

## SPECIFICATION IN BUYING DRUGS.\*

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The interest and value of scientific work in pharmacy lies largely in its everyday application. I believe you gentlemen are more interested in hearing of the final results of experimental and research work as it applies to you and your daily business, than you are in the theoretical and purely scientific description of method, apparatus, etc. Following out this idea, I am going to give you the conclusions drawn from a very large amount of analytical data on the raw materials of the market. These conclusions naturally take the form of suggestions to you as to the specifications for the raw materials which you buy. In other words, I am going to try to suggest to you certain definite specifications which are good to use in buying your drugs, and through which you can take advantage of this scientific examination of market chemicals and drugs that has been done during the last six years.

From the wholesale druggist's standpoint there are two conflicting interests at work in the selection of the raw materials for sale. He is probably desirous of giving as good an article as possible and he is certainly influenced by the desire not to supply anything which does not comply with the stringent drug laws. On the other hand, he must meet competition. He must buy an article which he can sell at a profit, in competition with the articles put out by his competitors. He tries to talk "quality," but always fears that his customers believe he is trying simply to get a larger profit and that he is not giving them better goods for their money. The result of this is, that the average wholesaler is convinced that some druggists do not care for "quality" but simply wish the cheapest article they can buy. If, therefore, he is compelled, by either a real or fancied demand on the part of the retailers, to sell the cheapest grades of drugs, he is not willing to state frankly upon the label or in his catalogs the exact quality of these goods. If he were to do so, his cheaper grade would immediately, in the eyes of the purchaser, seem to be inferior to the competitive grade offered by some other house, which was not definitely classified by statements of its label. The result of this condition has been that the wholesale drug trade, on the whole, is endeavoring to market low-priced goods, and is glossing over, as much as possible, the inferiority of the goods. Gentlemen, the only cure for this condition lies with the retail druggist. If you will specify definitely what you want and insist upon having goods definitely labeled as to quality, you will get good drugs at reasonable prices, for you will force your jobbers to meet each other's prices on a common ground, instead of trying to beat each other's prices on an inferior ground. Therefore, I believe that this matter should be brought to your attention and I hope the facts which I shall give you hereafter, which facts are based on the analytical reports of thousands of samples, will lead you to realize the true situation and to remedy it by specifying your exact wants when ordering goods.

The principal conclusion which I have derived from this work, is that the best

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and safest course for the retail druggist is to specify "U. S. P." on every article included in that standard of authority, the Pharmacopœia.

First, let us see how that suggestion affects the buying of chemicals. A wholesale druggist's stock usually contains two grades of each common chemical. The commercial, or ordinary grade, he buys and sells in bulk, while the so-called "C. P." grade is bought and sold in original packages, under the label of the manufacturing chemist. You will not find "U. S. P." specified very generally on chemicals. Now the commercial grade is, to the average wholesale druggist, of unknown quality. He has been handling Epsom salts, cream of tartar, permanganate of potash, etc., in barrels and drums, for many years without considering anything but price in purchasing, and he probably knows little or nothing of their purity. Doubtless he is buying from some large producer, the most of whose product goes for technical purposes, and who may have heard of the United State Pharmacopœia, but probably pays it little regard. These drugs, being sold to the wholesaler under labels as above, are consequently sold by him under the same label. Occasionally, to be on the safe side, he may put the words, "for technical use only" or, "commercial" under the principal title, but usually, he sells the goods under the same label he finds the manufacturer using. While the wholesaler is almost entirely at fault in this matter, nevertheless it may be said that many articles bearing the label "for technical use only" are accepted by druggists without hesitation. At the other extreme from these commercial grades, you have the so-called chemically pure articles. Of course they are not chemically pure. No chemical, not even those of reagent quality, can be. But, at any rate, they are highly purified. Of "highest purity" is the proper designation. This is the ordinary selection which you may make in buying chemicals from the stock of a wholesale druggist. It is a case of "out of the frying pan into the fire." You either take chances on a poor quality or pay excessive prices for the best quality. I am not sure which is "the fire." Often, the guaranteed purity and the beauty of the so-called C. P. chemicals, do not warrant the price asked for them, and, in practice, their super-excellence is often not demanded and is wasteful. Frequently, too, by being adjusted to a different standard, they vary from U. S. P. chemicals in strength, so considerably, that they must be standardized, before using in a U. S. P. formula. This is shown by the variations in strength between the C. P. and the U. S. P. mineral acids. Is it possible, you ask, to get out of "the frying fan" without getting into "the fire?" I think it is. If you specify U. S. P. *always and only*, your difficulty will be solved. The Pharmacopœia is a thoroughly practical, as well as a scientific volume. Drugs meeting the requirements of the Pharmacopœia are, in almost every case, just good enough for medicinal purposes. What need is there of having them purer? You will be surprised to find that you will frequently pay no more for U. S. P. chemicals, guaranteed to you, than for the present bulk goods, the quality of which is unknown to you. On the whole, the Pharmacopœia committee has directed standards for purity that are not expensive to comply with. There is one consideration, however, that you must learn to overlook if you buy U. S. P. chemicals and consider prices. If you secure goods labeled with these initials, from a house that you know has graded them from their own examination you must disregard their appearance. A large part of the expense of pre-

paring C. P. articles, comes from the many re-crystallizations, re-distillations, etc., necessary to secure their fine appearance, which is so much admired. If you do not wish to pay the price, you must be satisfied with the frequently mediocre appearance of the U. S. P. articles.

As applied to chemicals, then, insist on those marked U. S. P. and refuse all goods labeled with such vague specifications as, "pure," "purified," "white," "medicinal," "redistilled," etc. These same remarks also apply to the drugs and oils that are found in the Pharmacopœia, although, in the case of these drugs you will less often find a pure grade in the average wholesaler's stock, and you will also find fewer retailers who desire to pay the price for the U. S. P. grade. I think, if you consulted the employes of the drug-department of any wholesale druggist you would find that, in nine cases out of ten, their instructions were to send the ordinary commercial or technical grade of oils and drugs, unless a better grade was specified. And this is the result of experience and not from choice. It is because the retailer has too often returned the better and higher priced article, when it was sent him without his specific instructions.

Now I propose to give you some definite examples of the difference between the U. S. P. grade of a number of articles and the ordinary grade:

*Castile Soap.* Very little of the castile soap you buy is made from olive oil, or wholly from olive oil. It is manufactured from a compound of olive oil and tallow, in varying proportions. The proportions you know nothing about. It may contain a large quantity of water or a small quantity of water. In other words, you may be paying "Castile Soap" prices for water and for tallow soap—unless you order "Soap, U. S. P." If you do, the chances are good that you will get a pure olive oil soap, containing not over 36 percent water, which is the normal and maximum amount.

*Lime.* If you buy lime for making lime water, you will get an article containing perhaps 50 percent magnesia and also probably quantities of iron and other impurities. These impurities are, to a certain extent, soluble in water along with the lime, and you cannot possibly have pure lime water, if you make it of such an article. Specify "Calcium Oxide, U. S. P.," and you will get a product of at least 90 percent purity.

*Precipitated Sulphur.* The commercial grade of this article is called "Lac Sulphur." The U. S. P. article is prepared with hydrochloric acid. In the manufacture of the cheaper article sulphuric acid is substituted. The result is that the precipitate contains a large proportion of calcium sulphate which is inert. Now, however, the manufacturers have taken a step further and "Lac Sulphur," as it appears on the market, is derived from the surface sulphur beds without purification. It is not precipitated but shoveled, and does not contain more than 40 percent or 50 percent of sulphur. The balance is clay. Why buy clay?

*Alcohol.* Commercial alcohol, as it is ordinarily sold, is 94 percent. It is to a certain degree impure. "U. S. P. Alcohol," costing but a few cents more, is the old cologne or deodorized spirits, and contains 95 percent alcohol. It is hardly at all more expensive if you consider the increased strength.

*Turpentine.* I doubt if many druggists, even the gentlemen who come here,

are aware that the United States Pharmacopœia requires that Rectified Oil of Turpentine should always be dispensed for internal purposes. The term "Rectified" is such a loose one that if "U. S. P." is not appended thereto, you may not know that this re-distillation has included the shaking out with soda, an expensive process which causes a loss and is likely to be omitted if possible. Thanks to your pure paint laws, the ordinary oil of turpentine is quite safe. You are notified on the package if you get anything that is not "U. S. P."

*Tannic Acid.* This article is almost never "U. S. P." and it may contain any amount of impurities. In this case, I believe the standard, in regard to the amount of resinous matter present, is too stringent and should be modified. If you insist on having a statement on the label as to how much resin is present, you can probably secure for yourself as definite a value without specifying "U. S. P.," and at the same time save a little on the cost.

*Oil of Eucalyptus.* As ordinarily sold, it is the Oil of Eucalyptus Amygdalina. This contains very little eucalyptol and is comparatively valueless. "U. S. P." is the specification that will get you your money's worth in this case.

*Oil of Gaultheria.* Frankly, I do not recommend the purchase of this oil nor that of Sweet Birch. Use methyl salicylate. I have personally experimented with the methods of analysis used by several houses of excellent reputation, who claim to put out the true oil of wintergreen, and I am convinced that they are deceiving themselves, when they believe that they are able to differentiate these products by chemical means. The feeling against the artificial oil is largely due—first, to the fact that it is artificial, and second, to the fact that, when first introduced, there were present considerable impurities of a phenolic nature due to imperfect manufacture. With the perfection of the processes of manufacture, the cause for this prejudice has been removed, and methyl salicylate should now be recognized to be equal if not superior to the natural oils.

*Glycerin.* On account of the fact that much the largest part of the glycerin-production goes to the making of nitro-glycerin, much of the product on the market is not "U. S. P." The two common impurities in glycerin are butyric acid and acrolein, the one very distasteful and the other very injurious. Be sure that you find "U. S. P." on the package, and do not depend on some favorite manufacturer's name, which you have been used to seeing since the days when glycerin was a by-product of candle manufacture.

*Talcum.* This is called French chalk. It is, of course, not chalk, and has not the slightest chemical relation to chalk. Nevertheless as sold it usually contains large amounts of calcium and magnesium carbonates, lime, etc. We have found as high as 50 percent of these impurities. Unless your talcum is going to be used for filtration purposes, you do not need the "Purified Talcum of the U. S. P.," but for any purpose it is desirable to avoid an excessive quantity of lime, chalk and magnesium carbonate. The way to avoid it is to specify "U. S. P."

*Rosin.* Are you aware that rosin or colophony is also in the Pharmacopœia? Rosin is so cheap that there is not anything cheap enough to adulterate it with, when you buy it whole. But if you buy the powder, look out. On account of its low melting point it is very difficult to prevent rosin from forming lumps again after it has been powdered. The result is that the powdered rosin on the market

usually contains from 25 percent to 50 percent of a filler, bran, flour, etc., put in, not to adulterate it, but to overcome the difficulty of manufacture. On the other hand, when you are ordering rosin, you doubtless do not want bran, and I would suggest that you see that the label on your goods tells you what you are getting.

*Aloes.* The same situation is found in the case of aloes. This frequently contains varying proportions of pea-meal, etc., when sold in powdered form. Now the Barbadoes aloes and the Socotrine are official in the Pharmacopœia. But Cape aloes is not, and therefore the average grade of Cape aloes is very poor, as it has no standard to measure up to. Why not require a statement, upon your purchases of Cape aloes, of the percentage soluble in boiling water? When you buy powdered aloes you have the possibility of getting insoluble matter, in the form of pea-meal, as well as in the form of dirt and impurities present on account of careless collection. Probably it would be interesting for you to know what the insoluble portion consisted of.

*Asafoetida and Benzoin.* With these you pay for the amount of alcohol-soluble matter present. The Pharmacopœia requires 50 percent of the asafoetida to be soluble, and that the benzoin should be almost wholly soluble. Of course, a large part of both of these articles, as they appear on the market, do not comply with these requirements and probably this does no harm provided you insist on knowing exactly what percentage of soluble gum resin you get.

*Anise Oil and Cassia Oil,* as they appear on the market, are largely the product of Chinese stills invented during the period when the Chinese were discovering gun powder and printing presses, and they have not been improved since. They are very crude articles and are exported in lead-lined, copper containers from which they absorb a considerable quantity of lead and copper. Almost all of the oil of cassia and a great deal of the oil of anise sold to the drug trade are these technical articles which contain at least one poisonous impurity. The pure oil may be procured for a not much higher price, but it will never be supplied unless its purity is insisted upon.

*Oil of Juniper and Oil of Lavender.* These are two oils which are official in the U. S. Pharmacopœia, but which are principally sold in the form of "imitations." By "imitations" is meant simply this: You take so much oil of juniper or oil of lavender and you add to it so much oil of turpentine or other cheap pine-distillate. You adjust the proportions so that the cost suits you, adding a little something for the labor of mixing. Then you sell it as "Oil of ———, Imitation," at low price, and many people prefer it to the real thing.

*Beeswax.* You can have beeswax or beeswax-compound. You usually have a beeswax-compound. This is another joke of the wholesale drug trade. Beeswax-compound contains anywhere from 2 percent to 70 percent paraffin wax, according to the sense of humor of the manufacturer. I must say that, in this case, the manufacturer is usually not the wholesale druggist, and, personally, I sympathize with the wholesale druggist who has to buy and sell what is wanted. Sometimes, this beeswax-compound is sold as country wax or cup wax. If you want to pay someone for melting up beeswax and mixing it with paraffin, I suggest that you insist on knowing how much paraffin they use, because the competi-

tion in this article will doubtless eventually produce a pure paraffin-wax colored to imitate beeswax, and sold as beeswax-compound, unless something is done to stop it.

*Linseed* is another thing which is usually given but very little thought. It depends for its value wholly upon the presence of linseed oil and yet ground flaxseed, or linseed meal of the market, is very frequently a product which has been partly reduced to the condition of ground oil cake. In other words, the oil has been partly removed from it. The name "U. S. P." prevents that.

There are a number of articles which do not properly come within the scope of this paper, because they are not in the U. S. Pharmacopœia, and yet I am persuaded to tell you what they are, because I seem to have been exposing some fakes and I might as well make a clean job of it.

Do you every buy crude carbolic acid? If you do, DON'T. Or, if you must, buy it on a percentage basis. It varies on the market from 95 percent to 10 percent of phenol. Sometimes it has no phenol in it at all. This is the case when you are supplied with the so-called domestic creosote oil, which is often nothing but gas-house residues.

*Coal-Tar Creosote* is another little joke originated by the chemical houses, but no longer fathered by them. In fact, the leading houses have refused to supply this article. Coal-tar creosote, used as a substitute for beechwood creosote, is a solution of phenol in water of any strength that the maker happens to decide upon. Any merits which this article may have, that the regular solutions of carbolic acid have not, are due to psychotherapy.

*Almond Meal Compound* may contain any percentage of starch, flour, etc., that the manufacturer prefers, or it may be made entirely from these articles and flavored with oil of bitter almonds. If you want almond meal made from almonds and not from peach kernels, which is just as good, I would suggest that you require a definite statement of what you are getting.

*Horse Medley* is coal dust. It is sold for black antimony but it never saw a piece of antimony. It is remarkable that the same marvelous medicinal property of sleeking a horse's coat should be produced by two such dissimilar articles as antimony and coal dust.

*Calamine*. According to authorities this is an impure zinc carbonate, depending perhaps for its medicinal effects upon its impurities, which offer an opportunity for the imagination to enter into the results that you get from it. A great deal of imagination, however, is required. "Calamine, a compound," is what you usually get. This article consists of powdered sand colored pink, either artificially, or by impurities. This must be a most efficient remedial preparation! Silica is, about, the most fixed chemical known. You will remember that it is only affected by roasting with alkalies, and the only acid that will affect it is hydrofluoric.

When you know this, you will naturally refuse to take such an article and will buy the so-called "Calamine, pure precipitated," which is on the market under the labels of the well-known chemical houses. This preparation is doubtless a little joke on the mineralogists. It so happens that, in the classification of minerals, the name of calamine has been applied in Europe, to an impure zinc

carbonate. By all of the American authorities, however, it is applied to a zinc silicate. So, when the American houses wish to put out a calamine that is beyond reproach, they follow the American mineralogists. Powdered zinc silicate is almost as inert as silica. I believe if you are willing to forego the mysterious properties of the impurities of the old calamine, you will do better by buying and selling zinc carbonate, U. S. P.

Probably I have been a little severe on some of these products and on those who place them on the market, but that has not been my purpose. Your wholesale druggist will give you what you ask for. The remedy for this situation rests with you, and not with the wholesaler. No blame attaches to you, for you have not been in a position to know what you were getting. But, you will find your wholesaler most willing to coöperate in giving you a good raw material, if you but say the word and keep right on saying the word. The word is "U. S. P."

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#### BIBLICAL REFERENCES TO PHYSICIANS.

According to a writer in the *Chemist and Druggist*, biblical reference to the physician and his work are not particularly numerous, neither are they particularly flattering. In Genesis physicians are referred to only as "embalmers," a title too suggestive of undertaking to be agreeable; Job has a reference to "physicians of no value," by which he probably referred to the "irregulars" of his day; three of the texts are versions of the saying about them that are whole and need not the physician; two refer to the woman who had "suffered many things of many physicians," which Luke (himself a physician) softens to "had spent all her living on physicians." Luke, by the way, is the only Evangelist who quotes the proverb, "Physician heal thyself." This Evangelist figures in the only really complimentary text, "Luke, the beloved physician"; and there is even here nothing to show that it was his profession that made him beloved. It was Dean Swift, who preaching before the Royal College of Physicians, took for his text, 2 Chron., xvi, 12-13: "Yet in his disease he sought not to the Lord, but to the physicians. And Asa slept with his fathers," which decidedly suggests the connection of cause and effect.