

WHAT PREPARATIONS OUGHT TO BE AND CAN BE MADE IN A HOSPITAL LABORATORY.*

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In considering this subject there are some things to which we must first pay attention. The first in importance is the hospital's equipment for manufacturing medical preparations. I take it for granted that every hospital has the apparatus most commonly used such as scales, weights, graduates, mortars, funnels, filter paper, etc. Without any other apparatus there are a number of the simpler preparations that should and can be made at home. The next to consider is the time the person in charge of the medical department has to give to manufacturing medicines. If the pharmacist has a number of other duties besides filling the orders from the wards, he may not have time to manufacture any medical preparations. This is a matter for the hospital authorities to look into. What saving can be made by such manufacturing and will it pay to give more time to it, are the questions first to be considered. For this purpose it is necessary to find out the difference between the costs of home-made and bought goods. The quantity of an article used may have some influence on the price, but as a rule I will say that the manufacturers charge considerable for their work. If it seems that more money is spent for factory-made goods than is required to employ another person for some of the duties of the one having charge of the dispensary, this ought to be done, provided the person in charge of the department has the necessary knowledge and experience to manufacture pharmaceutical preparations. And here I come to one of the most important points to be considered. In many of the hospitals the medicine is handled by an intern or nurse without any special knowledge of such things. Of course everything then must be bought and considerable money will be spent unnecessarily. These interns or nurses, after a while, acquire some experience and make some of the simpler preparations. This ought not to be allowed and the Boards of Pharmacy should have the right to interfere in all such cases. It ought to be a strict rule that no manufacture of medical preparations should be allowed in a hospital where there is not an experienced pharmacist employed, because even a slight mistake in such manufacturing may result in serious consequences.¹ Of course such interns or nurses may in time become sufficiently experienced to make preparations, the manufacture of which is not too complicated. But in such cases they should be required to pass some examination or give other satisfactory proof of their competence, and the State Board of Pharmacy is the proper and most competent body to determine the qualifications of the pharmacists.

Those matters being considered and properly adjusted we can look at our subject from other viewpoints. The first thing to be considered is the price, and in that connection the preparations containing alcohol will be referred to. As we all know, hospitals secure their alcohol taxfree, while manufacturers must pay a very high tax. Therefore in making preparations containing alcohol, not only the cost of manufacturing is saved but also the tax on the alcohol. Not all alcoholic preparations can be made in hospitals, as the formulas are too complicated and the apparatus needed entirely too expensive to permit of such manufacture. I have

* Section on Practical Pharmacy and Dispensing, A. Ph. A., Asheville meeting, 1923.

¹ See JOURNAL A. PH. A., 12, 870-874, 1923.

especially in mind extracts, fluidextracts and similar preparations. But the majority of alcoholic preparations should and can be made in the hospitals. I refer to the tinctures, medicated wines, and elixirs of the U. S. P. and the N. F., which any pharmacist with fair education and experience ought to be able to make. Tinctures that require special facilities are tincture of kino, tincture of lactucarium and deodorized tincture of opium, and I warn against making them without the necessary equipment. There is no elixir that an experienced pharmacist cannot make, although elixir of phosphorus may cause trouble.

It would take me entirely too far to go through all the preparations of the U. S. P. and N. F., so I shall only mention a few, the making of which present some difficulties. I cannot recommend the making of anything but of galenical preparation. Even though the pharmacist may have had the most extensive experience in making the chemical preparations, he will rarely find the necessary facilities in a hospital laboratory. Further I will warn against making anything in too small quantities. In all manufacturing of medicine there is a certain loss and in preparing a very small quantity the cost is often as large as in making a fairly large amount. For example, I never make less than one liter of any tincture and other preparations in proportion. This rule does not apply to everything. For example, Scarlet Red Ointment and Analgesic Balm I seldom make in larger quantities than 250 Gm. Another rule I have is not to buy several drugs to make one preparation that is not being used sufficiently. Just now I have in mind Compound Licorice Powder. We use about 500 Gm. every three months. It is necessary to buy at least three of the ingredients especially for this powder, and they are used in different quantities so there will always be a small amount remaining on hand. Also the price of the ready-made powder is so low that very little can be saved by making it in the amount in which we use it. A few years ago we used about three kilograms a month and then there was enough profit in it to make it at home. And so on. Now let us look at the preparations I do not care to make and will not advise their manufacture in the hospital dispensary.

First as to the ointments. There are only two in the U. S. P. that cannot be made in the hospital pharmacy, namely, mercurial ointment and ointment of mercuric nitrate. For a person with proper experience and skill they present no great difficulties, but few if any hospitals have the apparatus required nor can the pharmacist afford the time necessary for their manufacture. All other ointments any pharmacist ought to be able to make with the facilities at hand in a hospital; all the ointments of the N. F. should be made by the pharmacist.

Concerning troches there is not much difficulty in making them, but as a rule they are sold so cheaply that it is best to buy them provided they are not used in very large quantities.

The greater number of the syrups are simple preparations that can be made without any difficulty in a hospital laboratory. But there are two official syrups—Syrup of Ferrous Iodide, and Syrup of Calcium Lactophosphate—that I must warn against making without considerable experience. The manufacture of a number of the syrups of the N. F. requires unusual skill and experience and I do not advise their manufacture. Such syrups are those involving a chemical reaction, for instance those that contain iodine.

Suppositories are as a rule made by the pharmacists and ought to be made

by them. Glycerin and boroglycerin suppositories are an exception as they generally can be bought cheaper from large manufacturers unless they are used in sufficient quantities, to warrant their manufacture. Most of the spirits are readily prepared, such preparations as spirit of nitrous ether and spirit of nitroglycerin are exceptions. Effervescent salts cannot as a rule be made at home, as the necessary facilities are generally lacking.

Soft soap (green soap) made in factories can be had of the U. S. P. formula at less cost than that of the dispensary.

Compound powders as a rule can and should be made at home. I have already mentioned some exceptions.

Pills are very seldom made in the hospital pharmacies as factory-made gelatin, chocolate or sugar-coated pills are much more satisfactory to both physicians and patients; however, a pill machine is a very handy and necessary apparatus to keep on hand in a hospital for special occasions.

The different petroxolins of the N. F. seem at first to present some difficulties, but really there is no trouble at all in making them. The oleoresins of the N. F. and the U. S. P. are not suitable for home manufacture; neither are the infused oils—the apparatus needed is expensive, and it requires more skill and experience than as a rule most pharmacists possess and they add to the fire risk. The mixtures, muls, oil sprays and oleates are all so simple that it is hardly necessary to mention them, but I have seen some of them bought by hospitals; in my opinion it is inexcusable for any pharmacist to buy these preparations or any other as simple and easy to make. The magmas again are not suitable for home manufacture. Many of the more simple solutions are readily prepared. Some, like several containing arsenic, are to be heated and will not pay to make in small quantities. Some others again include a chemical reaction and should not be attempted by a person not having the necessary experience and apparatus. Compound solution of cresol can be bought just as cheaply as it can be made. The liniments are simple mixtures, that will cause no trouble for any experienced pharmacist.

Glycerites and glycerogelatin are some of the very simple preparations which do not offer great difficulties in preparing them.

Plasters are as a rule factory preparations that neither can nor should be made in the hospital pharmacy.

Collodions should not be manufactured in a hospital pharmacy, however the different collodion mixtures can be compounded; the only possible exception may be cathartical collodion, but in small quantities it can be prepared by any pharmacist. Cerates are adapted for hospital manufacturing with the exception of cerate of cantharides. Cataplasma of kaolin can quite easily be made; the aromatic waters present no difficulties for pharmacists.

What has been said should be a sufficient guide to follow in deciding whether non-official preparations should be manufactured in the hospital pharmacy. Tablets require special consideration and this would extend the paper beyond the limits of time deemed advisable on this occasion.
