

A PLEA FOR FURTHER STUDY OF GREEN PLANT DRUGS.*

BY H. W. JONES.

Our knowledge of therapeutics being based upon experimental data, it is quite natural that our medical men should turn hither and yon in search of new remedies which might replace those already in use. No matter how satisfactory our remedies may be, there are always cases in which they will fail; and because they do sometimes fail, we are ever on the lookout for those which will be a little more sure. Like children gathering shells upon the beach, we collect our remedial agents, pausing to examine and discuss each new find, only to cast it aside when one more novel or promising appears. Therefore it is quite natural that in our search we should discard many remedies of great value, perhaps of greater value than those which have replaced them.

So it is that the roots and herbs used by our forefathers have been largely discarded for the more up-to-date remedies. The development of synthetic chemistry brought us a legion of remedies, most of which have proven of doubtful value. Serum therapy, organo-therapy and many other therapies appeared and have their following. In late years we have observed a gradual return to botanical drugs; a return which has been stimulated by the European War and the shutting off of supplies of synthetics. The new therapies have been more or less disappointing, and the prophecy of Prof. Tschirch, made in 1909, of a "return to drugs" seems about to be realized.

The years which have wrought all these changes have seen also a marvelous economic growth in our country. In past generations the physician or apothecary generally gathered his own supply of drugs and prepared his galenicals *secundem artem*; but to-day we find the marketing of these drugs largely in the hands of a few dealers. The physicians and druggists of to-day know little of roots and herbs, excepting as they see them occasionally in the dry state as they come from the dealer; while for the therapeutic effects of these drugs they depend upon the extracts and fluidextracts of the manufacturers, prepared according to the standards of to-day, which standards are practically without exception based upon *dried* drugs. In times gone by the preparation of galenicals was a matter of great care, and the physical condition of drugs a prime factor. In these days, with our chemical and physiological methods of assay, we depend upon the presence of certain active principles without regard to the other natural constituents of the drug or the changes which may have taken place in it since its gathering.

And so we come to the question: Do dried drugs represent the full therapeutic activity of the plant, and are they for some reason superior to plants in the fresh state?

In order to reach some basis for an answer to this question let us first consider what happens when a plant is dried in the usual way. To begin with, the gathering of a plant means the cessation of its life and the beginning of decomposition. True, this decomposition is slow, but nevertheless there is a breaking-down of the tissues. This we attempt to arrest by removing the water from the plants, but even in the dry state decomposition goes slowly on. For proof of this we have only to examine dried drugs kept for a number of years and we

* Read before Section on Practical Pharmacy and Dispensing, A. P. H. A., Atlantic City meeting, 1916.

will find, as a rule, that they have slowly disintegrated and are ready to fall to dust in our hands. This, of course, is an extreme case, for drugs are generally used before reaching this state. However, aside from this disintegration, there are other changes taking place during and after drying. If the drug contains volatile principles these are partially or wholly lost. Certain plants contain fixed oils which become oxidized just as the linseed oil in paint is oxidized. Most important, however, is the action of enzymes, which as stated by Prof. Tschirch in his splendid presentation of the subject,¹ does not cease with the drying of the plant, but continues indefinitely. By the action of these enzymes many new products are formed; the hydrolases splitting up glucosides, the oxydases causing the oxidation of certain components. Starches and sugars are formed and the composition of the plant is quite altered.

As a rule, drying a plant improves its odor. Here enzyme action plays its part, splitting off odorous principles from inodorous ones already in the plant. Color changes always occur, although this is relatively unimportant. The effect upon alkaloids is apparently negligible, although it has been observed that alkaloids are more easily obtainable in a crystallized form from fresh plants and that the alkaloids from dried plants are usually amorphous.

It is evident then that there can be but little in common between the fresh and dried plant. The one has the form but not the substance of the other. Therefore it follows that, being two quite separate and distinct substances, we cannot expect their therapeutic properties to be identical. In fact we would suppose them to be quite different. To show that they really are different let us consider a few specific examples.

The following extracts from prominent works on *Materia Medica* and *Therapeutics* reveal the views of the different writers as they are influenced by the use of the dried or fresh drugs. Take, for example, *Stillingia sylvatica*, of which the dried root is official. "Stillingia belongs to that class of drugs to which powerful alterative properties were attributed, but, like the other members of the group, the evidences of its power are not very convincing." (*National Standard Dispensatory*, p. 1455.)

"While the dried root is active, the recent root is far preferable. The present writer has used *stillingia* very largely, and believes a decoction of the recently dried root to be a most potent alterative." (Blair, *Materia Medica and Therapeutics*, p. 219.)

"There can be no doubt that this drug acts in two ways: first, by its immediate effects on the system, and, second, by its more slowly shown alterative influences. . . . The only official preparation is the fluidextract, which should always be made of the fresh root." (Hare, *Practical Therapeutics*, p. 464.)

"The fresh root should be used in making the preparations, as those from the dried root are almost inactive." (Potter, *Therapeutics, Materia Medica and Pharmacy*, p. 466.)

We pass without comment to Cottonwood Bark, at one time popular as an oxytotic, but now falling into disuse. The dried bark of the root is official.

"Is said by some gynecologists to resemble ergot in action on the uterus. It has little or no effect on animals, except in enormous doses, and is generally

¹"The Enzymes in Their Significance for Pharmacognosy," Prof. A. Tschirch. A lecture delivered before the International Congress of Pharmacy at The Hague, September, 1913 (*Apoth. Zeit.*, 1913, p. 866. Translated in *Pharm. Era*, 1913, pp. 595-597, and 1914, pp. 5-6.)

stated by those who have tested it to be entirely devoid of action in man." (Cushny, *Pharmacology and Therapeutics*, p. 463.)

"Is believed to be an efficient emmenagogue and oxytocic by southern practitioners, . . . but experiments on pregnant animals have not confirmed this view of its action." (Potter, *Therapeutics, Materia Medica and Pharmacy*, p. 293.)

"It may be employed as an oxytocic during labor, and is said to be a much safer remedy than ergot . . . The fresh is probably more reliable than the dried bark, but if gathered late in the autumn before frost, and properly dried, it still possesses some of its medicinal properties." (*National Standard Dispensatory*, p. 736.)

"This is a powerful emmenagogue and abortifacient in large doses. In smaller doses it is of value to control hemorrhages of uterine fibroids and incipient cancer. Most of the fluid extract of cottonroot bark upon the market is nearly inert. Only the fresh or very recent bark is active." (Blair, *Materia Medica and Therapeutics*, p. 120.)

These extracts tell their own story, and many other examples might be cited where the preparations made from dried drugs are reported as inert and useless, and yet by those who use the same drugs in the fresh state a quite different result is obtained and these drugs are lauded as having the highest therapeutic activity. Acknowledging, as we must, the inherent differences between fresh and dry drugs, what can these different findings mean, if not that we have neglected the opportunity of developing our native materia medica by closing our eyes to the possibilities of green-plant drugs? It does not follow, however, that all drugs should be used in the fresh state, for we all know that many drugs must age a certain time in order to develop, by the enzyme action already mentioned, their characteristic medicinal properties; but where, by clinical trials, a drug is found to yield better results in the fresh state than in the dry, why should prejudice and conservatism restrain us from using the most efficient remedies? Granting that many of our plant remedies are more efficient in the fresh than in the dry state, does not the pharmacist owe it to the physician and the physician to his patient to furnish these more efficient remedies? Because these remedies have been used for years by the minority schools of medical practice, should we cast them aside as worthless? Because they do not conform to our long-accepted standards of pharmaceutical practice, should we refuse to cast the light of modern research methods upon them and bring them out of the shadow of empiricism in which they have so long rested? That this is not the spirit of the pharmaceutical profession is evidenced by the propaganda being carried on by the National Association of Retail Druggists, in its official organ, for a return to our native green-plant drugs.

True, the Pharmacopœia has for years carried in its pages as a sop to the green-drug advocates the Tincturæ Herbarum Recentium, but these are little better than useless and quite deserve the place to which they have been relegated. The contention of the opponents of green-drug preparations, that because of the large amounts of water contained in the drugs, there can be no uniformity in the preparations, is quite justifiable. With drugs containing assayable principles, the problem of standardization is simple, but what are we to do if we wish to obtain uniformity in green-drug preparations which cannot be assayed?

It is the custom of those manufacturers who make a specialty of green-drug preparations to place the drugs in strong alcohol at the time of collection and store them in tightly closed containers. This procedure no doubt inhibits the

enzyme action, and if the moisture in the drug is determined before packing, a basis for uniformity is obtained. There is another procedure, used to some extent in Europe, which offers some excellent ideas. This is the process of sterilizing the fresh plants by the use of alcohol vapor or similar means. In this way the enzymes are destroyed and further changes in the plant prevented. Drying might be resorted to after sterilization with little fear of injury, at the same time rendering the drug much more stable and uniform.

The intent of this paper, as its title indicates, is to direct the attention of its readers to this class of drugs in the hope that sufficient interest may be aroused in them to cause a further study of their uses. Here is a wide field of research, for the therapeutic use of green-plant drugs has hitherto been largely empirical. An effort to place them on a scientific basis seems desirable, for clinical results attest their efficacy. Many lines of research suggest themselves, such as a comparison of the therapeutic activity of the plant in its fresh state with that of its dry state in order to determine which is the more effective; a comparative study of the constituents of the two forms of the drug with reference to possible standardization; a development of proper methods for handling the drugs and making their preparations.

The interest already aroused in this country in the cultivation of medicinal plants is a sure indication of the return to these remedies. Here is an interesting and profitable work which the druggist may carry on. For a druggist to have his own medicinal plant garden means a return to pharmacy in its highest and best. For those interested in this work the coöperation of universities and experiment stations, now engaged in the work, is assured. And the reward will be a better materia medica, an increased knowledge of drugs and a larger margin of profit. Let us then cease to overlook the possibilities of this branch of our materia medica, and by a concerted effort, endeavor to bring back that feeling of confidence in our botanical drugs which formerly existed.

OVERHEAD CHARGES.

Anyone can take a pencil and paper and figure out a way to become very rich by raising chickens. Every farmer's wife can make a large profit out of a few chickens, ducks, geese and other fowl; that is the profit is large in proportion to the capital invested. But when it comes to raising chickens by the hundred or thousand, special risks of contagious disease, etc., become factors and calculations based on raising a few fowl do not hold good when applied to larger enterprises.

This applies to other business enterprises. It is easy to prove by figures that large industrial corporations can produce at lower costs and undersell small competitors, but the figures do not always hold good in practice. If they did new concerns could not come to the front so easily. It is a common experience to find a man, successful in a small way, fail to achieve success after expanding his operations. His overhead charges often grow faster than his business when it passes the point where he can supervise everything personally.

Large corporations are like the man who tries to raise chickens by the thousand. With size come more loopholes for waste to close which come additional expenses of oversight and systemization. Personal contact with customers is an advantage of which the small man cannot be deprived.—From an editorial in the *Philadelphia Ledger*.
