It appears from results so far obtained here that Atropa Belladonna can be successfully cultivated in Minnesota, if due care is taken in the germination of seeds and the handling of young plants. The development of perfectly hardy strains, however, is a matter which will take much experimenting and careful study. The results of this work point out a number of other lines which must be followed up before certain questions can be answered and much work will need to be done before the cultivation of Atropa Belladonna is a commercial possibility for Minnesota.

REFERENCES.

[1]Borneman—Amer. Journ. Pharm., 1909, Vol. 81, p. 1.
[2]Schneider—Proc. A. Ph. A., 1909, p. 833.
[3]Tschirch—Pharm. Era, November, 1911.
[4]True—Proc. A. Ph. A., 1909, p. 827.
[5]Rippetoe—Proc. A. Ph. A., 1909, p. 834.
[6]Schneider—Proc. A. Ph. A., 1909, p. 833.
[7]Tschirch—Pharm. Era, November, 1911.

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CRUDE GELSEMININE AND ITS POSSIBLE CONSTITUENTS.

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In reports of the proceedings of this section there will be found, for several years past, a record of a continuous series of experiments, which have given a clearer conception of the nature of that uncrystallizable alkaloid, named by Thompson *Gelseminine*.

In the last paper, the writer reported that from this alkaloid could be extracted another which, if finally proven to exist, he would name *Gelsemoidine*. It was suggested that this Gelsemoidine could be separated from Gelseminine by alkaline solvents—the former being soluble, the latter insoluble in such a solution. Our work this year, upon a new lot of drug (50 pounds) has given us an opportunity to collect more of this crude alkaloid, Gelseminine and study it more thoroughly.

Fifty pounds of the drug were extracted first with Petroleum Ether, the drug dried and exhausted with 95 percent alcohol. The alcohol percolate was concentrated to soft extract in a vacuum. This soft extract was extracted with benzol (using a total of 4000 cc.) after the addition of 75 cc. 26 percent ammonia solution. The benzol extractions were washed out with 5 portions (300 cc. each) of 2 percent H_2SO_4. The acid solution shaken with four portions (500 cc. each) of chloroform to remove the so-called Gelsemic Acid (3.9 gm. of crude acid were recovered.)

The purified acid solution (after making alkaline) was shaken out with ether-chloroform (5 to 1) using 2000 cc. in all. The filtered solution was then concentrated in vacuum to small volume and set aside. Crystals of Gelsemine Hydrochloride (5.6 gm.) were deposited. The supernatant liquid would not crystallize on further concentration, but left a gummy mass (13 gm.) of Thompson's Gelseminine hydrochloride.

It should be stated in passing, that the dregs (drug exhausted with alcohol, above referred to) were again extracted with KOH solution. This alkaline percolate was washed with chloroform, and the chloroform solution put through a similar treatment as above. It was found that the alcohol-menstruum failed to exhaust the drug, as about 1.5 gm. each of Gelsemic Acid and Gelseminine were obtained, in addition, by this process.

The above Gelseminine Hydrochloride (crude) was taken up for special investigation. Previous study of this uncrystallizable alkaloid indicated that it was composed of two alkaloids, one soluble, the other insoluble in weak alkali. (See report of, in Jour. Amer. Phar. Asso'n. May, '12). This method of separation (by the use of alkaline solvent) was repeated and the two (supposedly different) alkaloids were separately purified, and then tested with the usual alkaloidal reagents for identification. To my surprise exactly similar color reactions were obtained. The characteristic color reaction for the purified alkaloid being: with manganese dioxide and sulphuric acid it gives a violet color which soon changes to dark green and finally to a dark blue, remaining about two hours.

If the alkaloid is impure by containing even a small quantity of Gelsemic Acid or Ammonium Chloride the above reagents give a reddish purple color which changes to a green and, in about five minutes, to a dark brown color. This is worthy of note, as one may be tolerably sure of the elimination of these impurities when this latter color reaction disappears. These impurities are very likely to contaminate the product, therefore it is a useful test.

The fact that these two seemingly separated alkaloids gave similar color tests led to the suspicion that they might be the same. Physiological tests confirmed this suspicion. On redissolving the portion (supposedly insoluble in alkaline solvent), denominated Gelseminine, in acidulated water precipitating again with ammonia, and persistently washing again the fresh precipitate it finally yielded to the solvent action. This fact naturally leads to the conclusion that if there be two alkaloids in Gelseminine the method of separation proposed is not practicable as one is soluble with difficulty and the other is also soluble in alkaline liquids. That there are two alkaloids in this amorphous substance is confirmed by the investigation of C. W. Moore of Burroughs and Wellcome Laboratory, (see Jour. Chem. Soct'y. Nov. 1910, No. LXXVII, p. 2223). This author, as quoted in a former paper, affirms the existence of two amorphous alkaloids besides the crystalline Gelsemine, in gelsemium. He says one of these has more basic properties than the other. I shall endeavor to obtain his method of separation so that I may test them physiologically.

Further experiments with the amorphous gelseminine have shown, what was not before suspected, that its salt, hydrochloride, is partly soluble in ether and in chloroform. Hence any acid solution of the alkaloid washed with the immiscible solvents to remove Gelsemic acid and extraneous matter, will take out appreciable quantities of this active ingredient.

Our thanks are here expressed to Chas. Vanderkleed of Mulford and Company for the crude extractions.