In an attempt to duplicate the natural condition in the body, stone D was placed in the large tube. An equal number of drops of the hydrochloric acid solution and urine obtained from the patient, were then allowed to flow through a tube and drop on the stone. This made approximately a 0.06 percent solution of hydrochloric acid acting on the stone till it was dissolved, which took about 48 hours.

From the experiments which we have reported, we feel justified in making the following statements:

First, that a 0.06 percent solution of hydrochloric acid will dissolve phosphatic stones.

Second, that the length of time the solution is in contact with the stone is a more important factor than the rate of flow.

In a limited way we have already demonstrated that acid eight times the strength of that to be employed clinically has no deleterious effect in the pelvis of a dog's kidney. Furthermore, we have used the acid in 0.5 percent solution in one patient with phosphatic diathesis and not only did no harm but accomplished excellent temporary results. Finally, in the treatment of renal infections, we have in scores of cases irrigated the pelves with silver nitrate varying in strength from 1 : 1000 to 5 percent and with formaldehyde solution varying in strength from 1 : 5000 to 1 : 1000. This is an accepted and highly effective treatment for this condition. Certainly the mild hydrochloric acid solution—less than ($^1/_8$ of 1 percent) will prove no more irritating than these pungent solutions. If it be objected that the process required a continuous hydrochloric acid drip lasting perhaps through several hours, we will reply (with a citation of cases if necessary) that we have conducted a continuous formaldehyde irrigation of the renal pelvis lasting from 3 to 24 hours and the patients have not only survived the treatment but recovered as a result of it.

Summed up in a word, we are satisfied that in expert hands the method will prove harmless, and if time permits we propose to put it to immediate clinical use. Only the results of its application in a series of actual cases will determine unequivocally whether it deserves the consideration it now appears to demand or whether it will eventually find its way to the therapeutic scrap-pile.

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A NEW METHOD OF EXTRACTING DRUGS FOR ALKALOIDAL ASSAYING.*

BY WM. MASKE, JR.

In brief, the U. S. P. method for extraction of most drugs for alkaloidal assaying consists of macerating a weighed portion of the drug in an alkaline solution of ether, chloroform, or a mixture of the two for a certain length of time; then pouring off an aliquot part of this extractive.

There are some things in this method of extraction which all chemists will admit are undesirable, if a satisfactory method of improving them can be obtained.

* Read before Scientific Section, A. Ph. A., Indianapolis meeting, 1917.

In the first place, we have no means whereby we can easily test whether or not the crude drug has been completely extracted of its alkaloidal constituents; and, in the second place, the use of aliquot parts has always been considered a makeshift, and it is particularly so in alkaloidal assaying, since the moisture content of the drug and the addition of ammonia water produce changes in the volume of the extracting solvent which cannot but help to make the assay somewhat inaccurate.

The following method devised by the writer overcomes both of these errors; it is simple, and will be a useful remedy to the aliquot part method. There are only two things standing in the way of it; first, the method takes a longer time. Although the actual time that it takes is longer, yet it requires no more work on the part of the operator than the U. S. P. process. Secondly, the liquid with its extractive from the crude drug must be a very limpid one; hence the liquid used for extracting the drug must be ether, chloroform, or one of similar limpidity; and the drug itself must contain no fatty matter, or anything else that will impair the limpidity of the menstruum.

This new method of extraction is carried out as follows:

Into the stop-cock orifice of a separatory funnel there is inserted a wedge-shaped piece of purified cotton, to act as a filter but at the same time not be too slow in acting as such; a little experience will enable one to know just how tightly to have it fit. Both ends of the piece of cotton are cut off flush with the surface of the stop-cock, and the ends are slightly pushed in with a blunt instrument. The stop-cock is then wiped off with a clean towel so as to remove all cotton fibers, and finally reinserted into the separatory funnel. In selecting a separatory funnel for this process be sure to get one in which the stop-cock orifice has a fairly wide bore. No cotton fiber must be left on the plugged stop-cock or the apparatus will leak.

The drug to be assayed is weighed out. Less drug is needed than by the U. S. P. method. The amount of drug taken is not the amount used in the U. S. P. but the amount of drug that the aliquot part used for shaking out represents. Place this drug into the prepared separatory funnel and add half the amount of solvent directed in the U. S. P. method. The amount of solvent need not be accurately measured; it need only be approximate. Stopper and shake thoroughly; then add the amount of ammonia directed by the U. S. P. Shake every five minutes for one hour. Then pour about 10 Cc. of solvent around the rim of the funnel so as to wash any drug adhering to the sides into the menstruum. Stopper and let stand over night.

Then open the stop-cock and stopper and allow the extractive to filter off into another separatory funnel. When most of the filtrate has run off and it begins to drop slowly carefully add about 10 Cc. of the extracting liquid and let this filter off. This process of displacement is continued in 10 Cc. portions until a few drops of the filtrate evaporated to dryness and dissolved in 1 Cc. of $N/10$ HCl does not give more than faint opalescence with an appropriate alkaloidal precipitant. The combined filtrates are then made acid and the assay continued as given in the U. S. P.

In addition to overcoming errors, this method uses less drug, and usually less solvent than the U. S. P. method of extraction. In order to show that this method gives higher and better checking results than the U. S. P. process in practice as well as in theory, the following results are appended here. In eight assays of belladonna root, four carried out by each method of extraction, the results were as follows:

By the U. S. P. method of extraction the percents of alkaloids ran as follows: 1.59 percent, 1.69 percent, 1.56 percent, 1.64 percent. By the new method of extraction 1.66 percent, 1.71 percent, 1.66 percent, 1.65 percent. In eight cinchona assays carried on in the same way the results ran as follows: By the

U. S. P. extraction method, the percentage of alkaloids was 6.31 percent, 6.28 percent, 6.41 percent, 6.24 percent. By the new extraction method, 6.37 per cent, 6.39 percent, 6.34 percent, 6.40 percent. In another assay of cinchoma, the writer took two samples, each five grammes, from the same batch of cinchona and got the same weight of alkaloid from each down to the fourth decimal place. This is the only perfect check that he has ever obtained in the hundreds of alkaloidal assays that he has run.

This method of extraction is applicable to all U. S. P. alkaloidal assays of crude drugs except colchicum seed, colchicum corm, opium and physostigma.

UNIVERSITY OF WASHINGTON,
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SOME POSSIBLE PHARMACEUTICAL USES OF PARA-DICHLORBENZENE.

A PLEA FOR THE USE AND FURTHER INVESTIGATION OF A BY-PRODUCT RESULTING FROM THE WAR.

BY W. A. KONANTZ.[1]

In the chlorination of benzene at ordinary temperatures, about 85–90 percent of monochlorbenzene and 10–15 percent of dichlorbenzene, chiefly para, are produced. At the present time enormous quantities of benzene are being chlorinated, for it has been found that picric acid can be made more cheaply from monochlorbenzene than from phenol. At the same time, however, large quantities of dichlorbenzene are accumulating, for which there is very little demand. For the complete success of this most valuable process of manufacturing picric acid, it is necessary that uses be found for the dichlorbenzene. Owing to the firmness with which the chlorine atoms are attached to the benzene nucleus, *p*-dichlorbenzene does not enter readily into chemical reactions, and all attempts to convert it into other commercially valuable compounds have so far been unsuccessful. The physical properties of this substance are such, however, that the writer believes it may prove of considerable value in pharmacy. Some possible pharmaceutical uses which have occurred to the writer are here described, in the hope that pharmacists and manufacturers will try them out and so help to solve the problem of utilizing this by-product.

From the viewpoint of the pharmacist, the most valuable property of *p*-dichlorbenzene, and the one upon which most of its pharmaceutical uses will undoubtedly be based, is its powerful destructive action on certain lower forms of life. Galewsky, who studied the relative efficiency of many substances as moth exterminators,

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