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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The Exchange" column is likewise open.

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LATEST DETAILS CONCERNING THE GERMS OF INFLUENZA.

DR. R. PFEIFFER, overseer of the scientific division of the Institute for Infectious Diseases at Berlin, has the credit of discovering, isolating, describing, and inoculating the germs that are the cause of influenza. The following results are based upon his thorough investigation of thirty-one cases of influenza, in six of which autopsies were made.

1. In all cases there was in the characteristic, purulent, bronchial secretion a definite kind of bacillus. These rods were shown in uncomplicated cases of influenza, in an absolutely pure culture, and for the most part in large numbers. Very frequently they lay in the protoplasma of the pus-cells. Where the patient has been subject to other bronchial troubles, one finds in the sputum, in addition to the influenza bacilli, other micro-organisms. The bacilli can enter from the bronchi into the peri-bronchial tissue, even to the surface of the pleura, where in purulent coats in two autopsies they were found in pure culture.

2. These rods were found only in influenza. Numerous control-experiments showed their absence in common bronchial catarrh, pneumonia, and phthisis.

3. The condition of the bacilli varied with equal force in the course of the disease; first with the exhaustion of the purulent bronchial secretion the bacilli also disappeared.

4. Two years ago, at the first appearance of the influenza, I saw and photographed the same bacilli in large numbers in preparations of sputum from influenza patients.

5. The influenza bacilli appear as small rods, of about the thickness of septicæmia bacilli in mice, but one-half their length; frequently three or four bacilli are found arranged one after the other like in a chain; it is difficult to stain them with the basic-aniline dyes; one obtains better preparations with Ziel's solution and with the hot methyline blue of Löffler. In this way one sees almost regularly that the end-poles of the bacilli stain more intensively, so that forms arise which might be very easily mistaken for diplococci or streptococci. The bacilli are not stained by Gram's coloring matter; and in hanging drops they are immovable.

6. These bacilli can be obtained in pure cultures; in one and a half per cent sugar-agar the colonies appear the smallest. The continued culture in this nutrient medium is difficult, and I have not been able to go beyond the second generation.

7. Many experiments for transmission to apes, rabbits, guinea-pigs, rats, pigeons, and mice were made. Positive results could be obtained only in apes and rabbits. The other species of animals were refractory to the influenza.

8. These results justify the conclusion that the above described bacilli are the cause of influenza.

9. Infection comes very probably from the germs of the disease in the sputum; and therefore for prevention of contagion the sputum of influenza patients must be made innocuous.

Dr. Kitasato has succeeded in cultivating the bacilli of influenza to the fifth generation upon glycerine-agar.

ARTHUR MACDONALD.
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A SERIES OF ABNORMAL AILANTHUS LEAFLETS.

A STURDY trumpet creeper (*Tecoma radicans*) has entwined itself about an ailanthus tree which stands in our yard, near the veranda. Together, they form quite a charming bower during the summer time, when the bright trumpet flowers are so profusely intermingled with the dark green foliage of vine and tree.

It was here that I had taken my chair one afternoon, to enjoy an hour's undisturbed reading. My anticipations of quiet, however, were very soon interrupted, by a sudden gust of wind, which set the leaves of my book a-fluttering so, that I was obliged to close it. But "it is an ill wind that blows nobody good," I said to myself, as I stooped to pick up some leaflets which came fluttering down from the ailanthus tree.

Although it was only June, these leaflets were of a bright yellow color, like the tints of early autumn. But what attracted my attention especially was their variation from the typical form. Every leaflet had a peculiar notch, lobe, or lop-sided outline which would cause it to be classed among monstrosities, or abnormal leaves. These abnormal specimens were more to me, however, than mere "freaks of nature." They were the tablets on which their own history was inscribed.

If we take one of the large ailanthus leaves, with its long rachis and numerous leaflets, we are led to inquire into the manner of its numerical increase of leaflets. At a cursory glance at the leaves we find that although the vast majority are odd-pinnate, there are many which we are scarcely justified in calling odd, nor yet should we denominate them even-pinnate. That is, transition stages between odd and even pinnate quite commonly occur, and I would call these "abnormal leaves" transition stages. They are the keys which will unlock for us the mystery of their development. Let us see if such is not the case: let us make use of these keys and thereby learn whether such is not the verdict rendered by the leaves themselves. We will put our queries to the terminal leaflets, because they seem to be the centre of evolutionary activity in nearly all pinnate leaves.

We have quite an advanced transition stage in Fig. 1 of our series; it has quite a conspicuous projection beyond the typical outline on the left side; a prominent vein is seen extending to the apex of this abnormal projection, from which

on the lower side, lead smaller, well-marked veins. There is also a very slight point on the opposite side of the leaflet, the venation here being similar to that just described What, then, does this abnormal leaflet mean? Can we not see that nature has decreed that there shall be an increase in the number of leaflets? And that she is about to "cut off" new leaflets from each side of this terminal leaflet?

Fig. 2 confirms us in this supposition, and furnishes an objective demonstratian of a more advanced transition stage. The sinuses have deepened, and the two lobes bid fair to become separate individual leaflets. We feel secure in making this statement because Fig. 3 stands ready to make good our word with a newly-added leaflet on one side and another on the other side, well under way. The rachis, meanwhile, has elongated to make room for the new-comer. Fig. 4 illustrates a repetition of this process of division, adding emphasis to our explanation of these "abnormal leaves." Nature is going right on, bent upon working out her conceptions to the fullest extent.

Nos. 5, 6, and 7 are certainly extremists. They may, perhaps, be compared with the impulsive, rampant reformers in the social world, who are imbued with a stronger progressive impulse than will harmonize with existing conditions; whose wishes to surmount all obstacles and soar aloft lead judgment and reason astray. The time is not ripe for

LEAFLETS FROM THE AILANTHUS TREE.

such prodigious strides, and much effort is therefore expended to little purpose. A few such leaders will occasionally be found among plants, fore-runners, as it were, of future attainment, and here we have leaflets which as yet have not even attained to an individuality of their own, taking upon themselves the work which legitimately belongs to the senior members of the family; if we may designate a leaf as a little family, and the leaflets thereof the individual members. No. 8 is such a senior member; that is, instead of a terminal leaflet it is from the base of the leaf. It is better able to take up the burden of secondary division than the mere baby leaflets that have not yet learned to take care of themselves. No. 8, however, may also be classed with the reformers, but with that more reasonable class who are not entirely beyond the ken of normal vision.

Would we not, therefore, be led to draw this conclusion from what we have said (and, I trust, demonstrated), that pinnate leaves are developed by a division of the terminal leaflet: the bi-pinnate leaf is evolved from the pinnate by the division of the leaflets, normally beginning in the lower or basal leaflets? That this is the law of division which holds among the majority of pinnate leaves is quite commonly demonstrated and verified by the leaves of various plants. The leaves of the trumpet creeper furnish as good illustra tions of these various stages of transition as the ailanthus leaves.

There is but a slight point on the lower or outer portion of the typical basal leaflet of the ailanthus; this point is crowned with a small gland; here seems to be the starting-point of the new departure, which, according to the prediction of No. 8, will, in the course of time, result in the evolution of a bi-pinnate ailanthus leaf. This secondary division, as we have chosen to call the division of the lower leaflets, is illustrated abundantly by the common elder (*Sambucus canadensis*). So conspicuous, indeed, are the variations in the elder that it deserves a chapter on its own progressive efforts; it seems especially able to respond to favorable conditions.

MRS. W. A. KELLERMAN.
Columbus, Ohio.

SUGGESTIONS AS TO TEACHING BOTANY IN HIGH SCHOOLS.

THE teaching of botany in our colleges and higher schools during the last twenty-five years has had the unfortunate effect of bringing the science into disrepute, and of engendering in the minds of many who — as they would say — "took" it (like a dose of medicine), a thorough distaste for it. It is only within ten years that any radical change has taken place in the teaching ideals, and even to-day in many of the best institutions of learning, conservatism forces instruction into the old channels. The lower schools have travelled the same line, partly because they knew no better way, and partly because they were meeting the demands of the higher schools in the matter of preparation.

The radical defect of the older teaching lay in the failure to study the plants themselves; in the failure to treat them as living organisms; and in the failure to take into account the existence of other plants than the flowering ones. The ease with which plants could be collected and preserved by drying early led to the study of their external characters with a view to their classification alone. From the earliest times, therefore, almost to the present day, classification has been looked upon as the most important portion of the science of botany. Now, however, that the economic importance of the study of the physiology of healthy and diseased plants and of the causes of disease is coming to be more generally appreciated, it is high time that both in primary and secondary schools those portions of the science be taught which have a vital and vitalizing interest.

What Text-Book Shall We Use?

The first question that is usually asked is, "What text-book shall we use?" It is a difficult question to answer, and probably the best reply is, "Whatever text-book the teacher can use best." There is no book known to me which presents the subject in just the way that I consider most important. Probably the one of most general adaptability is "Gray's Lessons in Botany." If the teacher is capable of using them, either Bessey's "Essentials of Botany" or Campbell's "Structural and Systematic Botany" may be recommended. Wood's "Lessons in Botany," revised, is unfit for use on account of the numerous and misleading blunders which it contains. There should be in the school library, for reference, Gray's "Structural and Systematic Botany," Goodale's "Physiological Botany," Bessey's "Botany," and Goebel's "Outlines of Classification." Miss Newell's "Outline Lessons in Botany" will be found suggestive to the teacher who knows nothing of the method of study suggested herein.

The suggestions here made are based on the supposition