avoided when possible. There must, however, always be questions affecting the national welfare which it is undoubtedly the function of the general government to investigate. The study of contagious diseases of man and animals, involving as it does questions of quarantine and other sanitary regulations, which may affect any or all the States, and the study of plant diseases, however caused, and the means of prevention, are good instances of the kind of work which should be undertaken by the national government, for they are of such eminently practical nature and so general in their application that it is important that the government should have constantly in its service experts capable of studying them and of giving at short notice information that may be needed. The theoretical aspects of the subjects mentioned and the study of certain special cases may profitably be undertaken by private or State institutions, but the resources and authority of the general government are needed for the obtaining and spreading of information and the enforcement of preventive or remedial measures. It is an important duty of our universities and scientific schools to train up a body of young men capable of entering the different governmental bureaus as scientific experts, that is to say in the lower grades, for it is not supposed that without a more or less lengthy active service in the bureaus themselves one would be prepared to fill the higher positions. In Germany there seems to be no difficulty in finding among the graduates of universities and technical schools well-trained young men for the scientific establishments of the government. If things are not in so satisfactory a state here it is due, in part, to the very rapid enlargement of the scope of government work in recent years, and there is no reason to suppose that before long the supply of well-trained young men will not equal the demand.

In my remarks this evening I have felt free to state what, to the best of my knowledge, seems to be the condition of our scientific organization, especially in our universities; but in what I have said I have endeavored merely to describe the situation viewed generally, and, if I have taken this occasion to refer to some points in which our system might be improved, I have done so without reference, either expressed or implied, to any institution or locality, but because I cannot help feeling that a plain statement of certain difficulties from which many, if not most of us, suffer is the first step to be taken if we are to expect improvement. I have described the older German universities as generous rivals in the promotion of knowledge. From conditions beyond our control we are at present in a condition of unrest and feverish ambition, each university striving, on insufficient means, to do all that any other university is doing. When shall we become cool-headed enough to do well and thoroughly what our means permit, and wait patiently for the time when we can expand farther without too great tension or attenuation of the resources now at our command?

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INHIBITING ACTION OF OXIDASE UPON DIASTASE.

IN the disease of the tobacco leaf known as Calico, or Mosaic, the lighter-colored areas are found to contain more starch in the form of granules than do the green areas of the same leaf. This is very peculiar, inasmuch as the chloroplasts of the light-colored areas are evidently in an unhealthy condition.

In an article published in the *Centralblatt für Bakteriologie*, II Abt. Bd. V., No. 22, I have pointed out the fact that these light-colored cells exhibit much more oxidizing activity than do the green cells of the same

leaf. The light-colored areas were found to correspond with the light-colored patches produced by insect punctures, certain fungi, and especially in that group of diseases known as variegation or albinism.

All these cases show a greater amount of oxidizing enzymes (oxidases as well as peroxidases) in the light-colored tissues. Mainly upon this evidence I was obliged in the article mentioned to differ from most other writers on the disease in question, in calling the lighter-colored tissues diseased, and the deep green patches, especially along the veins, healthy. It is true that much tobacco is apparently normally as light colored as the light-colored areas in the diseased leaf, but, on the other hand, there is quite as much which is normally as green all over as the green areas in many of the diseased leaves. It is true that some of the green patches, especially where the light-colored areas are unusually light, are abnormally green. A study of the histology of the diseased leaves has now revealed a histological difference which makes it very clear that the light-colored areas are not normal, and this difference consists in the fact that in badly diseased plants the palisade parenchyma of the light-colored areas is not developed at all. All the tissue between the upper and the lower epidermis consists of a spongy or respiratory parenchyma rather more closely packed than normal. In moderately diseased plants the palisade parenchyma of the light area is greatly modified. Normally the palisade parenchyma cells of a healthy plant are from four to six times as long as broad. In a moderately diseased plant, however, the cells are nearly as broad as they are long, or at most not more than twice as long as broad. As a rule, the modified cells of the leaf pass abruptly into the normal cells of the green area. In a badly diseased leaf simply looking across the surface with the naked eye shows depressions where the light areas occur, or where the leaf is mostly diseased the dark green patches are raised above the general surface.

The cells of the diseased area also translocate their starch with difficulty, the cells often becoming completely gorged with this material. The examination of the diseased spots early in the morning shows only a small decrease in the starch content of the cells from that present the previous afternoon, while the green, healthy tissues either contain no starch or contain only traces of it. It was thought that possibly the increase of oxidizing enzyme might either inhibit the production of diastase by the cell or inhibit the action of diastase upon starch. In order to settle this point strong solutions of tobacco oxidase were prepared, and after heating some of the solution to the boiling point, thus killing the oxidase, comparisons were made by adding 10 milligrams of taka diastase in solution to each of the tubes of juice to be tested. Equal quantities of freshly prepared potato starch paste were then added to each tube and the tubes kept at 45 degrees Cent. It was found that in the solution without oxidase the starch was completely converted into sugar in thirty minutes, while the solutions in which the oxidase was active only carried the change of the starch to the erythrodextrin stage. The action of the diastase of malt added in solution in the same quantity was somewhat less rapid than that of taka diastase, but the relative effects were exactly the same: the presence of the oxidase in the solution had a marked inhibitory action upon the activity of the diastase.

In these tests the proportion of diastase to oxidase was much greater than occurs even in the diseased cells, so it is likely that the inhibitory action of the oxidase in the cells is much greater than that shown in the tests outside of the cells.

It would seem a warrantable conclusion, therefore, that the tardiness in the trans-

location of starch in the diseased area is to be explained by the abnormal activity of the oxidizing enzymes of these cells, and that the mode of this action is by retarding or weakening the activity of the translocation diastase. This would also help to explain the slower growth of the diseased cells.

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*THE MEXICAN HALL OF THE AMERICAN MUSEUM OF NATURAL HISTORY.**

WHEN the Europeans first set foot in Mexico, they were met by a numerous people who had become settled into nations, and had developed a civilization which was astounding and incomprehensible to the conquering adventurers. The antiquity of this American civilization was so great, and it was so widely spread over Mexico and Central America, that there still remains a vast accumulation of materials exemplifying the daily life of the people. Hundreds of temples and other large and elaborate structures and sculptures in stone, which were connected with the ceremonials of an all-pervading religion fostered and maintained by priests and rulers, stand as monuments of this ancient civilization.

Several distinct phases of this culture resulted from modifications by different tribes with distinct languages and customs. In Mexico proper the most powerful nation was that of the Nahuas, commonly known as the Aztecs. Their principal seat was in the Valley of Mexico, but by migrations and conquests they left their imprint in various parts of Mexico and Central America. The other prominent cultures of this ancient time in Mexico are attributed to the Tarascans in the States of Michoacan and Jalisco, the Zapotecans and the Mixtecans in the State of Oaxaca, and the Totonacans in the State of Vera Cruz. The great southern development, in many ways the highest phase of this American civilization, is attributed to the Mayas. It extended from the State of Chiapas on the north, through Yucatan and Guatemala, to northern Honduras, where in the Copan Valley it probably reached its highest development.

From the time of the conquest by Cortes this ancient civilization on the American Continent has been a wonder and a mystery. Some of the Spanish priests and native writers following the conquest left accounts of the people and their customs, from which the student of to-day is obtaining important information; but it is only during the present century that serious research has been directed to the study of this remarkable phase of American archæology. The publication, by Stephens in 1841, of the volumes containing illustrations by Catherwood of the ruins in Chiapas, Yucatan and Central America, first aroused attention among English-speaking peoples to the ruins of these ancient cities of America with their strange sculptures. From that time this interest has been increasing, and during the last decade systematic exploration and research have led to many important discoveries, the beginnings of definite knowledge concerning the origin and development of this past American civilization.

It was in furtherance of this research that the American Museum secured from the Government of Mexico the right to explore the ancient ruins in that country. It was for this object that Mr. Lorillard provided the means for Charnay's expedition to Yucatan and other parts of Mexico. It was this incentive that led Mr. Thompson to take up his abode in Yucatan, and that induced Dr. and Mrs. Le Plongeon to pass years of arduous labor in that country. For this purpose the Duke of Loubat sent

* Opened on December 12, 1899.