

## CRUDE DRUGS OF THE U. S. P. IX, FROM A COMMERCIAL POINT OF VIEW.\*

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My subject, "Crude Drugs of the U. S. P. IX, from a Commercial Point of View," suggests several considerations and I shall try to present them in the following order: *Their Standards; Their Market Values; Difficulties of Securing Supplies of Foreign Drugs; Difficulties of Securing Supplies of Domestic Drugs.*

Of necessity, I will confine my remarks to Botanical Crude Drugs, since my relation is entirely with this line of business. About most other items of the Pharmacopoeia, I must confess a large amount of ignorance.

*Their Standards:* The standards that our new Pharmacopoeia has provided for Botanical Drugs, speaking generally, are unquestionably wise, and not unreasonable. We find in the U. S. P. IX a clear and specific standard for most of our important official botanicals. Those for which our chemists have been unable to establish chemical methods of determination of quality, are provided for by other standards which will safe-guard the public against anything that is not true to name and of the best quality.

## A WORD ABOUT CHEMICAL STANDARDS OF THE RECENT REVISION.

The drugs containing definite alkaloids, such as Belladonna, Henbane, Hydrastis, Ipecac, Jalap, Jaborandi, Nux Vomica, Colchicum, etc., have standards which can be readily met in the average good quality of the market.

In some of these assayable drugs, it has been interesting to note the changes they have undergone.

Some time ago, because of inability to obtain commercial quantities of belladonna root and leaf, jalap, colchicum and other crude botanicals, meeting the standards of U. S. P. VIII, these requirements were reduced and continue in force to-day. At the present time there is seldom any difficulty in securing most of these drugs well above the present requirements. It is not easy to explain why, at one time, in some cases the alkaloidal content is uniformly low, even in good appearing lots, while at others, perhaps with the lapse of a year or two, the same drugs having no less impurities, will run much higher in alkaloid. Taking, however, the maximum and minimum alkaloidal content of these drugs at different periods, the standards provided are doubtless a good average.

A most valuable addition has been the statement of ash-limits for each item. Information of interest is very rapidly available by this test and with much less likelihood of wide variation in the hands of different persons. It makes for cleaner crude drugs and in a way regulates the character of the foreign matter permissible under present requirements.

Passing from the chemical standards and considering physical qualities, we find wise provisions from a commercial point of view, now made for botanical drugs, the quality of which is judged by their physical condition and appearance. Owing to the fact that botanicals are widely gathered throughout the world by the lowest class of labor, both in pay and intelligence, it has been impossible to obtain a 100 percent standard of quality for scarcely any botanical drug.

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When buchu is gathered in the southern portion of Africa, it makes no difference how much pressure is brought upon the natives, they will still supply it with more or less stems, dirt, or other admixtures. When our spigelia root, leptandra root, queen of meadow root, skunk cabbage root, hydrangea root, are gathered, it would require, owing to formation of root branches, a great amount of labor to remove all the adhering dirt. In the collection of seeds which usually grow wild, the peasant labor of Russia is entirely beyond our control, and we cannot prevent the mixing in, to some extent, at least, of other seeds.

It may readily be seen that to purify such goods would more than double the labor cost, while only producing a quality about 10 percent better than now exists in the market. Because of this condition, we find in the new standards a general allowance for stems and foreign matter in many items. A few instances of such percentage allowances are: Buchu leaves, 10; pink root, 10; coriander seed, 5; caraway seed, 3; cloves, 5; senna, 10; *uva ursi*, 4; fennel seed, 4; and so on. In fixing these standards it is not to be expected that some mistakes would not occur, and we find some drugs which have never been (up to this time) produced commercially, equal to present requirements.

On consulting the item *Lobelia*—"the dry leaves and flowering tops, without more than 10 percent of stem and foreign matter"—is given as the standard. In the flowering tops there must be some stem, which would possibly be 10 percent of the total, so that no more stem must be present if the drug strictly conforms to requirements. The same conditions exist in the specification for *Grindelia*. Neither of these drugs will be found on the market within 50 percent of the requirements, and when eventually, both are commercially obtained to meet the standard mentioned, the price now averaging 8 cents per pound, crude, in bale, will be several times this figure, and will be due entirely to the increased cost of labor in producing them. There will also be the risk that there will not be anything like enough produced; this will cause a scarcity which may further increase the price.

The Microscopic Standards which the new Pharmacopoeia presents, of course, make necessary the services of an expert pharmacognosist; but we have no reason to be other than thankful, that such standards are possible, for we all know that microscopical work of experts has been the backbone of the enforcement of the Federal Food and Drugs Act, as far as botanical drugs are concerned.

It is not enough to-day to have a broad general commercial experience in identifying physically, certain products among which may be mentioned, matico, spigelia, belladonna and *viburnum opulus*; it is also necessary, in order to remove all doubt of the genuineness of these and others, that the microscopical work be conducted by experts. A great many mistakes have been made, and are being made to-day, in the identification of drugs because the proper methods are not followed, and it is vitally necessary to uphold the present standards and that expert microscopical work be done on all goods entering this country.

Under physiological standards recommended by the U. S. P. we find classed: Ergot, Aconite, Cannabis, Digitalis, Strophanthus and others. From a commercial viewpoint, we have more or less difficulty, though we are successful, in bringing all necessary drugs up to proper chemical, microscopic and macroscopic standards. But these difficulties are small compared with those encountered in the

maintenance of reliable physiologically tested drugs. I think, however, there will be improvements in the near future which will yield entirely satisfactory results.

It is of general interest to compare Crude Drugs Standards and Conditions of to-day with those of the U. S. P. VIII and prior to the passage of the Federal Food and Drugs Act.

In the foregoing, reference has been made to our present standards, and in comparing them with the U. S. P. VIII, we find very marked differences.

When the Pharmacopoeia was recognized in the law of 1906, the commercial viewpoint of it was not a pleasant one, but it eventually became apparent that the standards it provided would be enforced, making it necessary for many, who had not dusted their Pharmacopoeias for many years, to take them down and begin a new course of commercial work. In the beginning it was thought that unsurmountable difficulties were ahead, in testing assayable drugs, and in procuring supplies to meet the requirements, because of the fact that the U. S. P. VIII made no allowance for any foreign material present in various drugs; products containing even a minute quantity of foreign matter had to be labeled "not U. S. P.," thus damaging the merchandise from a market standpoint. When we compare our present standards with those of the old revision, we can be thankful that the Federal Food and Drugs Act came upon us with the less stringent requirements of U. S. P. VIII to conform to.

Some entertainment may be found in thinking of the conditions surrounding crude drug merchandising which existed prior to the passage of the Federal Food and Drugs Act. It was then merely a question of selling roots and herbs, much as any other commercial business is conducted. You could then buy a given crude drug for 10 cents per pound or 30 cents per pound, as you can to-day purchase a necktie for 25 cents or \$2.00.

It is not surprising that spigelia root was then found by inquisitive people to have no anthelmintic properties, that *viburnum opulus* lost some of its reputation. Although impressions to the contrary have prevailed, such practices were by no means intentional with many merchants interested in marketing crude drugs. Conditions then were such, that, commercially, the qualities of to-day could rarely be disposed of, and nothing short of the drastic Federal law, we now enjoy, could have wrought the change. When the law became effective, it looked rather dark for the future of the crude drug business, but, as was foreseen by a few, it has actually proved a very successful measure from a commercial viewpoint, and the standards of to-day stand as a protection to the merchant wishing to conduct his business upon ethical lines.

*Market Values:* In the Wall Street district since the outbreak of the war, the public has been treated to unprecedented fluctuations. We have seen some industrial stocks, especially "War-Brides," rise from a few dollars per share to several hundred dollars, and the only other parallel to such advances in commercial affairs has been in the drug and chemical business. Unfortunately the drug and chemical business has not the advantage that the Wall Street stocks have, inasmuch as our stocks must be real and cannot be turned out on paper according to the market demand.

The question of supply and demand is altogether responsible for existing conditions. During the past few months we have seen many botanicals pass from a

few cents per pound in market value to a good many dollars per pound, with the need just as great, though, of course, the consumption curtailed, as when the price was low.

It must be remembered that, contrary to a natural supposition in the case, an item such as pulsatilla herb is in demand not because of superior medicinal value, but merely because some particular pharmaceutical product containing this drug, or some unchangeable physician's demand for this particular herb, and nothing else, causes the rise in price. While pulsatilla herb formerly sold at 40 cents per pound, sales have recently been made in the New York wholesale market at \$8.50 per pound. We have seen henbane rise in value from 8 cents, to its present price, which though nominal, is \$6.00 per pound.

Aconite root formerly 8 cents per pound, now is 75 cents.

Alkanet root formerly 6 cents per pound, now is \$2.00.

Arnica flowers, formerly 8 cents per pound, now are \$2.75.

Buckthorn berries formerly 18 cents per pound, now are \$2.00.

Cantharides formerly 25 cents per pound, now are \$4.50.

Calendula flowers formerly 30 cents, now are \$4.50.

Chamomile flowers, formerly 8 cents per pound, now are 60 cents.

Fenugreek seed, formerly 3 cents per pound, now is 13 cents.

Licorice root formerly 4 cents per pound, now is 25 cents.

Senna, T. V., formerly 6 cents per pound, now is 24 cents.

Senna, Alexandria, formerly 12 cents per pound, now is 75 cents.

The mathematics required to calculate these percentages of advance is beyond the capacity of the speaker, but at present a mere 50 or 100 percent advance is of little moment.

The scope of activity of a crude drug establishment and the disposal of the many items coming under the general term of "Botanical Drugs" is not fully realized by many outsiders. We find the veterinary manufacturer an outlet for our aloes, gentian, and other similar items; the pharmaceutical manufacturer, for alkaloidal drugs, and the general line; the toilet goods manufacturer for many; the ice cream dealer for others; the textile manufacturer for others. Literally the butcher, the baker, the candle-stick maker are all customers of the crude drug merchant.

During the past three years, the market conditions have imposed the severest tests upon the ability of the crude drug merchant. It now seems that his problem of a few years ago was a very simple one, as it required only that he be guided by precedents, in arriving at the wisest course for the day's action. Precedent used to be spelled with capital letters, and usually signs of "Business before pleasure," "Do it now," and many other injunctions were all overshadowed by the word "Precedent." To-day the word cannot be found in a business establishment, and the person that ventures to suggest a "precedent" generally finds himself edged away from, and regarded as a freak by his associates.

As we all know, the severance of commercial relations with Germany, at the beginning of the war caused much anxiety and considerable panic, but we have not *yet* realized, perhaps, the full extent of the step. If in the beginning it could have been foreseen that so many of our drugs, both mineral and vegetable, would be cut off, steps could have been taken to replace them by substitutes or parallel drugs,

particularly the items above mentioned. To obtain supplies, we have been compelled to ransack all parts of the world, securing ridiculously small amounts from various countries, where surplus stocks were held. To-day, we are getting very limited quantities from neutral European countries. Little thought was given in the beginning to drugs other than those controlled by Germany, but it is now a fact that the scarcity of ships to bring us raw materials from the Far East, the Mediterranean and even South America, has entered into the difficulty of obtaining supplies and caused absurd market advances. Nux vomica and gamboge from India, and a number of items from Japan and China—our spices from the Far East—have all distressingly advanced in price. To secure merchandise by correspondence, as of old, has practically been abandoned. We must cable and re-cable to get materials at all.

*Domestic Drugs:* The difficulties of securing domestic drugs presents wholly a different aspect, as this line has been full of competition. A bare living was made by the natives of the mountains of Western North Carolina, in gathering our supplies of wild cherry, sassafras, black haw and about 150 other crude drug articles. Competition reducing the price, usually helped in normal times to secure these herbs. Now that we have greatly increased demands on labor for farm products, barks for tanneries, wood for paper pulp and many other industries which provide the same class of labor with remunerative work, we have great trouble in securing domestic drugs. The state of affairs is due almost entirely to labor scarcity. We have seen this winter, lady slipper root advance more than 200 percent; Canada snake root about 300 percent; spikenard, squaw vine and many others have advanced. There is little prospect of the present season's collection relieving the situation, and American drugs must take their place in the line of march to higher prices.

I am inclined to think that the crude drugs of the U. S. P. IX, on account of the higher plane they now occupy and because of the standards maintained for them, are likely to increase in consumption, and in usefulness. They will be real factors in the mitigation of sickness and disease.

LABORATORY, S. B. PENICK & Co.

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#### GELATIN AS A NUTRIENT.

It is generally supposed that gelatin is incapable of building tissues, and that in no way can it be regarded as a true substitute for proteins. But recent biochemical researches show that under certain conditions gelatin can replace the proteins for the purposes of nutrition. Evidence has been adduced that the addition of the amino-acid tryptophane alone to the hydrolysis products obtained from pure gelatin made these efficient in maintaining the nutrition of animals. The addition of tyrosine does not give the same decided effect as tryptophane. In the case of unhydrolysed gelatin, however, it was badly digested and absorbed, and this explains the failure to obtain good results upon the addition of the missing amino-acids in previous experiments. With the addition of tryptophane to hydrolysed gelatin in the cases of four rats experimented upon, two were not only able to maintain their weight but also exhibited some growth, and their general condition remained satisfactory.—G. Totani (*Bio-Chem. Journ.*, October 1916, through *Pharmaceutical Journal*).