PILL COATING.*

By EDWARD S. BULL.

THE subject of this paper, although not at present in constant use, is very important to the pharmacist, and the number of prescriptions (daily increasing) which have to be dispensed, in which pills are ordered to be coated, claims for it a little attention. We have heard a good deal of late about pill coating. Some of the processes I shall bring before you to-night are taken from papers which have already been published, and formulæ extracted from journals, etc. However, a few of the processes may be new to my hearers.

We are all well acquainted with the old and still general method of dispensing pills, namely, rolling them in fine powders, such as magnesia, licorice, starch, lycopodium, etc., any of which powders, adhering to the moisture of the pill, form a kind of coating, but do not cover the taste and odor of the substances of which the pills are composed.

As pharmacy progressed, the attention of the pharmacist was absorbed in devising some means for making pills pleasing to the eye and agreeable to the palate.

One of the earliest methods used to attain this end was covering them with a solution of gelatine, which effectually conceals the taste and odor, and prevents chemical change in the pill from exposure to air.

We have now besides this several methods of pill coating, namely, varnishing, chalk coating (Creta. Gall.), sugar-coating, covering with gold or silver leaf, on each of which processes I shall make a few remarks.

Before attempting to coat pills it is needless for me to impress upon dispensers the necessity of having the pills perfectly round and hard—when I say *hard* I don't mean that they are to be made like marbles—a firm consistence is all that is required; for when properly coated they should retain that consistence for a considerable time, and not harden like pills merely kept in powders.

When practicable I should recommend that, in place of the essential oils put in the pills to prevent griping, such principles as gingerine, capsicine, etc., should be used, as the oils very often soak through the coating and discolor it. I find also when glycerine has been used as an excipient that the pills do not so readily take the coating, neither is the latter so permanent as it is under other circumstances. This is probably due to the hygroscopic nature of the glycerine.

When the pills contain essential oil they should, previous to being coated, be covered with a varnish consisting of gum juniper dissolved in ether or other varnish. A little common resin in the varnish greatly assists the adhesion of the coating.

The method adopted by M. Garot to cover pills with gelatine was to make a solution of gelatine in a small quantity of water, which is to be kept liquid by means of a water-bath. Each pill, suspended on the point of a pin, is dipped and afterward allowed to dry; the pin is then withdrawn, previously being warmed, which causes the orifice to close up. When coating pills with gelatine the solution should be kept at a certain density by the addition of water to allow for evaporation. Collodion has been used as a coating, but does not meet with approval on account of its doubtful solubility.

The varnishes in ordinary use are solutions of mastic, gum juniper, resin, or balsam of Tolu, dissolved in ether or chloroform in the proportion of 1 to 4. To varnish the pills, they must be put into a pot (an ordinary ointment pot answers very well); the varnish is then poured on, the pot quickly shaken, and the pills thrown upon a tray or slab; in a few minutes the ether or chloroform has evaporated, and the pills present a shiny varnished appearance. I find that if the slab is previously very slightly smeared with almond oil a much better result is obtained, as otherwise the pills are apt to stick in one place.

The pills, varnished with gum juniper, I notice, become very dull, and present a powdery appearance by constant friction with each other; the mastic solution does not produce a bright varnish; therefore I make it a rule to use the solution of either balsam or resin of Tolu.

I have tried to form a pearl coating on pills by first varnishing them with Tolu, and, before the varnish is dry, throwing them into a tin containing finely-powdered French chalk, or a mixture of French chalk and magnesia, and then shaking them with a rotary motion, but the result has in each case been most unsatisfactory, the powder adhering to the varnish very unevenly. The varnish I have found best for this kind of coating is one consisting of Canada balsam and ether. I exhibit here some pills first moistened with this varnish, and then rolled in a mixture of French chalk and magnesia over a spirit lamp; these pills at first were of a good color and presented a glossy appearance, but after keeping for six months they have become dull and of a dirty yellow color.

A few years ago a gentleman advertised for sale a recipe for coating pills. This proved to be simply to moisten the pills with mucilage of acacia (about one of gum to seven of water), and afterward rotate them in finely-powdered French chalk. I have never got a very good coating by this method, but a tolerably good appearance can be given to the pills by repeating the process several times, allowing each coat to dry before applying another.

I could prolong this paper considerably by enumerating the different methods I have tried in order to coat pills, but as the reverses I have met with would not prove very interesting, I will simply give you a few processes from which I have gained good results. What we most need is some method for coating pills in small quantities. The specimens I have on the table will give you some idea of how the pills will look after adopting the following methods, but I would recommend you not to be discouraged if at first you do not succeed as well as you could desire, as the result depends not so much on the component parts of the coating as on the manipulation.

A mucilage should be used, consisting of 1 part mucilage, acacia (B.P.) and 3 parts distilled water. A very good coating can be produced by first moistening the pills with this mixture and afterward rotating them in a basin or covered pot containing French chalk or a mixture of French chalk, 1 part, and heavy calcined magnesia, 2 parts. After well shaking the pills in this powder transfer them to another pot containing French chalk only, again shake them well, and finish by rotating in a clean dry basin without any powder. You can in this way coat any number of pills in a very short time.

Another process worth trying is to moisten the pills with mucilage and shake them in plaster of Paris, which forms a groundwork upon which, when dried and again moistened with mucilage, French chalk will adhere and form a very pearl-like coating.

I have tried diluted albumen, but have not met with good

success.* By first moistening the pills with an emulsion, consisting of balsam of Tolu 3j, mucilage, acacia 3ij, and water 3ss, and afterward rotating them, as above, in French chalk, with or without magnesia, a nice shining coating can be obtained, but it is objectionable on account of its yellow tint.

Another good method is to moisten the pill with a weak decoction of linseed, and afterward roll in a powder consisting of French chalk and powdered gum acacia.

A very good coating can be produced by rotating the pills, previously moistened with mucilage of tragacanth, in a mixture of French chalk, sugar, and magnesia, or French chalk, gum acacia, and magnesia, afterward polishing in French chalk alone. The appearance of the coating in most of the above cases can be varied by coloring the powder with a few grains of carmine or tumeric, scented with otto of roses or essence of lemon.

With regard to sugar-coating I cannot say much, as I have not met with very great success. The various processes no doubt answer best when carried out on a large scale. I have tried a method suggested by Mr. Symes, Ph.D., in a paper read before the Liverpool Chemists' Association. His process is as follows: The pills, well dried on the surface, are introduced into a tinned copper bowl with a flat bottom, or enamelled iron dish, the surface of which has to be moistened with syrup or a mixture of syrup and gum; they are then rotated and gently heated, finely-powdered sugar being dusted on, and the motion kept up until a perfectly hard coating is obtained. This operation is repeated until the desired effect is produced. I find this answers very well, but prefer using a mixture of sugar and sugar of milk instead of sugar only. Before leaving this class of coating I must again impress upon you the necessity of proper manipulation. The first attempt generally proves a failure, but by perseverance a very good coating can be given to the pill by some of the above processes.

I need not describe to you the well-known way to silver pills, but I find a more polished appearance is obtained by allowing the pills to stand for a few minutes after covering with the leaf, and then rotating them in a dry pot. A little cotton-wool in the pot greatly assists in detaching any loose particles of leaf. Pills which contain chemicals likely to act on the silver, and those containing assafœtida, which, on account of the sulphur it contains, destroys the silver, should, previous to receiving the leaf, be varnished with Tolu.

FLOORS.

WHEN a man with limited means determines to build for his own use, he is likely to be puzzled about floors. On the other hand, if he already owns or hires a house and is dissatisfied with the old method of carpeting, he is likely to be still more puzzled. When means are unlimited, the principal difficulty is removed, and various materials are available. For vestibules and halls there are a variety of tiles of marble or encaustic; the latter glazed, figured, parti-colored, and enameled, in endless combinations and patterns. For rooms there are inlays, or marquetry, in various colored hard woods, whose surface may be kept polished to a high degree of perfection. The "wood carpeting," a veneer of marquetry about a quarter of an inch thick and backed with canvas glued on, can be laid over an ordinary floor old or new, and wears well. These are all good but costly. Even the "wood carpeting," the cheapest of all, costs more than the best English Brussels carpeting, and requires a smooth "upper floor" for a proper foundation, while it involves the same outlay for rugs and mats as the others, and demands the same expensive care.

These are all as foreign to a small, inexpensive house as any other species of extravagance would be. The common need is for an even surface of pleasant but not decided color, and one that will not catch or show dirt unnecessarily, free from cracks, and tough enough to stand without marked injury the ordinary wear of "living rooms." Rugs must be used, if at all, for other reasons than the protection of the floor; for it cannot be expected that a surface subjected to common use, with only common care, can be maintained with a finish like that of furniture. Projecting nails in boots will leave marks, and dust and mud tracks will show at times, to the annoyance of the tidy housekeeper who has been used to having a large share of dirt absorbed and held by carpets from one spring cleaning to the next. It is an honest floor, however, and when you put your foot on it you may feel that you have got hold of a part of the house; and if the footprints show, the showing can be removed. All the dust will collect in little rolls of lint under furniture and in corners where it can be easily detected. Such a surface needs a little more care than the old-fashioned carpet, but the work is of a lighter character.

A "plain board floor" is the thing desired, and the name would seem to indicate something easy of attainment; but it is not so simple a matter as one would suppose. To select the material needs the best of judgment, and the work of laying calls for highly skilled labor.

The best stock for the purpose now in the market is Ohio white oak, clear, free from all defects and thoroughly seasoned and kiln-dried. The boards should be not over two and a half inches wide, "matched," that is, tongued and grooved, and "blind nailed," that is, nailed diagonally through the edge. The surface should be well smoothed with the plane after laying (of course being mill-planed before laying), the tool being used with the grain only, as any cross planing at the ends of boards or elsewhere makes bad spots after finish. In places where the plane cannot be worked a steel scraper should be used. The filling of the wood should be of the finest whiting or plaster of Paris (with a little coloring matter slightly darker than the tone of the wood) in kerosene oil or spirits of turpentine. It should be spread on evenly with a brush, and very thoroughly rubbed in with fine hard-wood shavings or cotton waste. The kerosene oil and spirits are merely "vehicles" to hold the filling in solution and assist in getting it into the pores of the wood. None of the filling should be left on the surface. As soon as dry it should have one thin coat of shellac. When this is dry (which will be in a few hours) the floor will be ready for use.

For its care when in use, certain things should be borne in mind: The common scouring or scrubbing with hot soap-suds is neither required nor allowable. It is true that the oak floors of the old-fashioned kitchens, which lasted and looked well for a hundred years or more, were scoured with soap and sand; but the labor was very great, and could hardly be had from the modern servant at any reasonable expense. A little more care in the filling and finish suits the present condition of things better. Any soiling from mud

* A friend informs me that he gets a good result by mixing albumen with diluted mucilage and rolling the pills in French chalk with the aid of heat. He keeps the albumen dried and powdered for use when required.

can be removed with a damp woolen cloth, any dust with a dry one. Sweeping with a brush, followed by wiping over with a dry woolen cloth tied over the brush, answers ordinary needs. About once in six months it is well to give the work a very thin coat of shellac. No oil should be used on it before or after finishing. The great mistake made in the treatment of hard woods, and especially where used in floors, is the amount of oil, wax, varnish, filling, and other gummy materials that are applied to and left on the surface. The beauty of all such finish is to have the wood show its natural color and grain. The thin coat of shellac, specified above, is meant simply to prevent any greasy dirt from striking into the wood and causing a stain that would require hard scrubbing or scraping to remove. If a floor is once polished it must always be kept so, and this requires hard work by an expert at frequent intervals. In countries where such is the custom, two men visit the house about once a week, and work with stiff waxed brushes fastened to their feet and others on long handles in their hands. With these they skate and rub over the floor for an hour or so until the surface has a glaze like a mirror. Here such labor would be expensive and otherwise inconvenient.

If properly laid and kept, oak boards should endure for a century and improve in appearance with increasing age. But thus prepared they are expensive, costing complete at this time about fifty dollars for an ordinary room. Nor is the cost of carpeting saved altogether, for the rugs and mats needed near tables, doors, and fireplaces will amount to perhaps two-thirds the price of carpets, without going into any extravagance in the shape of Indian or Turkish fabrics; so that the house-builder with but a narrow margin for luxuries, although he might be led to adopt this method and material for the principal first-story rooms and hall, with perhaps the staircase landings and entries, where the hardest wear comes, would hesitate about the expense for the chambers. Hard woods of lesser cost for these would be white Western ash, white maple, black birch, cherry, and hard or Southern pine. Black walnut is too dark in color, except for partial use with other woods, and butternut is too soft. There are some other varieties that may, under some conditions of locality or special quality, be useful for the purpose; among these are brown ash and chestnut. But at present we confine consideration to the five more common and best tested varieties which we first named. If these are selected and laid with all the care prescribed for the oak, they will answer very well. The ash is lighter in color and coarser in grain than the oak, and improves less with age. Maple is light and rather cold in color, but has a fine even grain. Cherry has a very fine grain and nice warm tone of color, but shows marks a little more than coarser woods. Hard pine has a tendency to turn black if wet. The cost of these is from a third to a half less than oak.

Over an old floor any of the above woods can be laid, either one-half inch thick if matched and blind nailed, or one-quarter inch thick if square edged, in strips about two inches wide, nailed through the top with fine wire nails or long brads or finish nails. If quarter inch stuff is used, the floor on which it is nailed must have a very even surface, or the new work will be liable to be broken.

The least expensive floors that can be laid are of pine or spruce, and such are commonly used under carpets. Where they are to be left uncovered, nothing but extreme care in selection and finish will insure good work. Even at the best they will grow quite shabby under hard wear. The material is so soft and its color is so light that stain and shellac, or paint, are required to give a proper surface for use. No stain of a good tone of color has yet been devised that will penetrate the wood to such a depth that ordinary wear will not soon destroy it in places. Paint looks well at first but requires renewal, and its smell when new is neither pleasant nor wholesome in the house. When paint is used it should be put on in very thin coats and allowed to dry hard before use. The painting may be in party-colors, in a panel with margin or border and line, or it may be of a plain color and be spattered with another—or two if desired—a treatment which both looks and wears well for a time.

The greatest difficulty about all flooring—and this applies to some extent to the hard woods also—is to get proper stock. It seems at times as if good seasoned lumber were a thing of the past. Surveyors and dealers exercise the utmost ingenuity in devising ways to lower the standard of trade. Some years ago, if good, sound, clear, dry, straight-grained wood were needed, it was only necessary to describe it as "first quality" or "best." Now "first quality" means nothing, or perhaps an inferior third quality. To get the real first, if it can be had at all, a string of newly invented special terms must be used combined with two or three X's or other symbols, and even these terms and signs keep changing with the gradual degeneracy of lumber manufacture.

Flooring boards, to be fit for exposed wear, should be sawed from the heart of the log, and be of absolutely straight grain, entirely free from knots, and of clear, even color. Every board should be examined separately before laid, and none but careful and experienced workmen be employed to lay them. They should be well seasoned and "kiln dried" enough to stand furnace heat. There is such a thing as too much "kiln drying," which "takes the life out" of wood, causing it to absorb moisture from the air and swell. Boards to stand wear should never be sawed "slash-wise," that is, parallel or nearly so with the flat grain of the wood, as in the outside slabs of a log. They should be "quarter sawed," that is, the log should be sawed in quarters and the boards from the flat sides of the quarters. This increases the difficulty of sawing, but gives more good boards. Stock that shows wavy lines and marks, such as would be chosen for panels and furniture, is not desirable for floors. Any little edges, that under hard wear will scale up or become rough, are bad. Unless there is to be a pattern of colored woods, as in marquetry, it is no object to have any variety. A plain, even surface of dull, rich tint with a finish smooth but not slippery is what is needed.

It is hardly necessary to advocate or defend bare floors against carpeted ones. They are rapidly coming into use, not so much from fashion as because experience has convinced housekeepers that the objections to them are unfounded or are overbalanced by their merits. They are found not to be cold or noisy to any degree. Their so-called bare and cheerless aspect vanishes as the eye becomes accustomed to them; but, best of all, the labor of housekeeping is very materially reduced by their use. If rugs are selected of such materials as do not wear off in the form of lint too rapidly—rugs made of Brussels carpeting are very good in this respect, while those of Kidderminster are the reverse—the amount of dirt and dust that will collect in the ordinary use of a room is surprisingly small.

On the ground of expense, although the cost of a good

* A paper recently read before the London Chemists' Assistants' Association.