

The Study of Powdered Drugs.

The rapid advances which have been made in chemical knowledge, as exhibited in the large number of synthetic remedies which from time to time are put upon the market, appeal so strongly to the imagination of some pharmacists as to cause them to think that, because chemistry increases in importance, botany must necessarily decrease. A little consideration of the great number of remedies derived from the vegetable kingdom, and of the varying uses to which they are put in the practice of medicine, will at once convince the most sceptical that there is little fear that they will be displaced by synthetic products for many years to come. One need only allude to coca leaves, cascara sagrada, strophanthus, eucalyptus oil, and araroba, all remedies introduced into medical use during this generation, to show that there is no reason to doubt that many valuable medicaments still remain to be discovered for the healing of mankind. A more general study of plant analysis is likely to lead to much more fruitful and more immediate results, so far as remedial agents is concerned, than is the prosecution of synthetic chemistry. In saying this it is not intended to depreciate the latter, but there is reason to think that it is claiming so much attention as to interfere with the pursuit of systematic plant analysis.

In order to be properly equipped for the pursuit of plant analysis and for the control of the supply of crude drugs, as well as for the manufacture of efficient liquid and solid preparations from them, the pharmacist must possess a knowledge of botanical histology. Otherwise he will either have to rely upon the dealer from whom he obtains his materials or place his faith in external characteristics which are not infrequently modified by methods of collection and preparation for the market, as well as by the influence of varying soils and climates. And there is always a danger, as experience has shown, that a substance somewhat similar in appearance may be inadvertently collected in place of the genuine article. Above all it is desirable that the pharmacist should be able to judge of the purity of the powders which he almost invariably obtains from the manufacturing druggist. If the current of wholesale manufacturing pharmacy is not to entirely swamp the true art and craft of pharmacy the technical training of the pharmacist must rest

upon the assured rock of science, and it must be acquired in a manner which will permit of him becoming interested in it beyond the mere desire to pass his examinations. This can be done if means are taken to provide a proper progression of his studies.

In the case of vegetable histology as applied to drugs it generally happens that the student—the examinee of the immediate future—devotes at most a few hours to the subject, trusting to the chance of being able to satisfy the examiner, and is careless of any thought of the possible use of the knowledge in his future work. But even if desirous of conscientiously mastering the subject to the utmost of his opportunities, he too frequently becomes bored by the number of details of structure, the respective significance of which he is unable to appreciate because of the lack of that previous knowledge of general botanical histology which alone can bring them into proper perspective.

There can be no doubt that a pretty good acquaintance with the anatomy of flowering plants obtained by practical work with the microscope is an essential to the acquisition of a sound knowledge of the histology of drugs. In order to obtain this the student should first make himself thoroughly familiar with the various kinds of cells and vessels and the tissues which they form—epidermis, cork, fundamental parenchyma, endodermis, pericycle, phloem, xylem, medullary rays, and pith as well as the varieties of stereom. He should then make himself acquainted with the anatomical characteristics of roots, stems, leaves, flowers, fruits and seeds as exhibited in the types found in the usual biological text-books, at the same time learning to recognize with ease the different tissue systems both by means of their elements and the reactions the elements give with reagents. Then he should pass on to study in detail the various peculiarities of the different cells; the varieties of thickening of epidermal cells, and the appearance of their walls in surface view; the forms and sculpturing of lignified elements, stone-cells, vessels, fibres; the frequency, characters, and disposition of hairs and glands; the nature and disposition of cell contents, crystals and their composition, starch and its size and form of granules, inulin, tannin, resins, and oils. This is beyond what is required for educational work in biology. It is to be remembered that in the use of anatomy as applied to the recognition of

plants every detail is of value, just as every reaction in the identification of a chemical is of value, but in the latter case the knowledge is so well tabulated, because the subject has been so well worked, that it often suffices to apply a few crucial tests while the others are ignored. In the anatomy of plants, however, so much remains unknown that the anatomist dare not overlook a single character without running the risk of falling into error. It is not sufficient to learn a few distinctive features to be sure of recognizing a particular drug, for unless it agrees in every particular in accordance with botanical principles, there is every reason to conclude that it is derived from some other plant.

Following on, it is advisable, as far as time will allow, that as many plant structures as possible should be submitted to examination in order that some of the many abnormalities of plant structure should come under observation. This is of considerable importance because subsequently it will be found that the anatomy of many drugs does not at all conform to the type specimens of the ordinary biological class, and, unless the student is prepared by a course such as is suggested, he will fall into the error of ascribing undue significance to characters which may be ordinal or generic and he may overlook specific characters. Another reason why he should proceed beyond the study of type specimens is that he may learn something of the mortification which plant members undergo by secondary growth. Roots and stems when mature depart in the arrangement and character of their tissues very considerably from the typical structure of the first year. Cells are lignified, the epidermis disappears and is replaced by cork, deposits are formed, roots assume the apparent arrangements of stems, and other changes take place.

While pursuing these studies the use of the microscope and micro-chemical reagents and stains will become familiar. Comparatively few reagents are really requisite, but the action of each of them upon all kinds of tissue should be well understood. It will be found that some of them greatly assist in bringing into prominence other features than those for which they are specifically used. The most generally useful book for those who intend subsequently to follow up the study of the histology of drugs is Strasburger's "Practical Botany," translated by Hillhouse. A much more useful work in some respects is Gérard's "Traité Pratique de Micrographie," of which, unfortunately, there is no English translation. A somewhat smaller and a little more systematic English work on similar lines is a desideratum.—*Pharmaceutical Journal (Eng.)*.