elements are in excess. If the minima of all mineral elements are presented to the plant at the same time, normal growth can not take place.

In the experiments of Wolff it was conclusively shown that in such cases flowering and fruiting are practically prevented. The plant has, therefore, need of an excess of mineral matter, and this is secured from other mineral substances if one of the essential minerals is present in a minimum quantity. Thus some mineral foods may, temporarily at least, act as substitutes to a certain degree for others. Strange to say, however, sodium, which is so near potassium in its general properties, has but slight, if any, suitability as a substitute therefor. It is a mistake, therefore, to look upon the constitutional assimilation of mineral matters as their chief utility. The fact that both potash and phosphorus are always associated with the functions of the living cell is not to be forgotten. The absence of either of these minerals makes vegetable growth impossible. Especially are these two substances the katalytic agents whereby the living cell converts the other mineral foods of plants into starch, sugar, cellulose, oil and protein, of which the organic parts of plants are chiefly composed. These elements reach the tree solely through the soil, and the greater or less abundance of them in the soil can not fail to affect profoundly forest growth, perhaps to a greater extent than almost any other factor of the environment.

The soil has, therefore, marked ecological as well as physiological influences on forest growth. The soil of the forest is nature's own handiwork and will never be modified by man. When man begins his work the forest ends and the park begins. We all know how the soil alone has, in many instances, determined the character of tree growth. It is not wholly accidental that the sands are covered by pines and the mountains by oaks. The virgin forests in many localities were indexes whereby the early settlers selected their entries of land. They did not need to be told that the maple, the walnut and the tulip grew on the richer, and the beech, the gum and the oak on the poorer soils. The first forests that fell before the ax were those of the first-named trees. Thus the nature of the soil has often determined the original distribution of forest growth. Nature seems to know the edaphic principle in ecology better than man.

It is to be regretted that at this late day we should be told by such an eminent authority: 'Moreover, the total amount of mineral constituents in a tree is not only very small, but by far the largest portion is found in the leaves and young parts, suggesting again their merely fortuitous presence as a residue of the transpiration current, and mostly not required.'

I need hardly add the observation that the presence of mineral substances, both as such and as salts of the organic acids, profoundly modifies osmotic pressure, and without the aid of these substances the 'transpiration current' would never reach the tips of the trees, but, like the vanishing stream of the desert, be forever lost. The incidental fact of peripheral accumulation of mineral matter due to transpiration seems to have no bearing on the previous utility of the accumulated material during its passage through the cellular substance of the tree.

H. W. WILEY.

ARE STAMENS AND PISTILS SEXUAL ORGANS?

IN SCIENCE, XVII., 652, Professor W. F. Ganong suggests that stamens and pistils are sexual organs, and gives some interesting reasons for this conclusion. In brief, he proposes to abandon the morphological point of view and adopt one purely physiological. It must be admitted that a genuine argument is presented here, but it is still open to question whether such a use of terms conduces to clearness. If the stamens are male organs, I suppose their product, the pollen spores, must be regarded as male cells. And if the pistil is a female organ, I suppose the scattering of pollen spores upon the stigma must, if one is consistent, be considered as a sexual act and, in that case, may be termed, as Mueller did, 'Befruchtung.' But to the mind of a morphologist this confusion of the processes of pollination and fecundation is extremely ob-

jectionable. The phylogenetic history and the ecological significance of the two processes are totally different.

Since the appearance of Goebel's 'Organography' it has been the fashion to urge the morphologists to be humble, but it is not impossible that a clear definition of terms in accord with the facts of phylogeny, such as morphologists have insisted upon, may still be of some value to botanical science.

When it is so easy to use such terms as 'staminate' and 'pistillate,' it seems a pity to permit flowers to be called 'male' and 'female.' CONWAY MACMILLAN.

PATAGONIAN GEOLOGY.

UNDER the title 'L'age des formations sedimentaires de Patagonie,'* Dr. F. Ameghino has issued a collection of papers relating to this subject published originally in the *Anales de la Sociedad Cientifica Argentina,* Vols. 50–54 (1900–1903). The chief purpose of this series is to refute the views on Patagonian geology expressed by Mr. J. B. Hatcher and myself.

Unfortunately, the representation of my statements as given by Ameghino is in almost every single case more or less inaccurate, sometimes my views are not properly understood, sometimes they appear distorted and even directly altered.

Since it is not worth while to correct all these misunderstandings—this correction being merely a reiteration of what I have said before—I do not think it necessary to go into detail. I only wish to caution any subsequent writer occupying himself with the question of Patagonian geology, not to rely implicitly on Ameghino's representations of my views and statements, but always to consult the original version of them, as laid down in the final report on the 'Tertiary Invertebrates of the Princeton Expedition.'†

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* Buenos Aires, 1903.

† 'Reports of the Princeton University Expeditions to Patagonia,' vol. 4, part 2, 1902.

NOTES ON METEOROLOGY.

METEOROLOGICAL REPORTER TO THE GOVERNMENT OF INDIA.

SIR JOHN ELIOT, who has for a number of years occupied the important position of meteorological reporter to the government of India, and who received the distinction of knighthood on the occasion of the Durbar at Delhi, is to resign at the close of the present year. Mr. Gilbert T. Walker, who has been appointed Assistant Meteorological Reporter to the government of India, is to succeed Sir John Eliot on the latter's retirement. Mr. Walker is a fellow of Trinity College, Cambridge, where he attained highest honors in mathematics, and where he has taught mathematical physics since 1895. He has published a number of important researches on electricity and magnetism. After his appointment to the position of assistant meteorological reporter, Mr. Walker came to the United States, where he made a study of our methods of work in astronomy and in meteorology, visiting the Harvard and the Yerkes astronomical observatories, the Blue Hill Meteorological Observatory, the Weather Bureau in Washington, etc. Mr. Walker sails for India early in May. With his admirable training in mathematics and physics, his great ability to pursue original investigations along these lines, and his wonderful field for work in Indian meteorology, there is no doubt that Mr. Walker will make important contributions to our knowledge of the mechanics of the earth's atmosphere. He may be assured that he takes with him to his new field of labor the best wishes of American men of science for his success in a region where many of those whose names are written large in the history of meteorology have done their work.

DUNN'S 'THE WEATHER.'

'THE Weather' (New York, Dodd, Mead & Co. 1902. 8vo, pp. 356) is designed to 'avoid all mathematics, and scientific and technical terms (!), and present the subject in the simplest and most popular form.' The author is E. B. Dunn, for several years local forecast official of the Weather Bureau in New York City. The book endeavors to cover a large