alkaloidal reagents, but which exhibit no basic properties, are present. These substances are undoubtedly responsible for the claims by others that alkaloid is present in the drug.

4. The pharmacological activity of poke root is due to at least two different principles, one or more being soluble in water, the other being soluble in alcohol and insoluble in water. The water-soluble principle or principles appear to be responsible for the strongly irritant properties of the drug, while the alcohol-soluble resin-like principle is responsible for the ascending depressant action on the cerebro-spinal axis of cats.

5. The fixed oil (7) of poke root, extracted by petroleum benzin, proved to be devoid of significant pharmacological activity.

6. Procedures by which the following substances were isolated from aqueous extracts of dried and fresh poke root are given: Hemicellulose, isosaccharic acid (m. p. 185° C.), gum, resin, oxalic acid, potassium oxalate and saponin. The isosaccharic acid probably did not exist as such in the plant, but was formed during the treatment of the lead subacetate precipitate of the gum.

7. Starch was obtained from the expressed juice of fresh poke root. The clear juice did not reduce Fehling's solution, indicating the absence of free reducing sugars.

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A NOTE ON THE STABILITY OF ERGOT.*

BY L. W. ROWE.

In connection with our recent report on the definite stability of digitalis activity in the crude drug form (1) even when the drug is not stored in air-tight and light-tight containers, it is believed that similar data concerning the stability of *ergot* as crude drug might be of interest. The opinion has prevailed even in scientific circles that these two drugs are relatively unstable and this has resulted in the inclusion in the U. S. P. XI (2) of the following requirement for the storage of ergot: "Preserve Ergot under all conditions of storage and transportation in water-proof and air-tight containers."

Undoubtedly, in the case of ergot at least, the published opinions of Rusby (3, 4, 5) have been partly responsible for the prevalent idea that the drug must be very carefully stored and it is probably true that that drug which has been allowed to mold or has been infested with insects will not be of average potency in addition to being unsuitable from the purely physical standpoint. It has been our experience that it is not necessary to store the drug in air-tight and water-proof containers, but that storage in such a way as to keep the drug reasonably dry is sufficient to

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insure its stability. In connection with this question of stability, the following experimental data is of interest.

A sample of Spanish crude drug ergot which had been originally selected for display purposes about 1912, was kept on the laboratory shelf in a 16-oz., glass-stoppered bottle. It was undoubtedly of full standard activity for *Spanish* drug although it bore no identifying number. It had been subject to light but not direct sunlight and to room temperature in addition to some slight interchange of air since the glass stopper was not paraffined and the bottle was opened occasionally. Some ten years ago when the sample of drug was about 15 years old a U. S. P. fluidextract was prepared from a small portion of this sample and its activity determined by the cock's comb bioassay by a procedure similar to that now official in the U. S. P. XI but compared to U. S. P. X standards. The assay showed a potency of at least 80% to 100% of standard.

Six months later a retest of this same experimental fluidextract showed its activity to be fully 80% of standard so the second test served as a check on the earlier one and also that the fluidextract from this drug was reasonably stable in activity.

Now in 1936 when this sample is well over 20 years old (probably nearly 25 years old) two experimental fluidextracts were made from small portions of it and the results of the tests are as follows:

A U. S. P. fluidextract made after defatting the drug in the usual way tested 100% of U. S. P. XI standard by the official method while a fluidextract made without first defatting the drug showed an activity of 120% of U. S. P. XI standard. The apparent *slight increase* in activity during the past ten years is not at all significant since it is within the experimental error of the assay method. These two assays certainly confirm the opinion that the activity of this particular lot of drug has remained remarkably stable over a long period of time (over 20 years) and under conditions of storage that were very ordinary and certainly very different from the rigid conditions of storage required by the U. S. P. XI.

More recently two additional lots of crude drug that are not quite so old were retested with the following results. Both were ground and extracted with the official menstruum without first defatting since it was felt that there is always the possibility of a small amount of activity being removed by the defatting process. Drug No. 276581 which was fully U. S. P. when received fifteen years ago was now found to be nicely 100% in activity. Drug No. 353478 which was also fully U. S. P. when received four years ago was now found to be 110% of U. S. P. XI standard in activity. No. 276581 had been stored for the entire eleven years in a cork-stoppered, clear-glass flask in a laboratory case and so had been subjected to ordinary light and room temperature. No. 353478 had been stored for the four-year period in an ordinary paper sack and so had been subjected to room temperature and humidity changes in the atmosphere during that period.

The moisture content of the samples was determined since the U. S. P. XI sets an upper limit of 8% of moisture on ergot crude drug. The results on four samples are as follows:

25-year old sample	4.25%
No. 276581 (15 yrs. old)	4.41%
No. 353478 (4 yrs. old)	3.91%
Portuguese (4 yrs. old)	4.94%

These results indicated that all four samples are well below the limit set by the U. S. P. for moisture. The only significant fact is that the sample which was really open to the air (kept in a paper sack) was lowest of the four in moisture.

The fact that these three old samples of varying age, stored under ordinary conditions are still equal in activity to the present high U. S. P. XI standard for ergot as crude drug should be strongly indicative of a remarkable stability of potency. These tests should show that the conditions of storage of ergot crude drug as made mandatory in the U. S. P. XI, namely, in water-proof and air-tight containers, are not necessary. They are undoubtedly included because of the known instability of the average extract of ergot and of drug which has been allowed to mold but they place an unnecessary burden upon the importer and the manufacturer who know how to store the drug under proper but ordinary conditions.

It appears that keeping ergot dry is a sufficient protection of activity and that the U. S. P. requirements for storage may well be changed by interim revision to "Preserve ergot under all conditions of storage and transportation in a dry place."

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THE ASSAY OF THEOPHYLLINE, THEOPHYLLINE MONOETHANOLAMINE AND THEOPHYLLINE WITH ETHYLENE DIAMINE, U. S. P.*

BY ASA N. STEVENS AND DALE T. WILSON.[1]

A few years ago it became necessary for this laboratory to examine the available assay methods for the determination of theophylline. Of the various methods studied two appeared to offer possibilities. These were tried and the following observations were noted.

Kochum (1) described a volumetric method with 0.1*N* $AgNO_3$ using potassium dichromate as an internal indicator. The results obtained by this method varied so widely, due to the inconsistency in the end-point of the titration, that the method was abandoned.

Schmitt (2) used a gravimetric method, recommending silver ammonium chloride as the reagent. The results were found to vary unless the silver chloride precipitation was carried out in a dark room and, further, that a difference of 0.5 mg. in the weight of the silver chloride obtained made a difference of 1.11 per cent in the results.

Finding these methods unsuited to our purpose an attempt was made to develop a more satisfactory procedure. As a result of this investigation the following method is proposed.

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