SECTION OF PRACTICAL PHARMACY AND DISPENSING

EXTEMPORANEOUS TABLET MAKING.*

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This is an age of tablet medication. According to Kebler,[1] it is estimated that from one-fourth to one-third of all the medicaments in the United States are administered in the form of tablets. In view of this, is it not remarkable that dispensing pharmacists have so far taken very little interest in tablet making? The assumption is that tablets are unsuited for extemporaneous preparation because they require drying, and that they can be bought much more cheaply than they can be made by the dispensers. So far as the cost is concerned, it is just as true of pills, capsules, and suppositories as it is of tablets. The manufacture in large quantities is much more economical than the making of small lots; and whenever the demand for a certain kind of tablets justifies purchasing them in large quantities, it would not pay the retail pharmacist to make them. We believe, however, that so far as the making of prescription quantities is concerned tablets may as readily and economically be prepared as pills and suppositories.

The principal objection to extemporaneous tablet making is that drying is necessary, whether tablet triturates are to be moulded, or granules are to be prepared for the making of compressed tablets. If now a simple dry process of tablet making might be devised, extemporaneous tablet making ought to be easily accomplished. This study was undertaken to determine to what extent dry processes of tablet making are practical.

GRANULAR MATERIAL.

It is a well-established fact that granular material can readily be compressed in the tablet machine. Hence the following chemicals, kept as they usually are in granular form, are ready for compression in a tablet machine without further treatment: Ammonium chloride, potassium bromide, potassium iodide, potassium chlorate, monobromated camphor, hexamethylamine, chloral hydrate, thyroid, pancreatin, citrated caffeine, and saccharated ferrous carbonate.

Scales and crystals may be broken down to form granules, sifted through a No. 20 sieve, and they are ready for compression, provided the substance is fairly soluble, *e.g.*, boric acid, potassium permanganate, and pepsin. Gums and resins may also readily be made into tablets, as acacia and mastic.

Substances that are insoluble or almost insoluble, such as salol or phenacetine, can be readily made into tablets by themselves because of their flaky nature, but need the addition of a disintegrator; possibly the best is starch. Recently dextrin was suggested[2] for this purpose, 35 percent or 50 percent of which added to

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[1] Kebler, L. F., "The Tablet Industry," Jour. Amer. Pharm. Assn., June, July, August, 1914.

[2] Müller, Bertha S., "A Note on Compressed Tablets," Amer. Jour. Pharm., vol. 87, May 19, 1915, p. 197.

bismuth subnitrate does not make the tablets approach in disintegrating quality those made with 20 percent of starch. Hence salol tablets may be readily prepared by using one part of starch to four of salol. They are to be compressed in a tablet machine under considerable pressure. Betanaphthol, acetanilide, sulphonal, and trional may be made into tablets after the same formula.

FINE POWDERS.

We have thus far spoken of substances that are in granular or similar form. It has generally been assumed that substances in fine powder are unsuitable for tablet making. This is true if the fine powder is homogeneous. It is not true of certain powder mixtures: Dover's powder, for instance, lends itself readily to compression in a tablet machine.

The suggestion made by A. Schleimer[3] to add three percent of cacao butter shavings to the powder by gentle trituration is of extensive applicability, and enables one to make tablets of such substances as bismuth subnitrate, sulphur, calomel, and charcoal; indeed, of almost any other powder, especially if the proportion of cacao butter be somewhat increased, for instance, to five percent.

The following formula for bismuth subnitrate tablets is suggested:

Bismuth subnitrate	4. grammes
Starch	1. gramme
Cacao butter	0.1 gramme

One of the authors of this paper, experimenting rather extensively on the making of sweet tablets for "Candy Medication,"[4] has found that for sugar and analogous powders much more satisfactory results can be obtained by the use of starch impregnated with an oleaginous substance. The best is liquid petrolatum, for which the name "fat starch" is proposed and for which the following formula is given:

"FAT STARCH."

Liquid petrolatum	25
Starch	75

Mix by trituration.

This "fat starch," present in the trituration to the extent of 20 percent, enables one to make tablets of not only cane-sugar or milk-sugar, but also of all triturations containing a considerable proportion of either of these sugars, as well as of the following substances: Sodium bicarbonate, sodium salicylate, and aspirin.

It should be noted here that cacao powder added to the extent of ten percent lends itself to the same uses in tablet making as "fat starch," and where it is applicable it has the advantage of contributing flavor to the tablet. The added color is sometimes objectionable.

It might be interesting to speculate upon the reason that homogeneous powders in general do not lend themselves to tablet making, while certain heterogeneous powders are readily compressed into forms. A striking example of this is seen in sulphur and charcoal, neither of which can be made into tablets alone, but the addition of as little as two percent of charcoal to powdered sulphur will make almost perfect tablets. It has suggested itself to our minds that electricity might

[3] Schleimer, A., National Druggist, February, 1909, p. 54.

[4] Fantus, B., "Candy Medication," C. V. Mosby Company, St. Louis, 1915.

have something to do with these phenomena. It is well known that when a substance, *e.g.*, a glass rod or a stick of sulphur, is rubbed, it becomes electrified. When, therefore, we compress either powdered sulphur or powdered charcoal in a tablet machine, they might be expected to become electrified: the particles becoming charged with the same kind of electricity repelling each other, hence the failure to work well in the tablet machine. If now we mix these two powders which become electrified with opposite charges that attract each other, perfect working in the tablet machine is secured, provided the proper proportion is maintained. We have undertaken some work involving this thought, but have not advanced sufficiently to enable us at present to deny or affirm this hypothesis.

Tablets prepared by the foregoing processes disintegrate quickly and completely. For tablets made extemporaneously the following advantages are apparent:

1. They are fresh and unaltered.
2. The pharmacist can guarantee the product.
3. It is not necessary to buy large quantities.
4. It is not necessary to carry a large line of tablets.

It will be conceded that the tablet is a most convenient form of medication, and all indications are that its use will increase rather than wane. With the knowledge that the tablet is so popular, is it not the part of wisdom for the pharmacist to fit himself for preparing tablets so that he may be in a position to compound prescriptions for them in a manner that is in keeping with the profession? The manipulations are not difficult, the apparatus is inexpensive, and the different combinations can be quite as readily devised as for the same number of pills.

LABORATORIES OF PHARMACY AND OF PHARMACOLOGY OF THE UNIVERSITY OF ILLINOIS.

RULE FOR CONVERTING DEGREES FAHRENHEIT INTO CENTIGRADE AND REVERSE.

Professor Otto Raubenheimer has sent us the following rule for converting degrees of the Fahrenheit thermometer scale into those of the Centigrade, and, as with all good rules, the reverse calculation may also be made by the method, which is taken from the Bulletin of the College of Pharmacy of Jersey City.

Add 40 to the degree to be converted; if the conversion is from Fahrenheit to Centigrade, multiply the sum obtained by 5 and divide this by 9, then subtract 40 from the result of the division. If the conversion is from Centigrade to Fahrenheit, the only difference is in the second step; namely, the multiplication is by 9, and the division by 5.