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.

with 'American Wonder' peas when the character of soil favorable for the most desirable type is the opposite of that favorable for the best 'Extra Earlies.'

Seedsmen commonly believe that, in the case of peas, the character of the soil has a marked influence over the character of the plant, and that this influence extends to and is carried by the seed, but that such soil influence is decidedly cumulative in its effects, so that in practice they attach little importance to it for *one season,* but carefully avoid the use of stock seed which has been submitted to such influence for consecutive years.

Again in the case of garden beans, the tendency of rich, moist, heavy soil is to produce thick, fleshy pods slow to mature, while that of warm sandy land is to the production of flatter, less fleshy and quicker maturing pods. I can best illustrate this by experience. Some ten years ago I sent each of two growers living within a mile of each other, seed of 'Valentine' bean of precisely the same stock grown the previous year in the same field, which was a rich clay loam. One of these, whom I will call *C,* planted on rather heavy, rich soil, the other, *S,* on a light warm but rich sandy one. The next season *C* received seed grown by *S* and *S* seed grown by *C,* while a third man, *M,* some five miles away, on rich loam soil, received equal parts of both. When I visited the fields I noticed that in *C*'s field, which I supposed was planted wholly with seed grown by *S,* there were ten rows which differed from the rest and were such as I would expect if seed from *C* was planted, and I tried to account for them by extra manure, etc.; but I learned that as there was not quite enough of the seed from *S* sent him, he had filled out with some of his own, and I had detected the exact row where the seed was used. I then visited *M* on loam soil, and while I could tell that one part of the field was planted with *C* stock and the other with *S,* I could not detect the line between them.

These experiences seem to indicate that in leguminous plants soil does have an influence which is carried in the seed, and is cumulative in character, but in all my experience I have never seen any influence of the climate over the seed of leguminous plants.

The only gramineous plant with which I have had a large experience is sweet corn, and here the case of legumes is reversed. I have never been able to detect any influence of soil over the character of the seed produced, but I believe that climatic condition does have a marked influence, and that the difference between stock grown east and that grown west is the result of climatic rather than soil condition. People who use large quantities of sweet corn are very positive in their belief that seed produced in the eastern states gives a better product than that grown at the west. Some seedsmen agree with them, others maintain that if *eastern stock* seed is used just as good corn can be grown in the west. It seems to me that that *if* not only undermines their contention, but shows that seedsmen have a practical belief in the cumulative influence of soil and climate.

Turning now to cucurbits, in my experience I could never detect any effect of either soil or climate on seed of cucurbitaceous plants of the *same stock.* I don't wish to be understood as saying that soil and climate have no influence over the fruit, for they do quite as much as with any plant, but that this difference is not carried in the seed. As an illustration the writer has knowledge of a case where seed from small but select fruits grown in Michigan was sown in Oklahoma by the side of seed from large plants of the same pedigree grown in Oklahoma, and the result was equally large fruit in both cases. Also, in another case an old and experienced grower in Michigan, who claimed that he should be paid more for seed grown in Michigan, because earlier and better, was given seed of the same stock, grown for three generations in Michigan and for four generations within 200 miles of Gulf of Mexico, to plant side by side, and told that if he could detect any difference in the crop, his request would be considered, but he was unable to do so.

I have had the same sort of results with cucumber, muskmelon and squash, and it has made me think that seed of cucurbits do not carry influences of soil and climate, even when

such influence has accumulated for several generations. If time would permit I might go on and speak of tomatoes, cabbage and onion, each of which in my experience seems to have distinct habits in this respect, and considering all these cases it seems to me that plants of different natural orders differ in the degree to which influences of soil and climate are transmitted through the seed.

WILL W. TRACY, SR.

CURRENT NOTES ON METEOROLOGY.

CHANGES OF CLIMATE IN CENTRAL AFRICA.

IT is reported (*Pet. Mitth.*, X., 1903) that Lake Shirwa, southeast of Lake Nyassa, in central Africa, has entirely disappeared. Desiccation has been going on for many years, but the last stages in the process were very rapid. This lake used to be shown on the maps as an oval-shaped body of water, about thirty miles long and ten to fifteen miles wide. It now consists of a few small ponds. Livingstone discovered the lake in 1859. Lake Ngami, also discovered by Livingstone, has since disappeared. These changes seem to be a manifestation of a gradual desiccation which is going on in central Africa, but it is important that they should be more carefully studied before any definite conclusions are drawn. The recent reports to the effect that the Sea of Azov is drying up are misleading, in that the apparent desiccation seems actually to be due to a silting up of the lake.

A NEW DROSOMETER.

THE measurement of dew has always given trouble, because no drosometer has ever commended itself for universal use, and the results obtained by different methods have not been accurate, satisfactory or comparable. In *Das Wetter* for March, Ferle, of the Agricultural Experiment Station of Peterhof-Kurland, describes a new kind of drosometer, which he has found very useful, viz., a piece of specially prepared paper, soaked in a chemical solution. This paper is exposed over a box placed on the ground at night, and the amount of dew is indicated by the discoloration of the paper. A scale of discoloration, determined by experiment, is adopted, and the entry in the observation record book, based on the amount of discoloration, gives the amount of dew which formed during the night. Three kinds of paper are used, the first for the smallest amounts, the second for larger, and the third for the largest amounts. It is best to expose two kinds of paper, selected according to the season, so that, in case the amount of dew is too great to be indicated by one sheet, it may be recorded by the discoloration of the other paper.

METEOROLOGICAL OBSERVATORY ON MONTE ROSA.

AT the instance of the Italian Alpine Club, and with the support of Queen Margarita, the Duke of the Abruzzi, and of the Italian Ministry of Agriculture, an observatory has been erected on Monte Rosa, at an altitude of 4,560 meters (14,960 ft.) above sea level. Next to the Vallot Observatory on Mont Blanc, this is the highest meteorological station in Europe. Observations are to be begun during the coming summer. The observer is to live at the summit throughout the summer months, and during the winter when weather conditions are favorable. The observatory is to be open to scientific men of all nationalities who wish to carry on investigations there. The observations made on Monte Rosa will be of special value in connection with the international balloon ascents. The Monte Rosa Observatory will have, as companion Italian institutions, the Etna and the Monte Cimone observatories, at 2,942 (9,650 ft.) and 2,162 (7,095 ft.) meters respectively.

METEOROLOGICAL INSTITUTE OF ROUMANIA.

AMID the disturbed political conditions on the Balkan Peninsula, the Meteorological Institute of Roumania, under the able directorship of Dr. Hepites, continues its excellent work. Vol. XVI. of the *Annals* of the institute is at hand, comprising over 700 quarto pages, containing the annual report of the director for the year 1900; memoirs on the rainfall, earthquakes, climatology and magnetic observations of 1900; the regular hourly observations of all the elements at Bucharest, as well as the means for the 16 years 1885–