

## Papers Presented to Local Branches

### LABORATORY EQUIPMENT FOR THE MANUFACTURE OF GALLENICALS BY THE RETAIL PHARMACIST.\*

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The first consideration in planning for the equipment of a small laboratory may well be the space available for the work.

If the opportunity is given to begin with an empty room, ideal conditions are at hand, but most frequently manufacturing is carried on in a retail drug store as an adjunct to the prescription counter and during the odd moments available between customers and other store duties.

In either case, the following general principles may be kept in mind and made a feature of the department if their value is recognized and the proprietor is in earnest.

*Cleanliness.* Conditions should be such that cleanliness in the work will be possible. Dust should be eliminated in large measure and all equipment, floor, etc., thoroughly scrubbed regularly and frequently. This will help greatly in reducing loss and deterioration in preparations from the introduction of microscopic growths and is but fair to the public.

For health, as well as economic reasons, a rigid maintainance of sanitary conditions is as important in preparing medicines as in making foods.

*Arrangement.* The second principle, worthy of constant attention, is the arrangement of stock, library, working counter, sink, etc., in such a way that a minimum waste of time and energy results.

"Efficiency" is the keynote of big successes, and it should be written large in every pharmacy today, and the managing head should be studying every day's work and particularly routine duties, with the definite purpose of reducing lost motion and stopping unnecessary waste of energy, time and materials.

A kitchen cabinet has been put on the market which is well worthy of study in this connection. A working counter is provided and above and below in closets, open shelves or drawers are arranged every form of apparatus likely to be needed, and also a stock of the more frequently used materials.

At very little expense this plan could be adapted to a working counter for the pharmacist and by a careful study of the needs he could have within reach every kind of apparatus required for common operations. This could include distilled water and alcohol made available at a small spigot connected with the supply. The latter should be a key spigot to prevent waste or theft.

Provision could be made for the disposal of waste materials by having an opening in the counter above a galvanized iron can.

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The sink with draining board is an important adjunct and should join the working counter on the right or left, or preferably be immediately back of the operator, requiring only his turning to be made available. This sink should be deep, to avoid splashing, and to afford, when filled with water, a satisfactory place in which to wash bottles, apparatus, etc.

Probably one of the best forms of sinks available is a well-built wooden box, lined with sheet lead. The spigots should have a section of rubber hose slipped over the opening and this combination, lead and rubber, will prevent many breaks in glass apparatus. Hot water should be provided if possible at this sink, as its uses are many and the convenience great. A water-back can be fitted into the furnace at little cost and will give quantities of hot water throughout the winter, and a small laundry stove, burning little coal, or a small gas water heater, will help out in the summer.

Hot water is an essential also at the soda fountain for the proper cleansing of glasses, and the same heating plant will serve both purposes.

*Apparatus.* He should also provide sufficient apparatus to do the work he is planning and accurate measuring and weighing facilities.

*Executive Department.* The trained pharmacist will not lose sight of the brain part of his equipment. This means a desk and bookcase with some plan for keeping records, formulas, costs, etc., and a library more or less extensive.

These few general principles are applicable to all conditions under which manufacturing pharmacy is carried out; they are only different in the extent to which they are applied.

They may be introduced to advantage at the working counter of long-established stores, in those just being opened, or in a laboratory especially planned for manufacturing.

Now as to the detailed equipment: it is difficult to prepare lists of necessary apparatus since the requirements will vary as the kind of manufacturing to be done in each store varies. I might venture to name a few essentials for the making of U. S. P. and N. F. galenicals, however, although the list will be too long for many and fail to provide the needed equipment in other cases.

It is true, however, that the efficient worker needs but little complicated apparatus and obtains results from the simplest forms of equipment. There is one place, though, where no pains should be spared, namely, in the selection of weighing and measuring facilities.

*Measuring.* Be sure that graduates and measuring vessels are accurate. It is desirable to have at least

- 1 pipette (1 cc. in tenths).
- 1 pipette (in minims).
- 1 15 cc. graduate, conical.
- 1 1 oz. graduate, conical.
- 1 250 cc. graduate, conical.
- 1 8 oz. graduate, conical.
- 1 500 cc. graduate, cylindrical.
- 1 1 pint graduate, cylindrical.
- 1 1 quart copper measure.
- 1 1000 cc. copper measure.

When measuring small quantities of oils the custom of making dilutions in alcohol (say 10 per cent. dilutions), should not be lost sight of. This will often insure an accuracy in measuring which is not otherwise obtainable.

*Weighing.* It is very desirable to have a good laboratory balance. Several styles, at reasonable prices, having a slide weight for taring bottles, dishes, etc., are available. This is a great convenience, as many official preparations, solutions, ointments, etc., are made up to a definite weight.

If this form of balance is not provided, but only the counter box balance,, two cans of suitable size, containing sand or shot, can be used satisfactorily as a tare.

It is presumed that the pharmacist will have the smaller, accurate balances for other weighings and would not duplicate these for his manufacturing work.

*Heating.* Gas is now very generally available and, where it is at hand, a bunsen burner and a one, or preferably a two-burner, gas stove should be provided.

A large sheet-iron gas oven, for a two-burner stove, will be found of much service in many operations. It can be used for making effervescent salts, as an air-bath in evaporating fluidextracts and extracts at low temperatures, for sterilizing glassware and as a protected area in which to prepare sterile preparations.

A water-bath should also be provided. This need not be expensive or elaborate. For years we have used with much satisfaction a water-bath made from an enameled bowl, such as is sold for kitchen use, supporting the dish, beaker or flask in the bowl by a brass wire frame made like a triangle from three pieces of stiff wire with the ends twisted together and bent over the edge of the bowl. This seems to answer every purpose of a water-bath and the bowl can be bought in any size up to two gallons.

*Mixing.* An assortment of mortars and dishes should be at hand. The kinds will depend on the particular needs. Porcelain dishes should be used for strongly acid or alkaline solutions, but the enameled bowls to which reference has been made, can be used for moistening drugs for percolating, for making ointments, and in many other ways.

Spatulas, steel and rubber or wooden, should be ready for use. Some of the kitchen wooden-ware now offered for sale can be used in some cases where steel is not permitted.

*Sifting.* Several sizes of brass sieves will be found very useful and also a bolting cloth sieve where tooth powders, tooth pastes, toilet powders, etc., are being made. Such work should be done in an enclosed box if possible and an ingenious worker will readily provide an apparatus in which the sieve slides on strips inside a closed box.

For those who make larger quantities of powders requiring mixing and sifting, there are excellent and not very expensive outfits for sale.

*Percolating and Filtering.* Several sizes of both conical and cylindrical percolators will be of use, and also a metal (tinned-iron) percolator for such drugs as are to be exhausted by a hot menstruum. The receiving bottle for the percolate should be as nearly closed as possible, and a good plan here is to insert very narrow-necked funnels in the bottles. This permits the percolate to enter but practically prevents evaporation.

Funnels of various sizes will be needed, and covers for these should always be used. Flat white enameled lids or dishes are excellent for this purpose and are inexpensive, and may also be used for percolators. What has been said about the receiving bottle for percolates applies equally to filtrates.

For holding these percolators or funnels a good plan is to have a shelf strongly supported by brackets or a base, arranged along the wall. At any planing mill round openings of varying sizes can be cut in this board shelf and percolators or funnels can rest in these holes.

If any amount of simple syrup is being used either in the pharmaceutical manufacturing or at the soda fountain, it will prove economical to install one of the special forms of syrup percolators now on sale.

*Macerating.* For macerating drugs or dissolving sugar in official syrups where cold processes are required, the five-pint or smaller glass-stoppered, tincture, shelf bottle is particularly well suited.

No store should tolerate the custom of using a wide-mouthed confection tablet jar, and closing the opening with the hand when shaking. It is unsanitary and wasteful.

*Grating and Grinding.* The cylindrical grater known as an almond grater, sold for household use, having a hopper, a wooden block to press the material against the cutting surface and clamping to the table, will be found a great convenience in any store.

It may be used to advantage in reducing camphor to small particles for solution in oil and is particularly adapted to the reducing of cocoa butter to a state suitable for hand or machine-made suppositories.

Speaking of mills, an inexpensive and efficient form for brittle substances is now offered, called the Quaker City Mill No. 4.

For drug grinding the use of a hand mill is very laborious, but at times of great use. Many forms are now for sale. The larger stores can have an electric motor for such work or one of the small gas engines so extensively sold for use on the farm. If such power is available, it may be applied to tablet making machines and also to the churning of ice cream if the soda fountain business justifies it.

An iron mortar and pestle will often be called into service if the operator is not depending upon a drug miller to supply his raw materials in comminuted form.

For some purposes, notably vanilla, a meat chopper is very satisfactory for preparing the material for maceration.

*Ointments.* In preparing ointments thorough rubbing is essential. If large quantities are to be handled, a "paint mill" should be used, connected with power, but for the usual quantities made in a store a wide, shallow dish or a large plate of ground glass is best. The rubbing of an ointment in a mortar rarely proves satisfactory in my experience.

*Distilled Water.* A small automatic water still will be found of great convenience, since the character of many preparations is notably improved by the use of pure water, and a liberal supply is necessary for the best results.

*Thermometers.* Many preparations are spoiled because the temperatures directed in the formula are not maintained. Expensive thermometers are not necessary for most manufacturing work, although there should be a standard,

tested, thermometer at hand for checking up marked errors in the readings of a cheap thermometer.

The so-called "dairy thermometer" is useful for many operations where an error of a fraction of a degree may be ignored. If a section of rubber hose is slipped over the mercury bulb it will prevent many breaks.

*Finishing packages.* It is desirable that the pharmacist should learn to wrap packages of pharmaceuticals in the so-called onion-skin paper. This protects the package from being soiled, and being transparent, saves the cost of a second label.

*The Library.* This has been left until almost the last, but it is of first importance. Just what books it should contain will depend chiefly upon the inclinations of the pharmacist, his training and the scope of the work he plans. It should include, without question, the latest editions of the United States Pharmacopoeia, National Formulary, New and Non-Official Remedies, a Dispensatory, a good Pharmaceutical Formulary, a Text-book on Pharmacy, a book of Synonyms in foreign languages, a book on Toxicology and Doses.

To this may be added many additional reference books, as Foreign Pharmacopoeias, Foreign Formularies, Foreign Text-books on any of the subjects connected with Pharmacy, General Receipt Books, Proceedings of the A. Ph. A., files of Drug Journals, current Drug Journals, books on Chemical Subjects, books on Botanical Subjects, books on Commercial Pharmacy, etc., etc.

*Records.* Suitable provision should be made for the records of formulas, cost, quantities made, etc. These may take the form of bound or loose-leaf books—or card index outfits. The small loose-leaf ledger, made by the John C. Moore corporation, is inexpensive, serviceable and well adapted to the keeping of laboratory records.

*Quality.* These statements would not be complete without a caution about the quality of the materials selected for preparations. The retail pharmacist is in direct competition with large manufacturing pharmaceutical houses and unless quality is maintained, his experiment in manufacturing will prove a disappointing failure.

Also, after providing high-grade raw material, see that the official formulas are closely and accurately followed. Failure to obey this point is a frequent cause of unsatisfactory products.

*Chemical Analysis and Microscopic Examination.* If our pharmacist is planning to analyze and pass upon the quality of all raw materials to enter his preparations and then standardize the finished products where analysis is possible, additional equipment will be required, but it is not the purpose here to enter up that phase of the subject.

Notwithstanding this rather lengthy presentation of this subject, the cost of such an equipment, for thoroughly satisfactory work, is not large, and when all has been summarized its greatest importance is the calibre of the man who will do the work, and this part of the equipment is frequently waiting only the word of encouragement and the directions to go ahead.