocity in a straight line. He says again, "While these forces are in equilibrium, the bird is slowly drifting in the same direction as the wind." Why so? If the bird is in equilibrium, he must have the same velocity as he had at the instant at which he came to be in equilibrium, and that may or may not have had the same direction as the wind. In fact, if it is true, as Professor Pickering assumes, that the forces acting on the bird can be in equilibrium, the bird can move to any distance, in any direction whatever, with motionless wings. He has but to get up a velocity in the desired direction by using his wings, and then to poise his wings so that the forces acting on him may be in equilibrium. Since this result is contrary to experience, it makes the possibility of the bird's being in equilibrium under the given conditions doubtful; and it is obvious, that if force (3) has a leeward component, as I hold it must, its being equal to the resultant of (1) and (2) does not involve the vanishing of the resultant of all three; indeed, that whatever assumption may be made as to the magnitude of (3), the resultant of (1), (2), and (3) cannot possibly be zero.

Finally, Professor Pickering assumes the velocities of wind and bird to be such as to make force (3) greater than the resultant of (1) and (2). In that case, if the assumption criticised above were correct, the bird would be acted upon by a resultant force directed upwards and to windward, as Professor Pickering states. But if force (3) is directed upwards and to leeward, it will be obvious that the resultant force on the bird will be necessarily directed to leeward, and will not necessarily be directed upwards; and it follows, that, even if the velocities of wind and bird be assumed to be such that force (3) is greater than the resultant of (1) and (2), the bird's path will not necessarily have a general upward direction.

J. G. MACGREGOR.

Dalhousie College, Halifax, N.S., Feb. 27.

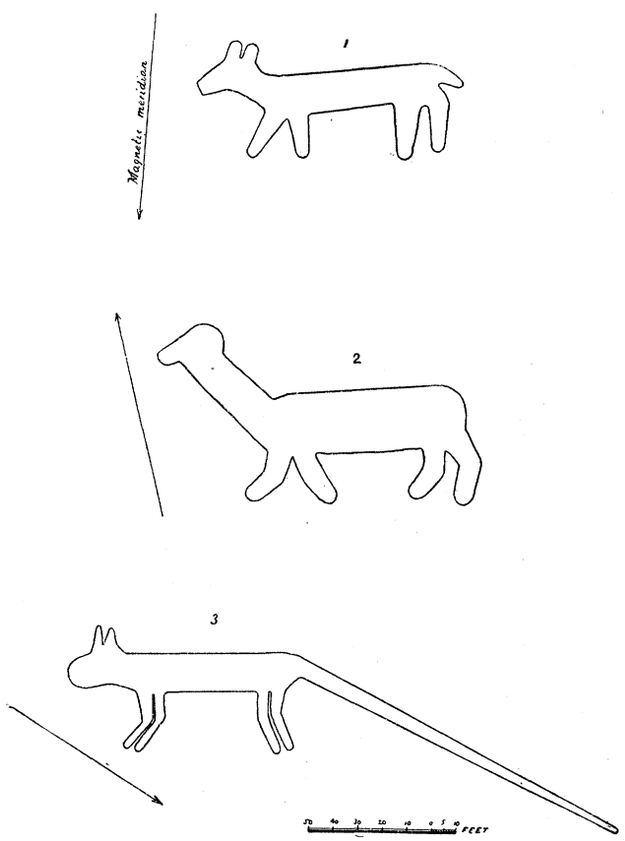
A New Departure in Effigy Mounds.

IT was first asserted by Dr. J. M. De Hart that there are to be found exceptions to the ordinary rule followed by the mound-builders in the outlines of their quadruped animals; i.e., that in-

stead of portraying them with legs in range of the eye, so that only two are visible, there are cases in which all four legs are shown. This statement occurred in an article written by him on the mound-builders of Wisconsin, which appeared in the "Proceedings of the Wisconsin Academy of Sciences for 1876–77;" and he furnished illustrations of two such animals which he found on the northern shore of Lake, or Fourth Lake, opposite Madison. One of them he considered to represent a deer with divided horns: the other he called a bear.

Now, this report of his did not go uncontradicted; for it was maintained some years later by a writer in the *American Antiquarian* (vi. p. 13), that "there is in the mound no such divisions in the legs or horns," and the doubt is also expressed "whether any effigy intended to represent a deer ever had the horns separate, as this has." Dr. De Hart does not seem to have written in defence of his position, and no one hitherto seems to have taken up the cudgels in his behalf. For my part, until last year, I shared equally in the doubts of the second writer, because, in addition to scrutinizing all the drawings of effigies by Mr. Lapham and others contained in the "Antiquities of Wisconsin," together with a few subsequent incidental surveys of similar figures, I had personally examined some hundreds of original effigies in the field, without being able to find a case of divided legs.

When visiting the Four Lake country last summer, I did not fail to search for, and find, the two effigies delineated by the doctor, which are on the grounds of the insane-asylum. The result of the examination did not entirely confirm his statement; for, though the "deer's" legs are most decidedly apart, there is no division of the horns into antlers that I could discern. The following descriptions,



with outline diagrams plotted from my surveys, are now submitted to the archæological world to substantiate the position taken.

The deer, so called (No. 1), is situated to the right of the road running from the asylum to the lake, and about equidistant from each. Its greatest length from the muzzle to the end of the tail is 108.5 feet, and the body is 1.5 feet high. Its horns or ears, whichever they may be, are divided into two sections, but there is no subdivision. There are several other effigies and a number of round mounds and embankments belonging to this group, but they are being gradually defaced and worn away by the patients passing back and forth over them in their daily walks.

On the same occasion I also found another four-legged animal (No. 2) not hitherto mentioned by any one. It is on the north side of Lake Wingra, nearly five miles distant as the crow flies, in a southerly direction from the one first described. The length of this effigy from the extremity of the muzzle to the rump is 127 feet, its body is 3 feet in height, and the legs are bent as if in motion. Last August, when I made the survey, it was in a fine state of preservation, the base outline being well defined. It is located on a knoll about twenty feet above the lake, less than one hundred feet from the shore; and on a high ridge above and to the east of it there are numerous round mounds, embankments, and effigies.

Leaving the vicinity of Madison, a north-westerly course in an air line of about 117 miles by the map brings us to a place where there is another effigy belonging to the same class (No. 3). It is located on the farm of Mr. George Gale on the N½ of section 10, township 18, range 8, on the west side of Black River, in Trempealeau County, Wis., within seven miles of the Mississippi River to the south-west. Its length from the muzzle to the tip of the tail, in an air line, is 234 feet, and the body is 2.5 feet in height. In this case, also, the horns, if such they be, are divided. The fore-legs are bent forward, and the hind-legs backward, which is probably intended to convey the idea that the animal is in motion. The tail is 144 feet in length, being just one and a half times that of the body and head combined. In addition to this one, there are four other effigies and several round mounds and embankments belonging to the same group, all of which were in a fine state of preservation last November, when my survey was made.

While these three examples, representing probably very different animals, are entirely unlike each other generally, they are yet fully sufficient to establish a class of four-legged ones; and probably by continued research others could be found in the same regions.

It may be further noted, in connection with these earthen effigies, that occasionally carvings or etchings are found on the sides of rocks and caves in Trempealeau and adjoining counties, which represent a great variety of figures of various kinds, and that among them are found some animals with two and others with four legs. The more interesting specimens of work have been copied by me. Although they may have been carved by another race, yet the fact still remains that both the artists in earth and the artists in stone adopted the same plan of outlines, but among the carvings there is by far the largest proportion of four-legged animals.

Whether this departure from a supposed rule be symptomatic of any incipient æsthetic evolution or not, and whether such construction of figures with legs apart preceded, was contemporaneous with, or succeeded, the similarly shaped carvings on the rocks, are questions which must be left to the future to answer.

T. H. LEWIS.

St. Paul, Minn., Feb. 27.

Queries.

42. LOOKING TO THE LEFT. — A writer in a recent number of the *Albany Argus* asks, "Why do theatre-goers prefer seats on the right of the house?" and suggests that when we are on the street we pass persons to the right and look to the left; that twenty-five or thirty years of this sort of thing naturally gets one accustomed to it; and, finally, that if one were to sit for two hours and a half or three hours in one position, if he has to keep his eyes to the right, he will find that it tires the muscles of the eyes quite perceptibly. Is there any evidence that this explanation is well founded?

43. DIGESTION OF FOWLS. — Permit me to ask a few questions about the digestion of fowls. Do they pick up the little stones when chicks, that serve through life, or do they secrete an acid that gradually digests even the pebbles, or have they a normal condition which produces the gravel in their gizzards as it is required for digestion? S. E. W.