

heat for five minutes. Strain and weigh 1,200 grains into a wide-mouthed bottle with a rubber cork, and when cooled to 130° add the phosphorus. Cork and shake well until the fat begins to solidify. This mass contains one per cent. of phosphorus. Another useful formula is as follows:—

R Phosphorus 1 gr.
Chlorof. pur 50 grs.
Pulv. althæa 80 grs.
Pulv. acacia 1 scr.
Glycerine 2 scr.
Aqua 1 scr.

Proceed by dissolving the phosphorus in the chloroform, mix the powdered althæa and acacia in a mortar, add the solution of phosphorus, then the glycerine and the water; work into a mass, and divide into 100 pills. They should be varnished with tolu at once. Carbon bisulphide is often used as a solvent for phosphorus, the mass being made up powdered liquorice and glycerine of tragacanth. When phosphorus is prescribed in combination with other ingredients, a convenient method is to use a base of definite strength and of a suitable nature, such as that prepared with suet in the following manner:

Phosphorus..... 10 grs.
Carbon bisulphide 50 m.

Dissolve, and add prepared suet 90 grains. Mix thoroughly and allow the bisulphide to evaporate. This base contains 10 per cent. of phosphorus, and may be combined with iron, nux. vomica, or quinine, &c.

To be continued.

What Constitutes a Drop?

BY A. E. PHILLIPS.

"THE size of drops varies from various causes, of which the nature of the liquid, the size and shape of the vessel from which dropped, the extent to which the lip is moistened and the rapidity of dropping, are the most important."—*Parish*.

"Small quantities of liquid medicines are often administered by drops, each of which is usually considered equivalent to a minim, or the sixtieth part of a fluid-drachm. The drop of water and watery fluids, is, sometimes about that size; but the same is by no means the case with all medicinal liquids, and the drop even of the same liquid varies much in bulk, according to the circumstances under which it is formed. This is, therefore, an uncertain mode of estimating the quantity of liquids, and should be superseded where minim measures can be had."—*United States Dispensatory*.

The following results were obtained by a druggist from fluid extract of gelsemium (the article used was prepared by R. A. Hance, of Philadelphia.)

Number of drops equivalent to a fluid drachm, minim measure—

From the original 2-pint bottle... 75 drops—

" 1 oz. Phil. oval vial 100 "

" minim measure 136 "

" medicine dropper 164 "

To be sure of accuracy, each experiment

was repeated, with precisely the same results.

The subjoined prescription was at hand:

R Ext. Gelsem..... dr. ij.
Syr. Tolut..... oz. ss.
Aq. Camph q.s. r. oz. ij.

M. Sig. Shake well and take a teaspoonful every hour as directed.

(It was not unusual for this prescriber to write "extract" when he intended fluid extract.) The dose printed on Hance's label was from 3 to 10 drops, so this was to be the guide in the case, notwithstanding the fact that only 2 or 3 drops were directed of the United States Ph. preparation. But before preparing the prescription there were two questions to settle: First, what constitutes a drop of the gelsemium to be used? Second, how many drops will be included in the prescriber's dose?

Discarding the number of drops obtained from the two-pint bottle, because of its very thick and broad lip, and adding together the number of those obtained from the three other sources, the sum was divided by 3 and the result, 130, was accepted as a fair average of the number of drops of Hance's preparation to the fluid drachm, not forgetting that 149 drops were required by the United States Ph. fluid extract.

By this procedure it was apparent that the prescription in question if prepared as written, would contain 260 drops of the gelsemium. The dose, as ordered, being 1-16 of this quantity would contain 16½ drops, or a little more than 1½ times the maximum dose authorized by the manufacturer, to say nothing of its being repeated "every hour as directed."

The circumstances were such, that it was not practicable to consult the physician, which, it is acknowledged is a plain duty in such cases. The patient was a chronic sufferer from neuralgia, and was undergoing an attack at the time. The case was familiar to the dispenser, and the fact that such a one, accustomed to strong remedies, might bear larger doses than usual, was considered. Yet to risk 1½ times the maximum dose of so powerful and dangerous a poison as gelsemium was not to be thought of. It seemed evident that the prescriber had fallen into the common error alluded to in the foregoing passage quoted from the Dispensatory, that a drachm of liquid signified 60 drops, and that, therefore the prescription would contain only 120 drops instead of 260, and his patient would take about 7½—a little more than a medium dose—instead of 16½ drops, or 1½ times the maximum.

Acting on this idea, only 120 drops of the gelsemium were used, and this was dropped from the minim measure, that vessel having yielded nearly the accepted number of drops to the drachm.

The object of this paper is not to present the course taken by the dispenser for criticism. It is understood, however, others might hold that under no circumstances should a physician's prescription be altered without his knowledge and con-

sent. The dispenser admits, as intimated, the correctness of this principle, and practices such a rule except in extraordinary cases like the one cited, when no alternative remained but to refuse to prepare the prescription and leave a well known sufferer to suffer, as well as risk unnecessary damage to the doctor's reputation. It is, of course his duty to state the circumstances to the prescriber as early as practicable.

But the object in view by the writer is to press the question forming the title of this paper. What constitutes a drop? From what vessel or instrument shall the dispenser drop the various liquids he proportions in order to secure accuracy and uniformity and to know precisely what he is doing? What standard can be adopted by which both the manufacturer and dispenser shall be governed so that the dispenser's drop shall be precisely the same quantity as that designated or intended by the manufacturer or Pharmacopœia?

The Dispensatory says: "The drop is an uncertain mode of estimating the quantity of liquids and should be superseded by the minim where measures can be had." But this suggestion is of little value in the present discussion, as will be immediately shown. It can only imply that in the absence of the minim measure the dispenser is expected to guess at the quantity to constitute a minim. But even if he possess the minim measure, what then? He is still at a loss, without experiment, to find how many drops make a minim, unless he has a correct drop-former at hand and then he would not need a minim measure. The number of drops is what he wants to know, not minims, if the prescriber, as usual, had drops in his mind in proportioning his dose.

Prescribers too often confound drops with minims as identical; but this error, as illustrated, is likely at any time to lead to dangerous results, which the minim measure if used in the same sense would only assure rather than avert.

Durand, Proctor, Parrish, Talbot, all come forward with their tables showing how the bulk of a given liquid will vary, dropped from different vessels, or how various liquids vary in the formation of drops under different circumstances; but none of them offer an expedient by which the difficulty that these very facts place in the way of the dispenser can be obviated. The dispenser cannot possibly keep all these differences definitely fixed in his mind, nor can he exercise necessary despatch if he must stop to refer to tables and calculate, every time he needs to know, how many drops of a certain liquid constitute a given quantity, nor is it likely that the liquid he may be required to measure will always be named in the tables. His confusion, however, does not stop here, but reaches a torturing extreme when, as is often the case, he is compelled to drop the dose of some dangerous poison, and finds that neither the table-makers nor any other duly constituted authorities have established a uniform rule for measuring or forming drops! Then it is that