never hope to compete with the manufacturer in releasing large quantities of standard strength ampuls. Again, in making up small quantities of ampuls of some special formula, the pharmacist makes a very strong appeal to the physician.

In putting up such ampuls, instead of using a burette, it will be found very simple and convenient to use a sterile hypo syringe. The solution to be put in ampuls should be prepared in a sterile bottle with a rubber cork, through which the needle may be passed.

Some time ago, I was asked whether it is possible or profitable for a prescription shop to put up ampuls of a special formula. My answer was "Yes" to both queries.

I am glad to say that I am able to show you here, the essential points of ampul filling, and, barring the sterilization process, how little time and effort are really necessary.

Of course, care should be taken that no inferior glass be used, but only the very best.

THE ACCURACY OF MEDICINE DROPPERS WITH FLARED TIPS.[1]

BY WILLIAM J. HUSA[2] AND LYDIA M. HUSA.

The so-called "eye pipettes," which are medicine droppers with flared tips, are commonly used for dropping liquids into the eyes, the flared tip serving to protect the eyes from injury. For the use of pharmacists in dispensing liquids which are to be dropped into the eyes, there are available the "dropping outfits" consisting of a bottle and a dropper packed together in a cardboard box, and the "eye drops bottles'" in which the dropper is contained in the bottle when not in use, the bulb of the dropper serving as a stopper for the bottle.

It has been observed that pharmacists also frequently use these containers and droppers for dispensing liquid medicaments for internal use when the dose is prescribed in drops. In one case the following prescription was dispensed in an "eye drops bottle:"

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Sol Atropine Sulph. 1–1000 8

Sig. gtts. iii q 3 h, as necessary for nausea.

The medicine was administered to a child as prescribed, measuring the drops from the dropper with flared tip supplied by the pharmacist. The result was that the child showed symptoms suggesting a slight overdose of atropine sulphate. While no permanent harmful results followed in the case cited, it was thought that possibly the dropper with flared tip delivered somewhat larger drops than the physician intended.

It is well known that the size of drops is variable, being influenced by a number of factors including the surface tension of the liquid, the kind of tip on the dropper, the rate of dropping, the temperature, etc. Various attempts have been made from

[1] Presented before the Section on Practical Pharmacy and Dispensing, A. PH. A., Madison, Wisconsin, 1933.

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time to time to standardize the size of drops of the various classes of liquids. Thus the International Pharmaceutical Conference at Brussels in 1902 recommended that the pharmacopœias of the world adopt a normal dropper with an external diameter at the tip of 3 mm. and which at 15° C. would deliver distilled water in drops of such size that 20 drops would weigh 1 Gm. Wimmer and Roon (1) reported measurements made with such a standard dropper. It delivered 20 drops to the Gm. of distilled water, 65.5 drops to the Gm. of alcohol and 90.0 drops per Gm. of ether. Scoville (2) recalculated the results of Wimmer and Roon on a different basis, thus showing that the number of drops per minim was 1.36 for distilled water and 3.10 for alcohol. Stated in another way, this means that for drops delivered by the Brussels dropper, each drop of water is equivalent to about 0.74 minim.

In the present study a test was made to determine the volume in minims of the drops delivered by a number of medicine droppers with flared tips. Of 7 droppers tested, using water, 3 delivered drops equal to 1.0 minim, 3 gave drops equal to 1.1 minim and 1 gave drops equal to 1.2 minims. A nasal dropper was found to deliver drops equal to 1.0 minim. The external diameter of the flared tips varied from 4 to 5 mm., as compared with 3 mm. recommended by the Brussels conference.

From these results it is apparent that the medicine droppers with flared tips delivered drops from 35% to 60% larger than recommended by the Brussels conference. This fact should be taken into account by pharmacists at the prescription counter. In doubtful cases it would be well for the pharmacist to check the size of the drops by dropping 10 or 20 drops into a graduate to determine the volume of a drop in terms of minims. From this determination, and by ascertaining the exact dosage intended by the physician, a correct dosage in drops can be specified which will hold good for the particular medicine prescribed and for the particular dropper to be used.

REFERENCES.

(1) Wimmer and Roon, JOUR. A. PH. A., 2 (1913), 1035–1037.
(2) Scoville, "The Art of Compounding," 5th Edition, pages 13–14.

GAINESVILLE, FLA.

SODIUM TETRATHIONATE AND METHYLENE BLUE IN CYANIDE AND CARBON MONOXIDE POISONING.

Of the various antidotes advocated to treat cyanide poisoning two, according to laboratory results, are quite effective. A dose of three to four milligrams of a hydrocyanic acid solution per kilogram of body weight is fatal for the rabbit when administered orally. The intravenous injection of two to three milliliters of a 2 per cent solution of sodium tetrathionate per kilogram of body weight is effective in saving rabbits having received orally three times the minimal lethal dose of hydrocyanic acid (10 milligrams per kilogram of body weight). The sodium tetrathionate solution is administered with the onset of the first symptoms of cyanide poisoning. Rabbits tolerate three times the above therapeutic quantity of tetrathionate without exhibiting any toxic effects.

Methylene blue administered intravenously in the form of a 1 per cent aqueous solution does not afford quite as much protection. Rabbits receiving more than two times the minimal lethal dose (more than six or seven milligrams of hydrocyanic acid per kilogram of body weight) could not be saved. The intravenous injection of quantities in excess of 2.5 of a 1 per cent solution of methylene blue was injurious to the rabbit.—From *Science*.