

## PROFIT AND PROFESSIONAL ADVANTAGES OF PHARMACEUTICAL MANUFACTURING BY THE RETAIL PHARMACIST.\*

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While most of us have a natural leaning toward one or the other side of pharmacy, professional or commercial, and may find it pleasant to contemplate the practice of pharmacy in accordance with our own pet notions or ideas, there are few of us who can afford to indulge in a one-sided business just for the pleasure we may derive therefrom. We owe a duty to ourselves and our families which requires us to practice pharmacy in a manner so its pursuit will yield the profits necessary to maintain our standing in the community equal to at least that of the moderately prosperous merchant or professional man.

Pharmacy, by its development, environment and demand of the public has become a vocation that intimately combines profession and business, and it is only by the harmonious and simultaneous practice of both that we may hope to obtain the full measure of success fortune has in store for those who serve well in their chosen capacity. So closely associated are business and profession in pharmacy that it is hard to draw a line between them or neglect one without injury to the other.

Many influences have been at work in later years which have had a tendency to reduce our professional scope or activity. Our investments have been increased and our returns decreased. Expense and cost of living have been on the advance. It behooves us therefore to take good care lest we allow foreign interests to make further inroads on our calling. Not only that, but it is pertinent for us to put forth every effort and use all legitimate means to increase our field of usefulness and service as pharmacists. For, by such means only, can we successfully hold our own under the ever-growing difficulties confronting us.

Pharmaceutical manufacturing by the retailer is a field of his rightful activity embodying commercial and professional pharmacy in a manner which makes it of peculiar value to the present day druggist. It offers great opportunities and advantages: commercially, in the profit to be derived therefrom; professionally, in its elevating influence in causing the pharmacist to practice real pharmacy and exercise his skill. It is a most healthful stimulant to our business. It opens the door to greater prosperity and higher professional standing and respect. Its possibilities are far greater than any one, who has not investigated them, can realize. To some it may seem a matter of little moment.

That manufacturing, an important side of our business, should have been neglected to the extent it has, seems astonishing but if we just remember how

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\* From an address before Nebraska Pharmaceutical Association.

easy it is for humans to be enticed into habits that relieve us of work, even though we suffer a loss of profit and prestige by yielding to this instinct, we can readily understand how we unsuspectingly, along with the doctor, fell victims to the manufacturers' exploits and arguments professing to save us money, trouble, labor and what not. Even now, we hardly realize what has been one of the fundamental causes of some of the distressing conditions that confront pharmacy. But the object of this paper is not to discuss the causes or events that brought about present conditions, but to offer some tangible proofs that we can help ourselves to greater prosperity by doing such pharmaceutical manufacturing as can conveniently be done by the retail pharmacist. I shall endeavor to show just what manufacturing means to the pharmacist by touching briefly on the various steps, considerations and equipment involved in the successful pursuit of this work, and showing the profit as well as professional advantages to be derived therefrom.

If I succeed in interesting you to the extent of investigating the possibilities of this field of pharmaceutical industry, or cause you to leave this convention determined to increase your activity along this line and put behind it the energy and enthusiasm it deserves, I shall feel that I have been more than repaid for my effort to serve you.

#### THE MANUFACTURE OF OFFICIAL PREPARATIONS.

That we possess a copy of the latest edition of the United States Pharmacopœia and National Formulary is of course essential in this work. Let us consider the formulas of these works for a moment. They have been subject to much criticism, but let me tell you the greater part of it is unjustified; while there are some formulas that are not entirely satisfactory, their number is small and the trouble they offer is easily overcome. Most of the criticism has been caused by the use of improper material. All our skill is useless when we try to make fine products from poor goods; not only will the final preparation be lacking in quality but frequently we encounter all manner of unlooked-for trouble. Here are two samples of simple syrup, one made from granulated sugar and the other from Confectioners A. The latter, clean and clear, free from ultramarine blue or other coloring matter, the former is dirty, turbid and looks yellowish as soon as the blue coloring has settled out. Granulated sugar is a commercial grade—good enough for household purposes but hardly fit for pharmaceutical use. The other, because it is a highly refined article, is free from coloring or impurities. A syrup made with a cheap granulated sugar is not only difficult to clarify by filtration or otherwise (pharmaceutical syrups should be clear and brilliant whenever possible), but the ultramarine blue so frequently present in the cheaper sugars will give rise to  $H_2S$  on decomposition. This is especially apt to happen in syrups containing free acids.

Similar illustrations of differences in quality could be made by producing preparations with commercial and official alcohol, commercial and pure chemicals, oils, etc., respectively.

We must buy good, yes, the best of materials for our manufacturing department. We must buy from reliable sources, more than that, we must be able to detect bad material and watch incoming goods closely enough to see that we get what we order. At present, we can feel fairly certain that goods are true to

label but it is a good practice to occasionally apply the official tests. Especially if we have reasons to doubt the quality of a given article. We should have the equipment and ability to satisfy ourselves as to their actual worth. The apparatus required for the simple pharmaceutical testing means but a very small investment, a few dollars will cover it and the value of the practice you or your employes get in applying these tests cannot be under-estimated. It gives you a feeling of security and when jobbers and manufacturers know that you can and will occasionally check the quality of goods received, they will exercise much greater care in seeing that you are supplied with goods meeting requirements. It is rather unpleasant for them to be caught in supplying goods that are not up to standard or in conformity with the label. Furthermore, this sort of work in your store will create respect for you, both with the laity and medical profession, for they will see that you have ability beyond that of a merchant.

Let me mention a few incidents illustrating the value of such work. I had been buying oil of turpentine from the same source for a long time. It came labeled as U. S. P. Oil of Turpentine and I had verified its quality by the usual tests. One day I received a notice from the Health Department to discontinue the sale of this commodity as they had found it adulterated. I immediately tested my stock and found that it was all right, so I wrote a courteous letter to the Health Department, stating that I had received their notice but that they were evidently in error as the turpentine I was selling was strictly U. S. P. A day later I met the State Chemist, who told me that he had examined many samples of Oil of Turpentine lately, and found none that were pure. He mentioned that he had relied entirely on the Sulphuric Acid Test of the U. S. P. I could see wherein he made his error as this test is faulty or may at least be misinterpreted by not being given in sufficient detail. I did not say much, but collected data from reliable authorities, principally from pamphlets published by the Department of Agriculture, showing wherein the test was deficient and then called his attention to this information. Shortly after an apology was offered, for the officials realized that they were mistaken.

Another incident was in regard to hydrogen peroxide. I had been buying from one firm but occasionally found their product below strength, and after several complaints discontinued my purchases. They then investigated the matter more thoroughly and were very much surprised to find that the fault lay with their chemist who was very careless in testing the product. The firm in question were manufacturers.

The necessity of watching the labels was brought to my attention when on ordering a pound of U. S. P. hypophosphorous acid I received the product of a very well known, and generally considered reliable manufacturing house, labeled "Hypophosphorous Acid," and in small type in one corner of the label appeared the note: "If this acid is neutralized with ammonia water, a turbid mixture will result which on filtration will yield a precipitate with Barium Chloride Test Solution." The U. S. P. requires that hypophosphorous acid shall do neither, but unless one is familiar with the tests for purity of this article, such statement on the label might easily be overlooked and hence also the fact that the product was not suitable for pharmaceutical use.

To get back to where I left off. Next in importance to buying good goods

and seeing that they comply with official requirements, is the process of production. Herein we should adhere strictly to the official formula unless the latter will under no circumstance produce a satisfactory product. This is necessary for several reasons. In our own opinion we may be able to improve on the official process, but others who are just as capable and qualified to pass judgment on these matters as we, may not agree with us. Uniformity is one of the most important points and uniformity in official preparations is out of the question unless everybody prepares them in accordance with official standards. As an illustration let me mention tincture of nux vomica. The official process calls for making this preparation by dissolving 20 grams extract of nux vomica in sufficient alcohol and water to make 1000 cc. of tincture. This makes a rich brown colored liquid. I know that some pharmacists make this preparation by diluting a fluidextract with sufficient menstruum. By this method a straw-colored liquid is obtained which further differs from the official tincture in containing a small amount of acetic acid introduced by the fluidextract.

A point frequently overlooked is the attention that should be given to the storage of our preparations, for it is quite important to protect sensitive products from the detrimental influences of light, air and temperature. Many excellent preparations have been spoiled or damaged by improper care in storage. When the Pharmacopœia states that a preparation, as for instance, spirit of nitrous ether, should be kept in *small, well-corked amber bottles in a cool place*, there is a good reason for keeping it this way. It deteriorates rapidly unless so kept. There is little difference between the pharmacist who prepares a substandard product and the one who permits a good product to become substandard through carelessness. In either case when such a product is dispensed, an injury is done to the patient, physician and pharmacy at large.

To be equipped to make the various preparations does not require a large outlay for apparatus. You need a number of percolators; some graduated receiving jars, these may be home-made, from candy jars or wide-mouth bottles; some porcelain evaporating dishes; flasks and funnels. Your prescription graduates and mortars will also serve in your manufacturing department. You should have a set of metric weights so as to save converting your formula into the apothecaries system and when once used you will find it the most convenient by far. Retort stands and steel rods fastened to shelves in your back room are very convenient to hang funnels and percolators. A filtering rack with adjustable shelves is desirable if space is available. Further necessities are thermometers; oven, water bath; tin, glass or rubber covers for funnels; scales beakers, spatulas, glass rods, etc. Earthenware crocks are quite handy as mixing vessels. Old glass stoppers will serve for percolator weights. In fact many little ideas will suggest themselves to you in carrying on the work that will save time, material and apparatus.

In making your preparations it is very desirable to have printed blanks, to be used for writing out your formula. Such a system prevents errors, saves your books and gives you a permanent record. All notes and other information, such as the amount of menstruum used in a percolation operation, notes on how troublesome points may be overcome, etc., should be made on the back of these blanks for future reference. These blanks should be numbered and filed like

COST CHART.

Preparation	Quantity	Cost			MANUFACTURERS' CHARGE			Saving	
		Materials	Over-head	Total	Equiva- lent to	A	B		C
Aromatic Elixir, U. S. P.	1000 cc.	.30	.05	.60	.29 pt.	.45 pt.	.42 pt.	.36 pt.	.07 .16 pt.
Aromatic Elixir, U. S. P.	4000 cc.	1.14	.14	1.53	1.47 gal.	2.47 gal.	2.40 gal.	2.40 gal.	.93-1.00 gal.
Aromatic Elixir, U. S. P.	20000 cc.	5.07	.54	5.96	1.09 gal.				
Elixir Cinchona, N. F.	4000 cc.	1.49	.18	2.02	1.91 gal.	3.15 gal.	2.55 gal.	2.40 gal.	.49 1.24 gal.
Elixir Terpin Hyd., N. F.	4000 cc.	2.39	.27	3.01	2.85 gal.	5.17 gal.	4.80 gal.	3.60 gal.	.75 2.32 gal.
Camphor Liniment, U. S. P.	4000 gm.	1.54	.18	1.97	.23 pt.	.72 pt.	.50 pt.	.50 pt.	.27 .49 pt.
Soap Liniment, U. S. P.	4000 cc.	2.64	.31	3.45	.41 pt.		.60 pt.		.09 .19 pt.
Comp. Glycyrrhiza Mixt., U. S. P.	4000 cc.	.95	.15	1.60	1.51 gal.	2.70 gal.			1.19 3.29 gal.
Syrup of Hydriodic Acid, U. S. P.	1000 gm. (850 cc.)	.39	.05	.54	.32 pt.	.54 pt.	.48 pt.	.45 pt.	.13 .24 pt.
Syrup of Ferrous Iodide, U. S. P.	1000 gm.	.58	.11	1.19	.53 lb.	.63 lb.	.55 lb.	.55 lb.	.02 .10 lb.
Comp. Syrup of Phosphates, N. F.	4000 cc.	2.48	.30	3.28	3.10 gal.	5.17 gal.			2.07 gal.
Tincture of Capsicum, U. S. P.	1000 cc.	.79	.10	1.14	.54 pt.	.86 pt.	.93 pt.	.72 pt.	.18 .32 pt.
Tincture of Nux Vomica, U. S. P.	1000 cc.	.73	.09	.97	.46 pt.	.81 pt.	.72 pt.	.60 pt.	.14 .35 pt.
Comp. Tinct. of Gentian, U. S. P.	4000 cc.	2.15	.26	2.91	2.75 gal.	.65 pt.	4.00 gal.	.51 pt.	1.25 2.45 gal.
*Comp. Resorcin Ointment, N. F.	1000 gm.	.75	.12	1.37	.62 lb.	1.08 lb.	1.25 lb.	1.50 lb.	.46 lb.
Sulphur Ointment, U. S. P.	500 gm.	.21	.04	.40	.36 lb.	.86 lb.		.60 lb.	.24 .50 lb.
		23.60 74%	5.45 17%	31.94 100%		58.88	54.71 Average, \$56.35. 100%	55.46	24.41 43%

<sup>1</sup> Three quantities are given to show difference in cost in varying quantities.

<sup>2</sup> Manufacturers' charges: A represents one class of manufacturers, B another class, and C a manufacturing jobber. Wherever possible price for bulk quantities corresponding to manufactured amount are mentioned. In a few instances the preparations were not listed by some class of manufacturers.

<sup>3</sup> Price of B and C are for preparations of similar nature, but not in compliance with official formula.  
<sup>4</sup> In arriving at the totals, quantities equivalent to the manufactured amount were figured and in case the preparation was not listed, the lowest competitive figure was used as a basis.

you do prescriptions. Such records will prove of much value. They should show, aside from the formula and directions, the cost of material, the time required to make the preparation, date and by whom made. If a card index is kept with a card for each preparation made, showing date, serial number of formula record, quantity made, cost of material, time, overhead and total cost, you will have all the information you may want in regard to any of your preparations. On a moment's notice, you will know just how much of each product you are using and what it costs you. Such a record system may seem complicated on first thought, but it takes very little time to keep it up.

I have prepared a chart showing what it costs to manufacture a few of the commonly used official preparations, using several classes and basing this cost on the cost of material, fifty cents an hour for the time required to produce the product and a further charge for overhead expense at 10 percent of the total. This chart also shows the prices charged by manufacturers for these same products, when bought in similar quantities. In all instances you will note there is a saving. Similar showing can be made on almost any preparation that can conveniently be produced in a drug store. The saving of money, however, is not the whole story. By making these preparations yourself, you can gain advantages worth more than the money you make. You gain arguments and talking points, with which to back up your prescription service and propaganda work, that would not exist for you otherwise. You will have a broader knowledge of and greater confidence in these preparations, factors that will prove a valuable asset. Your preparations will be better than those you can buy and the fact that you produce them, instills respect and gives you professional standing with the public and the medical men.

There are still other advantages worth considering, such as your increased buying power of crude materials used in manufacturing, which you would carry in more limited quantities in case you did not engage in this work.

For many pharmacists the cost of time and overhead expense included in the costs on the chart we shall now consider, is profit, for their pay roll and general expenses would not be decreased by refraining from making their own preparations, for the time devoted to this work would frequently be wasted, and rent, light, taxes, etc., would remain the same.

#### COST CHART.

You will note that on the preparations mentioned on the chart your investment in making them yourself would be \$23.60, as compared with an average of \$56.35 in case you buy them ready made. By paying yourself \$5.45 for time and \$2.89 for general overhead expense, you have a total of \$31.94, representing but 57 percent of the cost of the same materials bought from the manufacturers, while your cash investment is but 42 percent of the same. In other words, not considering the above mentioned advantages of manufacturing, and figuring your time and overhead expense into the cost of your preparations, you still make a profit of \$24.41 on a total cost of \$31.94. What other department in your store can make such a showing?

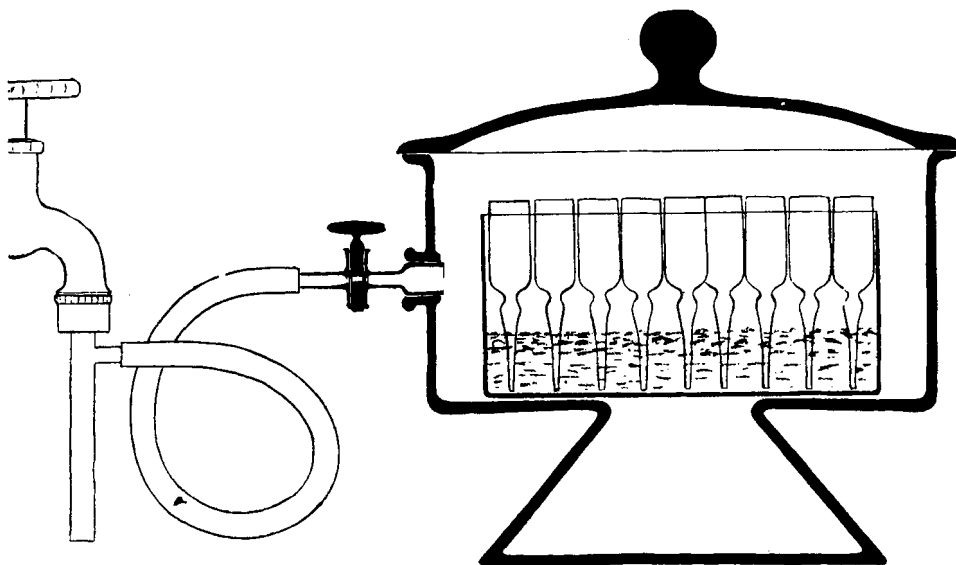
#### SPECIAL WORK FOR THE PHYSICIAN.

Hand in hand with the production of official preparations goes the special work you can do, such as the making of culture tubes, microscopic stains, test and

volumetric solutions for the modern physician who takes advantage of bacteriology and physiological chemistry as an aid to diagnosis, yes, practically relies on them. He needs various reagents for testing stomach contents, body secretions, etc., the preparation of which can be made a source of profit for the pharmacist. Physicians appreciate such service greatly. The opportunity along this line depends, of course, entirely on the kind of physicians in your vicinity. Practically all of the younger men value such service and many of them who are not using this class of preparations now, would avail themselves of this service if they knew it was obtainable.

The Pharmacopœia and reference works on pharmacy, chemistry and bacteriology give you formulas and information on this work. With the application of a little thought and energy, a profitable business along these lines can be created in many communities.

Another line of very profitable work for the pharmacist is the preparation of sterile solutions, intended for hypodermic and intravenous use. Direct medication is daily growing in favor with the medical profession and to make the introduction of medicinal substances into the blood or tissues of the body safe and free from unpleasant after effects, it is very necessary to have these products sterile. Sterile solutions in individual doses, dispensed in ampoules, have a decided advantage over the old hypodermic tablet and the modern physicians are rapidly becoming familiar with this fact. Empty ampoules may be bought quite cheaply and are easily filled, if you will equip yourself for this class of work.



Vacuum Apparatus for Filling Ampoules.

I have made a drawing, showing an inexpensive and very efficient vacuum apparatus, which I will explain herewith. Ampoules usually come with long sealed necks, clean on the inside. They are first washed outside, then the necks are cut to a uniform length and the so prepared ampoules are then placed right

side up in a flat bottom glass dish. A slightly smaller dish is inverted over them and then by inverting the whole, the ampoules will stand, necks down in the second dish. The amount of solution required to fill the number of ampoules contained in the dish is then placed in same and the whole placed in a vacuum desiccator. The air is exhausted, and then slowly allowed to enter the apparatus again. In this way the ampoules will draw up the entire amount of liquid. The dish is taken out of the desiccator inverted and the ampoules are now ready for sealing and sterilizing. In most cases it is desirable to place the unsealed ampoules in a sterilizer for a few minutes previous to sealing. The condensation of a small amount of steam in the necks of the ampoules will wash them and consequently prevent the charring of the substance, which would otherwise adhere to the necks. If they are sealed warm, there is also less danger of breakage in sterilization by heat, especially if they are sterilized by boiling in water.

Sterilization may be accomplished either by placing the filled and sealed ampoules in a dish of preferably colored water and boiling them for twenty to thirty minutes or by sterilizing them in an auto-clave, with steam under pressure. The latter has the advantage of creating as much pressure around the outside of the ampoule as is formed in the ampoule, thereby preventing unequal pressure which usually causes some breakage.

Some products of course will not admit of sterilization by heat, and in such instances the solutions may be filtered through a germ-proof filter and then filled into previously sterilized ampoules under aseptic conditions.

Ampoules of course are not the only safe container for sterile solutions. When large quantities of bulk solutions are dispensed, glass stoppered bottles are frequently preferable. Rubber caps such as are used by manufacturers of vaccines, form a convenient seal for a bottle of sterile solution intended to be used a little at a time. These rubber caps permit the physician to withdraw a portion of the sterile fluid with a hypodermic syringe by puncturing the rubber cap with the needle. After withdrawing the needle, this puncture closes itself, the solution remaining sterile as long as care is taken in using a sterile syringe and needle for withdrawing the solution.

You can achieve a good reputation amongst your medical friends by specializing on the production of certain preparations in a manner that will provide them with products of higher quality than those ordinarily supplied.

As an illustration I will mention ointment of yellow mercuric oxide. This preparation as ordinarily made is produced by triturating a dry mercuric oxide with an equal quantity of water and incorporating with this mixture lanolin and petrolatum or some other ointment base if desired. As you know, ointment of yellow mercuric oxide is used almost exclusively as an eye remedy. For that reason freedom from grittiness is of great importance and the finer the division of the oxide, the better the ointment you dispense.

A preparation that is far superior to one that can be produced from dry oxide can be made by precipitating the mercuric oxide from dilute solutions, washing, collecting and preparing the ointment from the moist precipitate. The preparation made in this way will contain particles of mercuric oxide so small that they are invisible when examined under a high power microscope.

It would of course be useless to prepare a very fine ointment and then dis-



pense it in a container that would subject it to contamination with dirt and dust as would be the case, if dispensed in an ordinary ointment jar. For that reason it is desirable to dispense an ointment of this kind, in a collapsible tube which is an absolute safe-guard against foreign substances accidentally becoming mixed with it. These tubes of course should be coated with a tolu varnish or other suitable medium that will prevent contact of the mercury salt and the metal.

Doctors who do their own dispensing should not be looked upon as competitors, although it is true they are in a sense, but their good will and friendship should be cultivated, as they require drugs and pharmaceutical preparations, with which you can furnish them if you will make an effort to get this business. While it may not net you the profit that you could derive if they were prescribing instead of dispensing and you could fill their prescriptions, you will nevertheless find that their business is worth while, if you can handle it on the proper basis. Aside from the dispensing physicians there are dentists, veterinary surgeons, beauty doctors and possibly others for whom you can produce various preparations profitably.

The larger your output of pharmaceutical products the greater will be the profit on the manufacturing end of your business.

#### THE MANUFACTURE OF TOILET GOODS, ETC.

Just as profitable, instructive and ethical as the manufacture of official preparations, etc., is the manufacture of toilet goods, simple household remedies, flavoring essences, food colors and other pure food products, as well as household utilities, such as cleaning fluids, furniture polish, insect destroyers, etc.

Formulas for this class of products may be found in the various formularies and reference books, as well as in the monthly trade journals, of which there are many excellent ones.

While speaking of reference books, I believe the average pharmacist does not make sufficient use of or use a sufficient assortment of such works. Every pharmacist can well afford to invest fifty to one hundred dollars in general works on pharmacy, formularies, reference works on chemistry, botany, bacteriology, aside from subscriptions for journals and Association dues, all of which are necessary means to keep one in touch with the constant progress. You will find it true almost without exception that successful men are well posted on all phases of their business and you will find that their greatest aid in keeping posted is their connection with national, state and local associations, the personal contact with men of affairs in their line afforded by such gatherings as these and the journals and reference works that do not serve as ornaments, but are read and consulted at every opportunity. In cities where local associations exist with a considerable membership, a great service is rendered if such organizations own a pharmaceutical library. In this connection I would like to say that such a library was started by the Denver Branch of the American Pharmaceutical Association in Denver a little over a year ago and we now have a reference library of approximately five hundred volumes covering practically every phase of pharmacy from merchandising and window decorating to works on bacteriology. This library was established without a great deal of expense and is proving a great help to the druggists of our city.

To resume, you will probably find that most of the formulas in the form they are published will not produce preparations entirely to your liking. We usually have our own ideas as to what this or that preparation should be and different classes of products are demanded in different localities. For that reason a little experimental work is usually necessary to perfect the preparations. Before such work is attempted, however, all reference books at your command should be consulted, and every formula for preparations of the nature or class you are trying to produce should be studied. The various hints and formulas that you will find will be of great help to you and offer many suggestions which with your practical knowledge of pharmacy will make the work of producing a satisfactory preparation, comparatively easy.

Whenever possible try to be original in your preparations. That is, your product should not suggest itself as an imitation of something already known. It should at least be an improvement over what is on the market. Individuality is always an asset.

As in the manufacture of your pharmaceutical products, it is quite essential to use the best of materials in their production. It is time enough to consider the cost when you have your formula established; you can then adjust your package and retail price so as to give you the proper margin.

With toilet preparations especially, the package is a very important factor and considerable care, thought and judgment should be used in designing it. Here, too, it is desirable to lend your package individuality. Hand lotions, creams, etc., should be well scented. Such toilet preparations as combine cosmetic properties with medicinal value should be prepared so that both points are properly taken care of. A hand lotion should have aside from a pleasant appearance, attractive package and nice odor, the medicinal quality necessary to make it a satisfactory product, so far as curing and preventing chapped skin is concerned. It should also be pleasant to use. That is, it should not be sticky, greasy, or in any other way objectionable. Any one doing or expecting to do prescription business and keep on good terms with the medical profession should not attempt to market cure-alls for every imaginable ailment. Any sensible physician will not object to household remedies such as are called for by the public for minor ailments for which physicians would not be consulted any way. But I believe that it is not within the province of the pharmacist to market dyspepsia or rheumatic cures or any preparation for the treatment of diseases or conditions properly requiring the attention of a physician nor imitate the frequently fraudulent proprietaries on the market.

A certain amount of advertising will be necessary to place your products along these lines before the public. Of printed advertising, I believe circulars or small pamphlets are the most effective. If these are gotten up in original style, are truthful and well distributed, you may be quite certain of results. One should avoid negative assertions in advertising and not be afraid to give proper publicity to all of the good qualities of the product. Of great value are window and counter displays. A great deal in fact can be said on the merchandising end of these lines but this is not within the scope of this paper.