obvious. They possess many advantages—sterility, stability, convenience and cheapness.

Dried half-cream milk is used for infant feeding, more especially in France and England, being similar in such application to evaporated milk. Two ounces by weight mixed with sufficient hot (not boiling) water to make 1 pint, gives a liquid that, except for deficiency in fat, approximates the composition of cow's milk, as follows: Fat 1.5 to 2 percent, protein 4 percent, sugar 5 percent. Dried whole milk mixtures are used, also, for infant feeding, especially for infants over six months of age.

Dried skim milk is used in making bread, rolls, muffins, cakes, custards, creamed soups, sauces, cocoa and chocolate; if richer products be wished, the dried milk or dried half-cream milk is employed.

MANUFACTURING BY THE RETAILER AND ITS RELATION TO PHARMACOPOEIAL REVISION.*

BY F. W. NITARDY.

Much criticism is voiced at times against the pharmacist of to-day because he does not, as of old, make the pharmaceuticals required by him. There are exceptions, to be sure, but in general even the best of our pharmacists as a rule do not do much manufacturing, and because of this, even such radical statements as, "the average pharmacist is lazy," have been made. It has been said that unless the pharmacist makes his own preparations, he is neither availing himself of the knowledge that is his, nor practicing his art to the extent that he should, and that he is largely a dealer in merchandise, restricting pharmaceutical practice to the filling of prescriptions.

At a recent meeting where the revision of the U. S. P. was the subject of discussion, the simplification of the official processes was advocated by one of the speakers as a means of interesting the retailer in manufacturing and rescuing pharmaceutical practice from its present trend.

The object of this paper is to discuss and analyze this situation with the purpose of determining if it represents a condition detrimental to pharmacy and what, if any, change of policy should be attempted in the coming U. S. P.

To reach an unbiased opinion, let us first determine the mission of pharmacy. Broadly speaking, it is to furnish those things which the physician requires in the treatment as well as the prevention of disease. We may also include those things which the public requires in treating itself, even though we may not always believe in the wisdom of this habit. The practice of pharmacy, then, includes the gathering or production of medicinal substances, their selection, preparation, standardization, elaboration, and final compounding for use by physician and public. Whether or not, and how well pharmacy fulfills its mission would, of course, be measured by the efficiency of its service and the reliability, uniformity, and quality of the products it offers, and its progress by the improvement noted in any or all of these factors.

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* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., City of Washington meeting, 1920.

The ideal pharmacist, from one point of view, may be the man who would grow his own drugs, gather, cure, test, select and extract them; who would mine or gather the minerals required, and purify, test, select, synthesize and prepare these, then mix, compound and dispense the products so obtained. We know, however, that this is not possible, for even if any one man had the expert and detailed knowledge required to do all these things, he could not accomplish them. Expediency, efficiency and economy require specialization and restriction of the individual's activity to a narrower field. All through the ages this specialization has been going on. First, pharmacy separated from medicine, then pharmacy itself, as well as medicine, separated into specialized activities.

To-day we do not think of the many people engaged in various parts of the world in drug growing and gathering as pharmacists. We do not include the miner of coal or minerals, the workman in the gas house or chemical plant in our profession, still they serve in producing the products which the pharmacist dispenses.

If we go back over the pharmacopoeias of the last four decades—which is not going beyond the memory of many of our ablest pharmacists of to-day—we see some interesting evidence of pharmaceutical evolution. We find, for instance, somewhat over eighty products in the U. S. P. IX for which no working formula or manufacturing method is given, but for which one of the three previous editions did give a formula or process. We also find that of the products for which working formulas are given in the present pharmacopoeia, there are over eighty for which chemical assays, and ten for which physiological assays are given. None of these assays appeared in the U. S. P. VI.

While it is not necessary for the pharmacist to assay Tincture of Iodine or similar preparations if he has made them himself or knows that they were properly prepared, and the right amounts and quality of material used, there are, nevertheless, many preparations which must be assayed. Any good pharmacist can do this, but it would not be profitable. Let us take Tincture of Hyoscyamus, for example. Assuming a pharmacist makes a liter of it, he requires 250 mils for the assay and would have to run it in duplicate to be sure of his result. He could easily buy a gallon or two for what the pint he would have left would actually cost him.

Is it any wonder, then, that we find the retail pharmacist unwilling to engage in the manufacture of such preparations? Is it not reasonable to assume that the formulas or working processes which were deleted from the previous editions of the U. S. P. while the products themselves were retained, were dropped because the average pharmacist was, for economical reasons, no longer interested in having these formulas given in the official standard? Is it not in fact a continuance of the process of evolution or specialization in pharmacy previously referred to, and is it not becoming even more necessary by reason of the progress and development of pharmacy as an art and science? Does it not in final analysis lead to greater uniformity and reliability of the products dispensed, and thereby give greater and more valuable service to the medical profession and the public?

Why should a line be drawn indicating as to what the retail pharmacist should or should not do? Will not economical conditions determine this in each individual case? Wherever the retailer does start to-day, he cannot start at the very beginning or with the natural source of the products he needs. Even if he makes

his own tinctures, someone has gathered, tested, selected and ground the drugs before he used them. So does it really detract from his value as a professional man if someone also extracts these drugs? To be sure, a pharmacist has to do this work, but why should we object to some pharmacists specializing on prescription compounding, while others specialize on drug extraction, if by this system all are able to render a better service to society at smaller cost?

Where it is possible to so describe or set standards for a finished preparation that absolute uniformity in drug strength and activity is insured, and where the preparation itself is no longer commonly made by the average pharmacist, would it not be desirable to drop the formula from the next pharmacopoeia?

It is generally understood that manufacturing pharmacists who produce preparations on a large scale sometimes have to follow methods somewhat different in detail from those given in the pharmacopoeia because the pharmacopoeial process is not applicable to quantity production. Each manufacturer usually works out his own method along such lines that a finished product identical with that produced by the official method is obtained, but these processes are not necessarily always alike. Would it, therefore, not be just as well for the next pharmacopoeia to describe the finished product instead of giving a formula for manufacturing a preparation like Fluidextract of Nux Vomica? If it stated that Fluidextract of Nux Vomica is a hydroalcoholic solution of definite color representing the total extractives of the drug, containing not less nor more than a given amount of strychnine or nux vomica alkaloids and extractive matter, alcohol, etc., in amounts ranging between definite limits, would not the standard be fixed fully as well as now? Where we are unable to standardize the preparation accurately, the best standard or guide may be a formula by which it is to be prepared, and in such cases we should, of course, retain the formula, even though it is not generally used by the retail pharmacist.

Should we not, therefore, take the attitude that the U. S. P. continue in its policy of setting the highest standard compatible with market and manufacturing conditions, and one which in each case meets the medical requirements, and that it continue to standardize products, and wherever possible provide suitable assay processes? Every step in this direction is a step toward greater uniformity and reliability.

If a retailer has the time and inclination to devote himself to manufacturing along with his duties as prescription pharmacist, he should certainly do it, especially if he finds it profitable; but there is no just reason for criticism if he finds it more interesting to devote his time to dispensing problems and more profitable to buy his pharmaceuticals.

Should he be more interested or better fitted for manufacturing than dispensing, the way is open to specialize in that field. Many of our college graduates are doing this to-day.

Some day, before long, we may see a general division of the retail trade into prescription pharmacies and drug stores. Just another step in the same general direction—specialization in a given field. It is the natural trend of things, not only in our line, but in every human endeavor of to-day, and while it narrows the field of the individual, it makes him an expert, capable of rendering a greater service; and this, after all, is the only aim worth while.