Notes on Indigestible Structures in Articles of a Vegetable Diet.

By John S. Wright.

Many articles of a vegetable diet, especially those which are consumed in a crude or raw state, contain tissue elements which pass through the alimentary canal without losing their identity. Examinations of fecal matter show that all of the tissue elements from parenchyma to sclerenchyma may under various conditions pass through the entire digestive tract almost unaltered so far as general character is concerned. In some diseases of children and in disorders of the digestive organs it is necessary to make fecal examinations to complete the diagnosis. In several such cases which have come to my knowledge the presence of these vegetable cells has given rise to considerable speculation, particularly where the physicians were not familiar with plant histology.

In one case the presence of what afterwards proved to be parts of orange pulp was very perplexing; in another the attending physician was concerned over the repeated occurrence in the stools of shredded or fibrous matter. As the patient, a man, was being treated for dyspepsia, he was of the opinion that these fibres resulted from the epithelial layer of the intestines. On submitting them for examination, they proved to consist wholly of tracheary tissue, mostly pitted vessels. In his examination, the physician had taken each pit to represent an animal cell. On inquiry it was learned that the patient, during the time his feces contained this material had eaten freely of small, fibrous sweet potatoes, which were likely the source of these pitted vessels. The above and other cases have suggested to me that further histological studies of the common articles of our vegetable diet would prove of practical value from both the medical and botanical standpoint.

The Action of Mercury and Amalgams on Aluminum.

By Geo. W. Benton.

Some Field Experiments with Formalin. By Mason B. Thomas.

At the last December meeting of the Academy we made a preliminary report on the effects of formalin on germinating seeds. As stated at that time, the experiments were conducted in the greenhouse, where all of the

conditions could be properly controlled and the best results secured. This work was intended to be preparatory to the field experiments to be tried early in the following spring.

The field experiments made with corn and oats were so striking that their results warrant publication and general application in the dealing with the smut of these two cereals. The laboratory experiments showed that the seeds of various plants would allow of only a special treatment with a certain definite strength of solution. The results of these tests gave us a basis for our field experiments and made this part of the work much easier.

The experiments of last year showed that wheat can safely be treated with a one-fourth per cent. solution of formalin for one-half hour, oats with a one-half per cent. solution for three hours and corn with a one-half per cent. solution for one hour, without interfering with their germinating powers.

The field experiments were tried with oats and corn on the farm of Mr. Henry Davidson near Whitesville, Ind. The oats to be treated were soaked for one-half hour in a one-half per cent. solution of formalin and then, without drying, sowed broadcast and the field dragged. Untreated seeds were sowed in a plat of ground alongside of these, and careful records made of the developments. The seeds in the two plats germinated at the same time and showed, so far as early appearances were concerned, no differences as a result of the treatment. The mature plants of the treated seeds were slightly smaller than those of the untreated ones, but the amount of grain produced was the same in both cases, except for the difference occasioned by the presence of the smut.

Upon ripening, the plants of the untreated seeds showed six per cent. of smutty heads, while none of the plants of the treated seeds had even a trace of smut about them, thus vindicating the value of formalin as a fungicidal agent.

In the experiments tried with corn, the seeds were soaked in a one per cent. solution for one hour and then dried in the sun. This treatment was more severe than that found advisable in the laboratory experiments. As a result the seeds were somewhat delayed in their germination and in some cases the plumule was not visible above the ground until two or three days after all of the untreated ones, planted in a corresponding plat alongside of these, had made their appearance. This inequality between the plants of the two plats was not of long duration and at maturity no

difference in size and development could be detected between the plants of the two plats. Of the plants from the untreated seeds two per cent. were attacked by the smut while none of those of the untreated seeds showed any signs of the fungus. These results with corn show the possibilities in this direction. Of course infection during the growth of the plant would not be prevented by this treatment. The treatment is not difficult, and the actual expense for the cost of material is not over six cents per acre.

Comments on the value of formalin as a fungicide are not necessary in view of the facts as presented.

Extensive arrangements are being made for experiments the coming spring on ground that has in years past produced crops showing a loss of from forty to sixty per cent. from smut.

The Resistance of Cereal Smuts to Formalin and Hot Water.

By William Stuart.

In connection with some studies on the comparative merits of formalin and hot water in the prevention of smut in wheat and oats, the subject of the resistance of the smut spores when treated separately was considered of sufficient importance to warrant investigation. The smuts of wheat and oats were selected from the fact that these two cereals are the only ones of economic importance in the State which it is possible to treat successfully for smut. While it is possible to kill the spores of corn smut by treating the seed, it affords no guaranty that the plants will be free from smut. This is owing to the fact that the method of infection by corn smut is unlike that of the other two cereals, inasmuch as the corn plant is liable to infection at any point where there is young, growing tissue, and at any stage of its development.

In order to test the relative resistance of smut spores as compared with the grain itself, separate lots of each were treated side by side in the same solution.

The smut spores used were those of the loose smut of wheat and oats. These were obtained from a quantity of smutted heads collected last summer from badly infected fields. When required for use the smutted por-