PRESERVATION OF MONOTROPA AND SIMILAR PLANTS WITHOUT DISCOLORATION.

J. A. NIEUWLAND and A. D. SLAVIN, University of Notre Dame.

We have been asked on several occasions whether plants like Monotropa, which blacken on drying, could possibly be kept with their natural color when preserved in various solutions.

In attacking the problem we surmised that the black color, which did not resemble that which developed on decay or decomposition, was really some plant dye which developed when the plant dried, and if so, the pigment giving the plant its characteristic white color was present as a leuco form of coloring matter which, when left in the presence of air or other substances containing oxygen, was oxidized to become black. With this assumption plants were placed in preservative solutions to which a reducing agent had been added. Sulphur dioxide from sodium acid sulphite has often been used in bleaching colors and dyes, and it was thought that possibly it would reduce the color here too. Our first guess was correct and it was found necessary only to keep the plant permanently in a free sulphur dioxide solution of a preserving fluid. It seemed necessary that the acid sulphite be used only in a medium that does not react to destroy the sulphur dioxide. As long as this latter is present in excess the plant may be kept in alcohol or even in xylol.

The first method and the one which gave the best results was as follows: specimens of the plant were placed in test tubes and the tubes filled with alcohol until the plants were submerged. About one-half a gram of sodium sulphite was added and finally about one-half cubic centimeter of concentrated hydrochloric acid. The tube was then lightly stoppered and shaken. Although the amounts of sodium sulphite and acid were varied slightly, the quantities mentioned above gave the best results. After a period of about two months no discoloration could be noticed. In using alcohol as the primary preservative it was found that there was an excess of sodium sulphite present which formed a cloudy precipitate whenever the tube was agitated or inverted. To obviate this, the tube was left so that the precipitate settled and the liquid was then filtered off. In this way a saturated alcoholic solution of sulphur dioxide was obtained. Finally the specimen was sealed in the tube after replacing the alcohol with xylol, and a little alcohol having sulphur dioxide present, if greater transparency was desired.

Several other methods were tried and gave varying results. Sulphur dioxide in camphor solution was also added to the alcohol or xylol in which the specimens were to be kept. In some cases the specimens darkened after being in the solution but a short time, while others

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which had been slightly discolored were whitened after being placed in the solution. The amount of camphor solution used ranged from two to twenty drops. Due to the fact that camphor dissolves over three hundred times its weight of sulphur dioxide gas, it is necessary to take but a small amount to obtain the required quantity of the reducing agent. Camphor-sulphur dioxide mixture is not as good as the first solution, inasmuch as the camphor in time removes the gas apparently, by reacting with it.

Attempts were also made to bleach some of the discolored specimens. This was done when none other than discolored specimens were obtainable. Chlorine water and Javelle water were used with interesting results. In these experiments the plants were placed in a solution of alcohol and the chlorine solution added in varying degrees. When more than one cubic centimeter of chlorine water was added it was found that the plant lost its black color, turned yellow, and finally became macerated. More dilute solutions bleached the plants to various degrees. Javelle water seemed to have little effect except in cases where the plant was discolored but a very little. This was undoubtedly due to the fact that no acid was added to the solution to force the evolution of chlorine gas. In some cases specimens bleached by chlorine were sealed in preservatives containing sulphur dioxide. They have retained their whiteness for several months. The chlorine, of course, bleaches the dye found in colored plants, and there is no purpose in using it unless only old darkened plants are at hand. With clean, white specimens available the first method suffices to attain the results desired. Although no work was done with fungi, it is reasonable to believe that the methods described might prove quite satisfactory.