

few years ago with Miss Okey, we wished to verify a specimen of emodin by a determination of the carbon and hydrogen content. Following the ordinary combustion procedure, the specimen was burned in an atmosphere of pure oxygen using copper oxide in the combustion tube. The copper oxide was heated to a white heat. Under these conditions, we found an orange-red sublimate in small amount in the absorption train which indicated that a portion of the material had passed over this white hot copper oxide in an atmosphere of pure oxygen and had undergone little, if any, change.

E. L. NEWCOMB: Some one has pointed out that "black hearted" Rhubarb yields a product which contains a larger amount of anthraquinones than does solid fresh rhubarb. There is another point that has not been mentioned heretofore. The astringent properties possessed by Rhubarb bear an important relation to its therapeutic value. Possibly the anthraquinones, glucosidic in nature, are in combination with the tannins. At any rate, no method which measures merely the laxative properties and does not take into consideration the astringent values will fully estimate the value of the drug. The importance of these compounds should be considered in connection with the work on this drug.

E. N. GATHERCOAL: Dr. Beal was asked to present this paper at the Conference because it represents a type of unsolved problem in connection with Pharmacopœial Revision that should be brought to our attention; the problem of the valuation of drugs. Perhaps in Europe and America during the last decade or so, more research work has been done on the determination and estimation of the active principles of the anthraquinone drugs than upon any other drug or group of drugs. Dr. Beal has splendidly presented the problem. Fortunately, the anthraquinone drugs, if properly prepared, are likely to be of uniform quality and are not liable to deteriorate, but rather, perhaps, tend to improve upon aging.

MR. WARREN: Whether the anthraquinone reactions really do evaluate this group of drugs, or even can be relied upon to detect these drugs, is a question that has arisen in connection with certain problems. I recall that at one time, a certain compound medicine was claimed to contain cascara, but I could not, after repeated trial, obtain any identifying reactions. Yet there was no question but that the therapeutic properties fully indicated cascara.

REPORT OF THE SCOVILLE ORGANOLEPTIC METHOD FOR THE VALUATION OF CAPSICUM.*

BY ELMER H. WIRTH AND E. N. GATHERCOAL.

The Scoville Organoleptic Test offers a simple and fairly accurate means of determining the approximate pungency of a given sample of Capsicum. Although it possesses to a certain degree the limitations of all organoleptic tests it may be considered as being of greater value than the average in as much as it depends upon the sensation of pungency rather than on the sense of taste. This greatly eliminates the personal equation so prominent in the great majority of organoleptic tests. Experiments with unknown samples on students show a fairly consistent check as to results and the factor due to personal equation is quite constant.

The test itself as proposed for the U. S. P. is as follows: mix well 1.0 Gm. of the powdered capsicum in 50 cc. of alcohol in a stoppered flask and macerate for 24 hours. Dilute 0.1 cc. of the clear supernatant liquid with 140 cc. of a 10% solution of sugar in distilled water. Five cc. of this solution swallowed at once will produce a distinct sensation of pungency and taste of capsicum in the mouth and throat.

The pungency of capsicum is generally conceded to be due to capsaicin. This test therefore sets a standard for the minimum amount of capsaicin permissible in

* Read before the Unofficial Conference of U. S. P. and N. F. Revision Workers at Chicago, January 12, 1924.

the official drug and requires that a dilution of 1 part of the capsicum powder in 70,000 parts must give the characteristic pungent sensation.

This immediately suggests that a slight modification of the test would make it applicable as an analytical method to determine the approximate percentage of capsaicin in a given sample of capsicum. By preparing a series of graduated dilutions and performing the test on each, the greatest dilution still giving the positive pungent reaction can readily be selected. This can, of course, be considered only as an approximate value as there are undoubtedly some limitations. The degree of pungency is difficult to detect within certain limits. The element of fatigue also enters into the operation, and succeeding experiments must not be undertaken until the pungent sensation of the previous experiment has entirely disappeared. As a whole the method gives satisfactory results, and these results confirm what we have always believed, namely, that the larger the fruits of different species and varieties of capsicum, the less their degree of pungency.

Some rather interesting experiments were prepared for the unofficial meeting of the members of the Revision Committee and those interested in pharmacopœial work, at Chicago, January 12, 1924. Three samples of chillies were submitted by Dr. E. L. Newcomb, the samples being from plants grown in the Medicinal Plants Garden of the University of Minnesota during 1923. These with two other samples of chillies selected from the museum of the School of Pharmacy of the University of Illinois were submitted to the Scoville test, the dilutions having been prepared previous to the demonstration. Those present who tried the test confirmed the results which were as follows:

Sample 1. Red Cluster Chillies, U. of M. Garden 1923. A fruit from 2 to 3 times the size of that of African chillies.

Sample 2. Mombassa Chillies, U. of M. Garden, 1923. Grown from the seeds of true African Chillies.

Sample 3. Japan Chillies, U. of M. Garden 1923. A fruit almost twice the size of that of African capsicum.

Sample 4. Japan Chillies, U. of I. Museum. A fruit similar to Sample 3.

Sample 5. African Chillies, U. of I. Museum. A true African capsicum.

Sample 6. Capsaicin, Bureau of Chemistry sample.

I. The test as outlined in the proposed Capsicum Monograph.

Sample.	Dilution.	Result.
1.	1-70,000	No pungent sensation evident.
2.	1-70,000	Distinct pungent sensation evident.
3.	1-70,000	No pungent sensation evident.
4.	1-70,000	No pungent sensation evident.
5.	1-70,000	Distinct pungent sensation evident.

II. The test as modified to determine the approximate pungency of the samples.

The samples were diluted until the sensation of pungency was approximately the same for all.

Sample.	Dilution.	Sample.	Dilution.
1.	1-45,000	4.	1-45,000
2.	1-70,000	5.	1-70,000
3.	1-55,000	6.	1-10,000,000

The results are self-explanatory and show the rather interesting fact that home-grown capsicums are not inferior to imported ones. The fact that Sample 3 shows a greater pungency than Sample 4 would tend to show that the converse was really true. This cannot be accepted as final, however, as we have not proved the botanical source of the samples.

As a whole, however, the experiments prove conclusively that there is a variation in pungency between chillies of different sizes and different botanical sources, and that it is advisable to include only African Chillies in the Pharmacopœia. The Scoville test shows itself readily adaptable to detect this variation in pungency, and due to its simplicity and relatively accurate results, its inclusion in the Capsicum monograph is fully warranted.

HYPOCHLORITE SOLUTIONS.

BY RUTH M. DAVIS AND H. A. LANGENHAN.

(Continued from p. 133, February JOURNAL A. P. H. A.)

(NO. 3) TECHNIQUE OF LABARRAQUE'S SOLUTION.

The method of preparing the solutions of sodium hypochlorite has proved to be important in controlling the strength of the finished product. There are two different methods founded on the materials used, *viz.*, that of passing chlorine gas into alkali solution, and that of mixing a solution of chlorinated lime with a solution of sodium carbonate, sodium bicarbonate, sodium sulphate, or sodium phosphate.

The two methods are basically the same, varying only in small but important details, and these are best noted by reviewing the changes in formula in chronological order.

Durand gives a description of the first method or Labarraque's original process, that of passing chlorine gas into a solution of "subcarbonate of soda." This process consists, first, in the preparation of the "sodium subcarbonate" solution which was to be exactly saturated and must "mark 12 degrees on Baume's aerometer for salts." The chlorine was to be made in the following manner: The sodium chloride and manganese dioxide were placed in a "matrass." "Apply a cork to the mouth of the matrass and place it on a furnace. A hydrostatic funnel for the introduction of the acid is adapted to the cork as well as a safety tube, bent at a right angle, and plunging by its extremity into a Woulfe bottle with two necks, containing water, destined to wash the chlorine. From the second neck of the bottle emerges another safety tube, whose extremity plunges in the bottle containing the solution of carbonate of soda." Introduce the acid into the hydrostatic funnel and place a few "ignited coals under the matrass, and raise the temperature gradually, until the disengagement of chlorine ceases." This should be continued until "one part of the chloride would discolour eighteen parts of sulphate of indigo."

Faraday did not change Labarraque's method, but he passed the chlorine through the wash bottle into the sodium carbonate solution just so that "no carbonic acid was set free." Payen introduced the second type of manipulation. His method consisted in mixing "dry chloride of lime" with twelve parts of water, letting the liquor settle during three hours, in closed vessels, filtering and washing the dregs with two parts more of water, then dissolving the "soda" in the remainder