

BOTANY AND COMMERCE.

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"Mr. Toastmaster, ladies and gentlemen:—It strikes me that it is indicative of the times that on the occasion of a gathering of scientific men of the State of Illinois in your capital city, you should be entertained by the Chamber of Commerce of that city. Nothing more clearly indicates the recognition on the part of the commercial men who are making the higher life of our time possible, that they are themselves dependent for what they are doing on the results that the scientific experts are placing in their hands as tools to work with.

In a State like this, flowing with milk and honey, and a land which gushes forth its fatness if you break it, it would seem fitting that your first speaker should be a zoologist or a geologist, but I am delighted that you have selected a botanist as the first speaker,—for if corn is king anywhere in the world, he is certainly king in Illinois; and coupled with King Corn, making one-half of the great eight billion dollars' worth of national products poured into the national granary last year, a few of the other leading products are also vegetable.

I want to call attention, in passing only, to the fact that nearly all of human life is really dependent directly upon plants, and of course botany is concerned with the study of plants. A large part, an essential part, of our food comes from the vegetable kingdom. A very large and necessary part of what goes into the manufactures and the arts, and the essential part used in healing us, comes from the vegetable kingdom. After all, I take it you do not want me to analyze these, they belong not to the botanist but to the commercial man: it is an actual fact that that which is not patented no longer belongs to the person who brought it forth but belongs to those who know how to use it. But there are certain other

things that I do wish to present as still belonging to the botanist. They will belong, in the course of the generation now living, in almost equal part to commerce and manufacture. A generation ago a botanist traveling through the northwestern Canadian region made a casual observation of the trees and plants he saw growing there and found some plants that generally grow where wheat and corn are grown. To-day all of that northwestern country has been converted into one of the great wheat fields of the world. The way was pointed by a botanist, traveling through the country, looking at the vegetation alone. To-day there is never a question of introducing crops into a new district without first studying the life zone the district belongs to; and year by year the possibilities of agriculture are being increased, through simple observation of what animals and plants naturally grow in the region that the plants to be cultivated come from and that you propose cultivating them in.

There has been of late years an application of botanical knowledge in more than one commercial field, just as great, just as extensive as this. Your own state of Illinois is increasing enormously the product of that crop which is the domineering and dominating crop of this country—corn—by simple observation of, first, what constitutes good corn; second, how certain changes can be made in corn which will give it greater value; and, third, how those changes can be brought about. You are spending enormous sums of money; other states are doing the same. You are getting returns year by year for what you put in it, and the return is going to be increased on greater investment. It is not what you get this year but what you get as long as corn is cultivated—until others have, in some way, improved upon these gifts that are now being made. Our Assistant Secretary of Agriculture, while he was in Minnesota, was active in breeding a new variety of wheat. Five years ago that variety of wheat had increased acreage enough to give something like a million dollars added revenue. I might give other lessons pertaining not simply to field-crops; orchards, nut-bearing trees—it matters not what,

—everywhere the field is the same. If there is any use in growing plants, they can be improved.

A number of years ago in the neighboring State of Wisconsin it was shown how it was possible to treat seed oats in such a way as to reduce the loss from smutting of the oats. In Wisconsin alone, the saving through that practice amounts to more than the entire cost of operating the great University of that State; and it is not limited to the State of Wisconsin.

Every little while I have an opportunity to talk with a railroad man, and he tells me about the terrible problem that cross-ties and structure-timbers present. White oak sticks that a few years ago were being cut down for cross-ties are now becoming available for cabinet-wood purposes. To-day tie-sizes are too valuable to be so used. What the future is to be is very much of a question. Of late years the same attention has been given to this problem as to those of plant breeding and of protection against fungi, in the treatment of timber as a practical means of preservation, and Dr. von Schrenk, and the people who have worked with him in the conservation and careful handling of timber have done more than we, to-day, realize, in enabling us to leave standing on their own roots the trees that are going to be absolutely needed for construction in a very short time.

If it were not for the botanists who studied the Cinchona tree and who discovered how it could be planted and, cultivated profitably, we should to-day stand in much greater dread of malaria than we do, because quinine is derived largely from trees planted in the Old World, originally from New World derivatives. To-day, we do not know where to turn for that indispensable article we have in hand at all times—the lead pencil, and as for India rubber, this is narrowing down to such an extent that it is hard to tell where it is going to come from. Gutta-percha is absolutely essential for electrical wiring and electrical construction. Botanists are at work the world over studying the origin of every kind of gutta and gum that can be applied to these industries, and cultivation is going to

bring into the market of the future just the same sort of relation that the cultivation of *Cinchona* has done.

Bacteria are moot creatures; call them animals if you choose; call them plants; but the botanist still looks on them as plants. If it were not for what students have learned of this group of plants we should have no such thing as rational sanitation or aseptic surgery. In a dairy the quality of butter and cheese depends on these lowly creatures; and what has been made out about them is still unfinished. More and more, scientists in this line are going to bring practical returns in dollars, with the decimal point moved away off to the right. Soil fertility comes in the same category. One of our American botanists, Dr. Moore, giving attention to the minute creatures, algæ, which grow in fresh water everywhere, made a discovery which has enabled any community in this country which has polluted water to purify it. I might give you a dozen other illustrations; but I do not mean to take more time for illustrations; it is unnecessary: I trust the few I have selected are such as to show you that the botanist is worth something to commerce, to the manufactures and arts.

But this botanist is not the botanist who picks flowers to pieces and quarrels over the shape of a stamen. He is the botanist who, looking to see what there is in the first place, takes scientific interest in the next, and turns himself to that; and then turns to see what there is of practical utility in the discoveries that have been made, and makes them directly available for human progress. The man who breeds better plants to grow in your gardens and along your streets, and who has the faculty of the book-agent or the tree-seller of making you buy them and use them, is a man who is doing a great deal for the community in which he operates.

In conclusion I would like to say that the world to-day is absolutely dependent on the standing and pulling together of individuals and organizations of men. We have gone so far in our civilization that it is impossible for one of us to stand by himself on his own feet and carry along all that he ought to be able to carry along. It is in the touch of elbows and

the stimulus of marching side by side that our advance is to be found. You commercial gentlemen are making money. You are dependent on the investigator for the power of making money in the way in which you want to make it. The investigator is dependent upon you for the power of investigation. Investigation is what some people think of as being in a class that is of no value or interest to mankind; but our civilization rests upon it. What we are going to do in the next fifty years is going to amount to more than what we have done in the last fifty years. The fruit of abstract scientific study must be applied through schools of experience, through engineering and through practical schools; and that is exactly the course that things are taking. I take it that there is not to-day a single field of science which affords to the commercial and industrial world such great opportunities of wealth as the science of botany does. I do not except chemistry. The time is ripe now for developing each one of these fields I have spoken of as fields of abstract investigation and of applied instruction. The *time* is ripe for it. Our children are going to the operetta "The Time, The Place and The Girl." The question is where "The Place and the Man" for this happy co-ordination are to be found."
