HERBERT OSBORN: 'Notes on a Macropterous *Phylloscelis atra*.'

MAX MORSE: 'The Breeding Habits of the Myriopod, *Fontaria Indianæ* Boll.'

EDWARD L. RICE: 'A Statistical Plea for Nature Study.'

LEWIS G. WESTGATE: 'Shore Line Topography between Toledo and Huron, Ohio' (lantern slides).

J. H. TODD: 'Some Rare Forms of Aboriginal Implements.'

EDO. CLAASSEN: 'List of the Mosses of Cuyahoga County and of Several Other Counties of Northern Ohio.'

J. H. SCHAFFNER: 'Extra-Floral Nectaries and Other Glands.'

JOHN H. SCHAFFNER: 'Notes on Nutating Plants.'

OTTO E. JENNINGS: 'Notes on Some Rare and Interesting Ohio Plants.'

WM. R. LAZENBY: 'The Keeping Qualities of Apples.'

WM. R. LAZENBY: 'Seeds of Celastraceæ.'

L. B. WALTON: 'Variation and Environment.'

W. A. KELLERMAN: 'Further Floristic Studies in West Virginia.'

W. A. KELLERMAN: 'Additional Infection Experiments with Species of Rusts.'

W. A. KELLERMAN: 'Mycological Flora of Cedar Point, Sandusky, Ohio' (abstract).

W. A. KELLERMAN: 'Group Names in Natural History.'

W. A. KELLERMAN: 'Historical Account of Uredineous Culture Experiments, with List of Species' (abstract).

W. A. KELLERMAN and O. E. JENNINGS: 'Annual Report on the State Herbarium.'

E. L. MOSELEY,
Secretary.

DISCUSSION AND CORRESPONDENCE.

'HORSES' NOT HORSES.

THE notice by E. C. Case of 'The Tree Dwellers' exposes a truly remarkable view of nature and the relations of 'horses' of the present epoch to animals of the past. That picture of 'tiny little creatures' with 'five toes on each foot' flying from dinosaurs and escaping by climbing trees involves as grotesque confusion of time, place and adaptation of structure as could well be conceived. But the critic has not shown up one of the most misleading characteristics. The author, after asserting that 'long before the tree-dwellers lived there were wild horses' which were 'tiny little creatures,' naïvely adds, 'Perhaps you would not think that they were horses at all'! If 'you' did not think so 'you' would be perfectly right and any one who thinks otherwise perfectly wrong. The use of the word horse in such an enlarged sense has been to some extent encouraged by those who know better, but it is extremely deceptive. I have asked a dozen persons of more than average intelligence and culture (school teachers and college graduates) what idea they derived from the paragraphs in question, and found that those who had no special knowledge of zoology were entirely misled; they imagined an animal like an ordinary horse (more like a horse than a zebra or an ass is like a horse), differing simply in having five toes besides stripes like a zebra. Now, every instructed zoologist would know that such a characteristic as five (or four) toes must necessarily be coordinate with innumerable modifications of other parts and that, consequently, an animal so endowed must differ vastly more from a horse than an ass or a zebra does. In fact, every student of recent mammals would place the extinct beast in an entirely different family from the horse.

But no ungulate in the line of the horses with five toes has been discovered! The nearest approach to it is the *Hyracotherium* or *Eohippus* of the lower Eocene and that type had only four front toes and three hind ones; its jaws were relatively short, its teeth quite different from a horse's, and, in fine, its associated characters compel zoologists to differentiate it as the representative of a peculiar family—the Hyracotheriids. In an article (Horse) by a special student of the subject (Dr. William D. Matthews), just published in the Encyclopedia Americana, it is aptly stated that the 'first ancestor of the horse line is very difficult to distinguish from the contemporary ancestors of tapirs and rhinoceroses.'

Furthermore, I object to the assumption that the early representatives of the equine phylum were striped like a zebra. The only basis for such an assumption is that most of

the modern equids actually have such stripes, but the diversity between them leads one to suspect the universality of the tendency and to believe that it is of recent origin. At any rate, no one has a right to take it for granted that primitive forms were striped. The evidence, such as it is, is against the assumption.

Another pure assumption is that the primitive equoidean animals lived especially in the marshes. (The unfortunate author of 'The Tree Dwellers' of course misread 'nature' in postulating that 'the land at that time'—when five-toed horses lived!—'was almost entirely covered with water.') The assumption is based on the obvious fact that a four- or five-toed spreading foot is better adapted for progression on soft earth than a soliped, but there is no reason for confining such animals to marshes. The elephants and rhinoceroses are not marsh-loving animals.

The misuse of the word horse is in natural sequence to the same idea that has been carried to an extreme in 'The Tree Dwellers'; it is the expression of a contemptuous condescension or concession to such as are assumed to be insufficiently educated or receptive to be addressed in more precise language. In the extreme form—disconnected sentences and crude verbiage—analogous language is known as 'baby talk.' Science is scarcely food for babies.

Theo. Gill.

SPECIAL ARTICLES.

THE INFLUENCE OF CLIMATE AND SOIL ON THE TRANSMITTING POWER OF SEEDS.*

In speaking of the influence of soil and climate on the transmitting power of seeds, I will confine myself to certain practices which seedsmen have been taught to follow through long experience, as indicative of certain botanical facts, rather as if these facts had been established by scientific study and experiment.

Speaking first of leguminous plants, in the 'Extra Early' varieties of garden peas the desirable form of vine is one eighteen to forty inches high, and of a determinate growth, by which term I mean a vine that before the lowest and first formed pod has become too large for use as green peas, has completed its elongation and has its apex crowned by a well-formed pod or at least one well out of the blossom. The objectionable form is a vine twenty-four to sixty inches in height, which even when the lowest pod is fully ripe is still growing having its apex covered with blossoms and buds. Such plants as these last are called by seedmen 'wicks' or 'offs,' and a stock of 'Extra Early' peas is valued in inverse proportion to the number of such plants it produces. I never have seen a stock which did not occasionally produce them, and in number varying with different conditions of cultivation. On very rich soils, or those which have been recently fertilized with stable manure, there will be a great many more such plants developed than on a poorer soil. A stock which, when grown on a white clay soil of uniform composition, will ripen down very uniformly and not show more than a dozen such 'offs' to the acre, will, when planted on a mucky soil or one which has been enriched by fresh stable manure, give a dozen 'offs' to the square rod.

As an illustration in detail is a case when three large fields of very favorable soil were planted with the same stock, two of them when visited showed practically no 'offs,' nor were there many to be seen in the third field, except in a double row of circles, each about ten feet in diameter, where piles of manure had been spread, and in each of them there were twelve to twenty-five bad 'offs' more than could be found on an acre of the rest of the field.

Seedsmen find that if the seed from such 'off' plants grown from good stock is planted on soils favorable for the development of the true type, it will produce few, very few, often no more 'off' plants than seed from plants of the true type grown from the same stock; but if seed from the 'off' plants is sown on soil favorable for the development of 'off' plants, they will produce more 'offs' than seeds from the true type, and this tendency to produce 'off' plants on either favorable or unfavorable soil increases very rapidly with the number of consecutive generations of 'off' plants back of the seed in question. An illustration was given of precisely similar results

* Read before Botanical Club of Washington.