the flanks of a leaf trace may be called "widening of medullary rays" if one finds greater satisfaction in such a designation. In teaching the herbaceous stem, however, the writer has found that the student grasps the situation better when he realizes that the subtending nodal ray and the parenchyma which flanks the trace on either side are but parts of one physiological system specialized for food storage. As to its actual phylogeny this tissue would seem to represent a complex of vertical parenchyma united with vertical series of rays, but since the same thing can be said of the subtending ray there is no real difference between them. The flanking tissue is certainly not a single ray broadened out. Our critics are in danger here of setting up the same subtle doctrine of specificity of tissues that animates those realists who are so obsessed by the Platonic Idea of the stele that they can sense imaginary lines running across a leaf gap to separate cortex from pith.

As to the fact that some trees and shrubs have foliar rays, that would seem to have been known for some time. In fact it serves as the very basis from which the theory takes its departure. The damning fact that certain herbaceous stems, on the other hand, have "essentially continuous vascular cylinders" is to be regretted, perhaps, but it only shows that nature refuses to be forced into ways of absolutism in her operations.

So far as the writer can see we have come to a substantial basis of agreement as to facts.

Messrs. Sinnott and Bailey admit that foliar rays may occur in aerial stems, and they realize that "high multiseriate rays" or flanking storage parenchyma of a leaf trace is not the same thing as a subtending ray, hence they won't search any longer for leaf traces on the central side of such a flanking band.

The writer, on his part, is willing to call flanking tissue a medullary ray, though truth to tell, both terms are poor ones for the tissue in question. Further he gladly admits the existence of trees with leaf rays and herbs without any.

So all considered we come to substantial agreement as to how a tree became an herb. As far as the writer is concerned the affair is closed.

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FEMORAL DEFORMATION

DURING an examination of skeletal material from an archeological site at Roebuck, Ontario, it was found that in many cases a certain amount of dissimilarity existed between the right and left femora of the same individual. When paired femora were placed side by side on the same level, and with their condylar extremities together, it was found that their heads were on different levels, the right being usually the higher. This difference in the heights of the heads was due to a difference in the forward angles of the necks of the femora, that is, the angle between the neck of the femur and the horizontal. No twists or other abnormalities were observed in the shafts.

The deformity seems to have been very general among the inhabitants of this site. Of twenty-three pairs of adult femora examined, only three pairs were normal. The deformity is noticeable also among the bones of children, and even among infants so small that it is quite certain that they never walked. This would seem to prove that the deformity was congenital, and shows that it was certainly not the direct result of any habitual occupation.

Detailed examination has been made only in the case of adult skeletons. It shows that of twenty-one pairs of bones seventeen had the right deformed and six the left, two pairs having both bones deformed. In the case of the latter, the inclination of the necks was in opposite directions.

Although it has been asserted that the apparent hereditary nature of the deformity shows that it was not the direct result of habitual occupation of any sort, still habitual occupation may have been its primary cause. If it had been caused for generations by occupation it would ultimately, it may be presumed, be handed on by heredity; and thus a theoretical cause for the deformity may be found both in the case of adults and of children.

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A CASE OF SUPERSENSITIVENESS TO THE POISONOUS ACTION OF THE CASTOR BEAN

THE frequency with which the castor bean seed is used in elementary courses in botany makes it seem advisable to record a case of supersensitiveness to the poisonous action of the castor bean plant which came under my observation.

The subject, Miss K., while taking the laboratory work in botany as a student developed a severe case of what appeared to be hay fever. It was apparently associated with something used in the laboratory. Not until a year later when she acted as an assistant in the same course was the castor bean found to be the cause.

The attacks were initiated with severe sneezing and some headache and general discomfort a few minutes after exposure. Her face became inflamed and puffy, eyes reddened and swelled, breathing was accompanied by a wheezy sensation. The mucous membranes were decidedly irritated and later cracked. The surface of the cornea of the eye in some cases became slightly wrinkled. After the heaviest attack

Miss K. was confined to her bed for three days, and the after-effects lasted for two weeks.

It was not necessary for her to handle the castor beans but merely to be in the room where they were dissected. In fact, in one instance a few beans were used in the laboratory in the morning from 10 to 12 when Miss K. was not present and was not aware of their being used. A few minutes after she came into the laboratory in the afternoon at one typical symptoms with sneezing and headache developed.

The castor bean plant had an effect similar to that of the bean. Within a few minutes after cutting the leaves and stems of a castor bean plant for histological purposes Miss K. suffered from a mild but typical attack.

Out of several hundred students the case mentioned is the only one of its type I have observed. It was noted, however, that one of the instructors suffered from a badly inflamed eye due to rubbing it with his fingers after dissecting some castor beans. Pammel, in discussing the castor oil bean in his manual of poisonous plants, states that "a case is known of a young lady whose eyes became inflamed when in contact with a mere trace of the material in the laboratory."

Effects from the castor bean similar to those described may be mistaken for colds or for attacks of hay fever produced by pollen.

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QUOTATIONS

INDUSTRY AND CHEMICAL RESEARCH

WHY do clear-thinking, well-informed business men who hold the stock or compose the directorates of companies in our chemical engineering industries so frequently disparage a policy of research? An old riddle which is growing more perplexing as it ages! To regard a technical staff as a semi-liability at best, to dispense with it whenever storm clouds gather on the business horizon—such is altogether too frequently the creed of those who pass upon expenditures. No more clear-cut evidence of such folly, or rather the wisdom of the maintenance of research, has come to our attention recently than the remarkable story of achievement made by one of the great yeast companies. This story is at once an inspiration to the research worker and a rebuke to those whose first thought is to reduce the technical staff in time of financial difficulty.

A few years ago yeast was made by this particular company from a cereal mash on an enormous scale and in eleven plants. About one quarter of the grain was converted to yeast; from the mash alcoholic beverages and allied products were produced which yielded sufficient revenue to make possible a very low margin of profit on the yeast. Then came our entrance into the war. Edible cereals could no longer be used. Research found a manner of using oats as a substitute. Labor cost rose as high at 260 per cent. above the pre-war level. As an offset to this, research developed a process to increase the yield to a figure previously unheard of.

Then prohibition came, seemingly to cap the climax. Competition with industrial alcohol makers could not be met with the costly high-grade grain alcohol produced by this process. Yet without this market the cost of yeast must be substantially increased. Again after a real struggle on the part of the research staff in a comparatively unknown and poorly charted field of chemistry the answer was found—production from new materials with the evolution of no alcohol and of almost no other side products. The net result of its research, which was well paid for, enabled this company to maintain its retail prices at pre-war standards through years of rapidly shifting economic conditions. Its process reached an efficiency of practically 100 per cent. conversion of raw material to yeast. Its product was improved, its sales were increased, its research facilities developed to the highest point. And all this through a period when many firms were endeavoring to weather the storm by putting a sign over the laboratory door, "This Way Out."

We have cited other similar instances; we shall cite more. Research, despite the many kicks it has had, is alive and growing. Here is added justification for our contention that it is indispensable in trying as well as in prosperous periods. Properly directed, there is no better manner of insuring increased dividends.—*Chemical and Metallurgical Engineering.*

SCIENTIFIC BOOKS

Text-book of Agricultural Bacteriology. By F. LÖHNIS, Ph.D., U. S. Department of Agriculture, and E. B. FRED, Ph.D., University of Wisconsin. New York, McGraw-Hill Book Company, 1923, 283 pp., 10 plates, 66 illustrations in the text.

THIS work, as the authors indicate in their preface, is largely based upon the senior author's "Vorlesungen über landwirtschaftliche Bakteriologie," published in 1913, and representing the material collected during eleven years' experience in teaching and research at the University of Leipzig. It is, moreover, more than a translation of Löhnis's "Vorlesungen," representing a thorough revision and a rearrangement of the subject matter to make it more useful to the American and British reader.

Following an introduction which includes a survey of the history and scope of bacteriology, the authors pass to the main portion of the book which is divided