suprarenal glands of varied strength and origin, is likely to contain impurities that are inherent in the process of manufacture, and is also likely to undergo partial racemization with a consequent decrease in both optical and physiologic activity.

Aside from this, scientific progress has been along the lines of synthesis. No sooner has a natural product of therapeutic value been discovered, than attempts are made to isolate it to determine its chemical constitution and ultimately to synthesize it. We have such examples in suprarenin and thyroxin (the active principle of the thyroid gland). The isolation and synthesis of insulin would no doubt create a furore in the scientific world and would be a boon to humanity. Once the synthesis of a natural product is achieved, the medical and pharmaceutical professions are assured of a uniformly pure product which may be prepared at a price low enough to permit of its more general use.

In spite of the large amount of work which has been done on epinephrin, considerable progress can still be made in the field of research. Available data are still lacking regarding the exact relative physiologic activity of the two optically active components of racemic suprarenin. Also the field is still open for the synthesis of new derivatives which may be equal or superior to suprarenin and still be easy of manufacture.

We have recently described the preparation in our laboratory of three new derivatives of suprarenin which have unusual chemical interest and which may have valuable, physiologic properties. These new compounds which are at present under investigation are ethers of suprarenin in which the secondary alcoholic group is involved. Further research work is now being carried out in our laboratory on the chemistry of suprarenin and various compounds related to it.

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THE ALKALINITY OF MAGMA MAGNESIÆ AS DETERMINED BY THE HYDROGEN ELECTRODE.*

BY R. B. SMITH AND P. M. GIESY.

Since the U. S. P. method for the determination of free caustic in Milk of Magnesia does not always appear to give reliable results, it was decided to investigate the p_H of Milk of Magnesia of various degrees of purity with a view to finding some more reliable method which would give reproducible results under all conditions.

Milk of Magnesia which had been thoroughly washed but which still contained an excess of water was found to have a p_H of 10.33. After slightly diluting the milk with water, the magnesium hydroxide was washed four times by decantation, centrifuging each time to effect settling. After the fourth washing it was diluted and boiled and allowed to cool in a stoppered flask. The p_H of this material was found to be 10.37.

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* Scientific Section, A. Ph. A., Asheville meeting, 1923.

The above material was again washed four times in the same manner except that it was diluted until with each washing about twenty times as much water was separated as there was solid which remained in the tube. After the last washing this material was boiled and cooled; the p_H was found to be 10.51.

The results of these tests were as follows:

Before washing	p_H = 10.33
After four washings	p_H = 10.37
After eight washings	p_H = 10.51

Twenty-five cc. of 45% NaOH was added to 350 cc. of the original material and the p_H determined to be 13.31.

This material was diluted with three volumes of water and washed twice by centrifuging, the solid material being removed from the tube after each centrifuging in order to thoroughly mix it with the next wash water. The washing was continued until the material gave a constant p_H.

The results were as follows:

	p_H
Before washing	13.31
After 2 washings	11.52
After 4 washings	10.49
After 6 washings	10.23
After 7 washings	10.20

The p_H of Milk of Magnesia can be calculated quite closely from the solubility and solubility product of Magnesium Hydroxide.

The p_H of a concentrated Milk of Magnesia was determined to be 9.96. To 30 cc of this solution three drops of concentrated HCl was added. This is equivalent to about 0.15 cc. The p_H was then lowered to 9.32. Concentrated HCl is about 13 normal so that the molar concentration of $MgCl_2$ would be

$$\frac{0.15 \times 13}{2 \times 30} = 0.0325$$

Since the p_H value of this solution containing three drops of concentrated HCl was 9.32, its p_{OH} was 14.12 − 9.32 = 4.80. This is equivalent to an OH concentration of 1.60×10^{-5}. Calculating the solubility product we have,

$$K = 0.03 \times (1.60 \times 10^{-5})^2 = 7.68 \times 10^{-12}$$

In a solution of pure $Mg(OH)_2$ the concentration of the OH ion will be twice that of the Mg ion, or if x = concentration of the Mg ion, K will equal $4\,x^3$

$$x^3 = \frac{7.68 \times 10^{-12}}{4} = 1.92 \times 10^{-12}$$

$$x = 1.243 \times 10^{-4} = 0.1243 \times 10^{-3}$$

The concentration of the OH ion will be twice this value or 0.2486×10^{-3}. This corresponds to a p_{OH} of 3.61 or a p_H of 10.51.

Since the milk used had an original p_H of 9.96, it evidently contained some Mg salt. If the amount of this is calculated in a similar way, and allowed for in the calculation of the p_H of pure magnesium hydroxide suspension, the final value is raised only 0.01 of a p_H unit, to 10.52.

The p_H values obtained above were obtained electrometrically using a saturated KCl calomel electrode.

There is very good agreement between the p_H as calculated from the solubility product and the p_H of purified Milk of Magnesia which had originally contained a slight excess of magnesium salt. We are unable to explain the value obtained by washing out an excess of caustic soda and this matter is being further investigated.

The electrometric method is more delicate than the U. S. P. titration method for free caustic, and we believe that the U. S. P. standard should be based on the p_H of the Milk of Magnesia rather than on any titration value.

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THE STANDARDIZATION AND STABILIZATION OF ACONITE PREPARATIONS.*

PAPER I.

BY E. E. SWANSON AND A. L. WALTERS.

I. INTRODUCTION.

The standardization of aconite preparations by the present official chemical method U. S. P. IX Revision has been found to be unreliable. Rudolph and Cole,[1] Robinson,[2] Haskell[3,4,5], Haskell and Zirkle,[6] and others found considerable variation and inconsistency in the potency of aconite preparations, when assayed chemically and biologically. Aconite contains several alkaloids of variable pharmacological action and toxicity, but similar in chemical properties toward solvents and precipitants. Therefore the chemical method indicates the total ether-soluble alkaloids, including aconitine, which is regarded pharmacologically and therapeutically as the important alkaloid. Considering aconitine as the active therapeutic principle of aconite, and noting its high toxicity in comparison to the other alkaloids, particularly benzoylaconine and aconine, it seems to the writers that a lethal dose assay would furnish a method for testing the therapeutic efficiency of aconite, and that aconitine crystals could be used as a standard.

II. METHOD OF ASSAY.

Such a method has been developed by the Scientific Section of the American Drug Manufacturers' Association in which the writers have had a part. The method and its results have been published by Dohme,[7] Chairman Committee on Aconite of the Scientific Section of the American Drug Manufacturers' Association.

* Scientific Section, A. Ph. A., Asheville meeting, 1923.