

to impress the right ideals and practice in the premises. While no exact time can be defined as the maximum for the preparation of chemic evidence, the general principle may be laid down that it requires so much time and expert skill that fees at least ten times as large as those demanded for the best commercial work should serve as the base price; and that, as with lawyers, physicians and surgeons, the chemists' time and skill should be further rewarded according to his demonstrated efficiency.

Sixthly, experts have often brought discredit upon themselves and their kind by attempting to carry their testimonies as experts beyond that field in which they are strictly qualified as experts. The courts are also to blame for this. The public is beginning to perceive that the present chaotic condition of affairs in governmental inquiries into the effect of sodium benzoate upon the public health is due to this cause. Since the two views so prominently before the public are essentially contradictory, the public knows that at least one view is false—and the shrewd suspicion has arisen that neither side has proved its case. No better example could be given of the frailty of the principle of the rule of the Expert Overlord; nor of the good that would ensue should these opposing experts be placed in such a position that their contentions would have to be conducted and decided under the admirable and orderly process of our American judicial procedure. Let us hope that some great lawsuit will come to clarify this now hopelessly entangled condition of one of the most important economic and hygienic problems in the world today.

THE RATE OF DISINTEGRATION OF PILLS.

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During the past year we have been asked to determine the fitness for medicinal use, of a number of samples of old pills. As a first step in this investigation it was decided to ascertain their rate of disintegration, since it is generally believed that old pills disintegrate, if at all only very slowly.

We endeavored to make the conditions of our experiments as favorable at least as those existing within the human body. In order to secure continued action from the disintegrating solution the pills were placed in wire cloth baskets and suspended in test-tubes about one-half inch below the surface of the 20 cc. of solution. These test-tubes were placed in a water bath and a temperature of from 37° to 38° C. maintained throughout the experiment. The pills were rubbed gently with a glass rod about every five minutes to note the progress of disintegration as well as to simulate the action of the muscular coats of the digestive organs. The effect of this manipulation with the glass rod was subsequently ascertained to have shortened the time of disintegration about 20%.

Two disintegrating liquids were used: No. 1, an aqueous solution containing 2% of pepsin and 0.25% of hydrochloric acid, and No. 2 distilled water. The results given are the means of several trials. The maximum variation in any case was not more than 10% of the mean result. The samples examined were

forwarded to us in their original containers and through the courtesy of the manufacturers we are able to give in a number of instances the date of manufacture. The results obtained together with such other data as might influence the rate of disintegration is given in the following table:

Number	Kind of Pill	Av. time for disintegration in minutes		Kind of Coating	Average Diameter in Mm.	Average Weight in Mg.	Date of Mfg.	Supply sufficient to last (in years)
		Pep. Sol.	Wat.					
1	Emmenagogue	60	55	Gelatine	7.7x4.9	140		
2	Morphine Sulph., 1-8 gr.	20	14	Gelatine	3.1	26		
3	Iron Strych. & Arsenic tab.	15	9	Sugar	6.1x3.3	140		
4	Acetan. & Quin. Comp. tab.	12	9	Sugar	10 x5.4	420		
5	Antimalarial tablets	79	69	Chocolate	10.6x4.7	430		
6	Creosote Comp. tablets	30	42	Chocolate	9x4.1	310		
7	Opium, ½ gr. tablets	30	28	Sugar	7.3x3.5	150	1897	233
8	Hinkle's Cascara Comp.	77	68	Sugar	6.6	220		
9	Morphine Sulph., ⅛ gr.	14	10	Sugar	4.9x3.5	50		
10	Cathartic	84	79	Gelatine	9.5x6.5	270		
11	Strychnine, 1-20 gr.	24	21	Gelatine	4.2x2.9	40	1890*	230
12	Camph. and Opium., 3 gr.	76	72	Gelatine	9.2x5.9	230	1890*	25
13	Asafetida	180	150	Gelatine	9.4x6.2	280	1899	23
14	Ichthyol, 1½ gr.	180	170	Gelatine	8.6x4.9	180	1890*	32
15	Aloes and Iron	61	62	Gelatine	9.4x6.3	270	1890*	32
16	Warburg's Tr.	67	67	Gelatine	9.8x6.3	260	1891	32
17	Antidyspeptic	65	70	Gelatine	8.8x6.1	270	1889	30
18	Warburg's Tr.	86	80	Gelatine	8.9x5.9	230	1890*	46
19	Strychnine Nitrate, 1-40 gr.	27	27	Gelatine	4.2x3.2	40	1890*	43
20	Morph. and Atrop.	18	13	Gelatine	4.5x2.9	50	1889	24
21	Anti Chill	160	530	Gelatine	9.2x6.7	330	1890	35
22	Aphrodisiac	77	66	Sugar	9.3x6.6	340	1890*	25
23	Strychnine Nitrate, 1-30 gr.	25	25	Gelatine	4.5x3.1	30	1899	120
24	Arsenious Ac., 1-20 gr.	23	22	Gelatine	3.9x2.8	40	1890*	87
25	Nitroglycerin, 1-50 gr.	26	22	Gelatine	4.2x3.2	40	1890*	53
26	Hepatic	71	65	Gelatine	9.2x6.8	360	1890*	67
27	Calomel, ¼ gr.	25	20	Gelatine	3.9x2.7	40	1890*	420
28	Pep. Bi. and Strych.	79	77	Gelatine	9.5x6.3	340	1890*	46
29	Strych. Comp., 2 gr.	54	52	Gelatine	8.4x5.6	200	1888	39
30	Morph. Sulph., ⅛ gr.	25	26	Gelatine	4.5x2.9	40	1902	25
31	Opium, 1 gr.	51	45	Gelatine	6.8x4.1	90	1890*	25
32	Ergotin, 2 gr.	59	64	Gelatine	9.5x7.2	370	1886*	56

*Made prior to date indicated.

A little more than 50% of the pills were more rapidly disintegrated in water than in pepsin solution. It was thought that the colloidal nature of the pepsin might have been responsible for this but repeated experiments with the solution to which 4% of peptone had been added failed to confirm this opinion. In only one instance, Anti Chill pill No. 21, did the kind of coating make any material difference in the rate of disintegration in the different liquids. This pill had a thick coating of gelatin and required 530 minutes in water or nearly four times as long as in the pepsin solution. Fifty-six per cent. of the pills in pepsin solution and 53% in water were disintegrated within 60 minutes and in each solution 90% were disintegrated within 90 minutes. In most of the cases where disintegration was slow the therapeutic nature of the pill was such that this was not seriously objectionable.

In conclusion it may be said that our results tend to show that the rate of

disintegration depends primarily upon the composition, size, and coating and that the age exerts only a slight influence. These samples were collected from twelve different drug stores, and assuming the demand to be the same in the future as in the past it is interesting to note that the original supplies would be sufficient to last from 23 to 420 years.

NOTE ON CAPSICUMS.

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For many years pharmacists have appreciated the fact that different varieties of ginger vary in pungency and flavor, but that capsicums vary in the same way and to a much greater extent, seems to have escaped attention.

The pungent principle of Capsicum is capsaicin, a crystalline body which E. K. Nelson says is so hot that one drop of a solution 1 in 1,000,000—or less than one-millionth of a grain—will make itself known to the tongue. He found one variety of capsicum to contain 0.14% of this principle.

H. C. Irish in a "Revision of the Genus Capsicum" describes 42 garden varieties and quotes authorities to the statement that the different varieties readily degenerate or change under cultivation or the lack of it. Hence the pungency of capsicum varies not only with the species, but with variations in growth or cultivation. Paprika, one of the mildest forms, has been grown quite free from capsaicin—in short, a non-peppery pepper. And while Tabasco by another name might be quite as hot, yet the Tabasco species may not always come up to its reputation.

In other words, the pharmacist cannot, by specifying a certain species of capsicum, be sure thereby of securing the most active medicinally. The best method of selection appears to be the physiological test—which will be referred to again below.

In commerce the greater demand for capsicum is as a condiment, and for the preparation of sauces, pickles, etc. In these a full rich flavor is desired as well as pungency. Supplies for such purposes are marketed as "Japan Chillies," "Zanzibar Chillies" and "Mombasso Chillies." Doubtless there are other brands, but these appear to be the leading ones. A limited number of tests on these three brands shows that Japan Chillies have a very rich and full flavor, but are not very pungent, as compared to the others. They command a higher price, and make a superior condiment. Zanzibar Chillies came next in pungency and flavor, and Mombasso Chillies are the most pungent and the poorest in flavor.

Physiological tests are tabooed in some quarters, yet when the tongue is sensitive to less than a millionth of a grain it certainly has an advantage over the analytical balance, which has a sensitiveness far below that, and since it is not necessary to compare different capsicums in terms of percentage of capsicum, when a direct ratio of drug to drug expresses all that is needed, the physiological test offers here a ready and satisfactory means of selecting capsicum.

¹Journal Ind. and Eng. Chem., 1910, page 419.

²Report Mo. Bot. Gardens, 1898, page 53.