

yield of only 4 percent in plants from number 10, and 9 percent in those from number 17, and 8 percent on soils 3 and 5 in plants from number 13. After allowing 5 percent for experimental error there is little difference in favor of soil influence in the foregoing instances. The results as a whole indicate that further work is necessary on the influence of soil composition upon medicinal plants, before any generalizations can be made. The second experiment indicates that seasonal variations in alkaloidal percentage may have to be investigated more thoroughly. In this instance the percentage of alkaloids in the control plants increased nearly as much as in the fertilized plants. Also the influence of the two fertilizers, though apparently slight, seem to be identical with reference to the percentage of alkaloids. It is believed that there have been considerable sources of error in most of the work upon soils and fertilizers. It is desirable in this respect to first locate these sources of error and then attempt to eliminate them before proceeding further upon the problems of soil composition.

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 FURTHER STUDY OF THE ALKALOID GELSEMININE.

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In previous papers read before this Section by the writer on the alkaloids of Gelsemium, it will be seen that there has been a progressive study of the uncrystallizable alkaloid, named by Thompson, Gelseminine.

The attempt has been to bring this alkaloid into such a state of purity that it will be available for making an ultimate chemical analysis.

The present year's work has been that resulting from an investigation of the alkaloids from 50 pounds of the crude drug. From this 50 pounds, there was obtained in an unpurified condition 21.5 gms. of Gelsemic acid, 75.7 gms. of crude Gelsemine and 36.4 gms. of crude Gelseminine, making in all 112.1 gms. of crude alkaloids and 21.5 gms. of crude Gelsemic Acid.

The effort in the present year's investigation was to purify the gelseminine for physiological testing and for the comparison with the alkaloid gelsemine. It should be stated in passing that hitherto we have found it very difficult to rid gelseminine absolutely from the contaminating impurity, gelsemine. We have found the separation of the two alkaloids to be made more complete by treating the crude gelseminine hydrochlorid first with alcohol which separates out most of the gelsemine hydrochlorid. The alcoholic extractive resulting from the evaporation of the alcoholic filtrate is now re-dissolved in acetone and a further separation of gelsemine hydrochlorid is possible.

By treating the extract resulting from the evaporation of the acetone solution of gelseminine hydrochlorid with water and precipitating the solution

with a slight excess of ammonium hydroxide, the precipitate, after washing, is dissolved in diluted sulphuric acid, and re-precipitated with ammonium hydroxide and the resulting precipitate washed until free from sulphates. This precipitate, when dried in a desiccator was a light brown powder apparently free from resinous and gummy material. This was the product mentioned in the physiological experiments in the following paper.

Since Dr. Chillingworth's experiments, we have been able to further purify gelseminine and we have separated this substance into two parts,—one more highly colored and weaker, the other very much lighter and stronger in physiological action.

During the next year, we shall continue this investigation and have strong hopes of bringing the so-called gelseminine into such a state of purity that it may be analyzed for its elementary chemical constituents.

The gelsemine used by Dr. Chillingworth was a purified product resulting from the purification of the alkaloid obtained from this year's lot of drug. It was perfectly white, and apparently free from any of the uncrystallizable coloring matters or uncrystallizable alkaloids.

PHYSIOLOGICAL STUDY OF GELSEMINE AND GELSEMININE.

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In this paper I will adhere strictly to the physiological action of the alkaloids of gelsemium. For the chemistry and preparation of these active principles consult F. A. Thompson,¹ L. E. Sayre,² E. D. Reed,³ Kimberly, Robertson and Vanderkleed,⁴ and L. E. Sayre.⁵

We will first take up the physiological actions of gelsemine and gelseminine in detail and later will draw our conclusions.

Throughout these experiments two standard solutions were used (one of the active principle gelsemine and the other of the active principle gelseminine) so made that one cubic centimeter of the solution equalled .001 gram of the alkaloid.

Our results though not extensive enough to serve as a basis for far reaching conclusions, nevertheless are of enough importance perhaps to add to the observations of others, and we hope suggest certain lines of experimentation which might be followed up to good advantage.

The two standard solutions referred to above were prepared for us by Prof. L. E. Sayre, Dean of the School of Pharmacy at the University of Kansas. This being the first time that the two alkaloids of Gelsemium have been successfully isolated in the pure state.

The literature on the action of these alkaloids is very confusing and unsatisfactory. Prof. C. Binz, of Bonn, is by far the clearest on this subject and we cannot do better than to quote in brief: "Gelsemium paralyzes the motor centers of the brain as well as the respiratory center in the medulla oblongata. Sen-

¹Thompson, F. A.: *Phar. Era*, 1887, page 3.

²Lloyd Library: Sept., 1910.

³*Proc. A. Ph. A.*, 1908, page 855.

⁴*Jour. A. Ph. A.*, 1912, April.

⁵*Jour. A. Ph. A.*, 1912, May.