

at the British Medical Association were veritable triumphs.

His final seventeen years at the New York Public Library were the culmination of his laborious and distinguished life.

Samuel D. Gross, Weir Mitchell and Billings were by all odds the most widely known American medical men in the last half of the nineteenth century.

Dr. Garrison's book is delightful. He is judicious in his selection from Billings's Letter and Addresses. His style and his general review of the various stages of Billings's development and of his character and personality leave nothing to be desired. The only regret I have is that he takes as I think a backward step in using the archaic and superfluous "u" in labour, endeavour and their similars.

W. W. KEEN

#### SPECIAL ARTICLES

##### EFFECT OF COLORED LIGHT ON THE MOSAIC DISEASE OF TOBACCO

IN connection with extended work on the mosaic disease of tobacco in this section of the Connecticut Valley, it was found that plants grown under shade or tents appeared to be much less affected with the mosaic disease than those grown in the open. This fact had previously been noted by Sturgis<sup>1</sup> in Connecticut, and the writer, in conjunction with other work on this disease, outlined experiments relative to a study of light conditions on the intensification or reduction of the disease.

While the writer's preliminary work was in progress, his attention was called to a paper by Lodewijks<sup>2</sup> published in 1910, which dealt with the effects of colored light on mosaic diseased plants. As a result of his experiments Lodewijks stated that a cure was effected by blue light; red light diminished the disease,

and suffused light checked it somewhat. This is not the place for an extended discussion of his methods of experimentation, but in brief it may be stated that the diseased leaves of the plant were enclosed in a cloth hood of the desired color, the apparently healthy basal leaves remaining uncovered and exposed to normal daylight. After some time the hoods were removed and the plants examined for symptoms of the mosaic disease. The results obtained, if substantiated, would be of great interest and value. In order to satisfy himself the writer duplicated in so far as was possible the work of Lodewijks, employing the same methods and cloth hoods of approximately the same texture as those used by him in his experiments. The hoods were allowed to remain over the plants for thirty days; at the end of this period they were removed and the plants carefully examined for visible symptoms of the disease. The results obtained were in brief as follows:

The plants covered with the red cloth hoods showed a diminished color variation between the light and dark green areas of the diseased leaves, and all new growth showed a more or less pronounced mottling. After remaining a week exposed to normal daylight, all the new growth was badly diseased. Healthy plants inoculated with juice from the treated leaves became diseased in from ten days to two weeks. Control inoculation remained healthy. From the above results it may be stated that there is a diminution in color variation in diseased leaves, not of a permanent character, however, and the active principle of the disease remains very virile and highly infectious.

Similar experiments carried on with blue cloth hoods gave the following results: On three plants after thirty days' treatment no visible symptoms of the mosaic disease were observable, although there was a slight tendency towards curling noticeable on a few leaves of the new growth. One other plant, however, showed a slight mottling on two of the young leaves. Two weeks after the hoods were removed, the first three plants did not show any marked symptoms of the mosaic disease other than a faint mottling of a few

<sup>1</sup> Sturgis, W. C., "On the Effects on Tobacco of Shading and the Application of Lime," Conn. Agr. Exp. Sta. Ann. Rept. 23: 252-61, 1899.

<sup>2</sup> Lodewijks, J. A., Jr., *Zur Mosaikkrankheit des Tabaks*. Rec. Trav. Neerlandais, Vol. 7, 107-29, 1910.

leaves. The fourth plant developed mosaic again, but not as seriously as before treatment. Healthy plants inoculated with the juice of leaves from the first three plants contracted the disease almost without exception, as they did from the fourth plant, which showed the disease. Here we have a case of *apparent* recovery, but the plants still contained the active principle of the disease in a very infectious form. The percentage of infection from these plants is given below:

From plant No. 1, 8 healthy plants developed 6 cases of mosaic in 18 days, 75 per cent.

From plant No. 2, 8 healthy plants developed 8 cases of mosaic, or 100 per cent.

From plant No. 3, 10 healthy plants developed 9 cases, or 90 per cent.

From plant No. 4, which showed a slight trace of the mosaic, 100 per cent. infection was secured.

These results show that when blue light is used, there is a suppression of the leaf color variation more or less permanent in character, the treated plants with one exception showing no typical symptoms of the disease for at least two weeks subsequent to the removal of the hoods. It can not be said, however, that the disease was controlled, as inoculation of healthy plants with juice from diseased leaves produced the trouble in nearly every case. The active principle of the disease was still present in apparently normal, fully recovered leaves, and was highly infectious.

These experiments were repeated and the same results obtained in practically every case. They do not entirely harmonize with the results obtained by Lodewijks, but do in so far as the plants under the blue hoods showed an *apparent* recovery; but as Lodewijks, so far as the writer is aware, did not try any re-inoculation experiments, he overlooked the fact that the active principle might still be contained in the leaves and that it might be capable of transmission. This is clearly shown in the above experiments, and there is no doubt that the active principle of the disease is still present in plants treated in this manner. It is evident that the treatment of plants as above recorded does not destroy the

active principle, whatever may be its character, the treated leaves apparently still containing it, very probably in the same manner as do parts of the plant which do not show visible symptoms of the disease normally, such as the stem, lower leaves and roots—the juices of which are often highly infectious.

More detailed results of these experiments are to be published later in connection with a report of work on the mosaic disease of tobacco as carried on at this station.

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MASSACHUSETTS AGRICULTURAL  
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### THE NATIONAL ACADEMY OF SCIENCES

At the annual meeting of the Academy to be held on April 17, 18 and 19, the program of the scientific sessions will be as follows:

Auditorium, National Museum. Public scientific session for the reading of papers.

*On Permeability of Endothelia:* S. J. MELTZER.

*The Influence of Morphin upon the Elimination of Intravenously Injected Dextrose:* I. S. KLEINER and S. J. MELTZER.

*The Sex of a Parthenogenetic Frog:* JACQUES LOEB.

It seemed of interest to determine the sex of frogs produced by artificial parthenogenesis. The first experiments in this direction by Loeb and Bancroft had been made on a frog and a tadpole of about four months old. The gonads of both sexes contain eggs at that age and it was only with approximate certainty that the sex of our parthenogenetic specimens could be determined. As far as we were able to judge the sex in the two cases referred to was male. The writer has since succeeded in keeping a number of parthenogenetic frogs alive for about one year and one of them was recently killed and the gonads sectioned and examined. They were found to be testicles containing well-developed spermatozoa. This confirms the former statement of Loeb and Bancroft that the frogs produced by artificial parthenogenesis are males.

*Finer Mechanisms of Protection from Infection:* SIMON FLEXNER.

The biological phenomena associated with recovery from bacterial infections among animals remained largely unexplained until the era which