

receive most attention and there should be no especial difficulty in communicating it.

An outline of how best to present the course depends much upon whether the study is to be given in one semester or throughout the year or, as with us, it is divided, and the gross anatomy and more elementary part of vegetable histology are given at one time, and the more difficult part at another time. Right here, let me emphasize that at no time should Botany be taught the beginner by starting him off with the compound microscope. I have tried various ways and have found that much depends upon whether the course is given during the first semester or the second. For the fall course, start out at once with a complete flowering plant; point out the vegetative organs and the reproductive organs; the student should have, at least, some idea of what the thing is about. Next, take up the flower, while some may still be found; then fruits and seeds and their germination; then stems, buds and leaves. The student, having learned what is meant by a Spermatophyte or Seed Plant, can easily study a fern and its life history; then a moss and its life history and alternation of generations; and lastly, representative Thallophytes, one or more Fungi and one or more Algæ, and then be made acquainted with the compound microscope. Knowing now, that there are plants consisting of one cell, some of rows of cells, etc., etc., the time has come to study a typical plant cell—that all plants are built up of cells, that these form tissues and are variously constructed and arranged in our higher plants.

If the course is given in the second semester—start with fruits and seeds, and bring in flowers last. Spring, with its many flowers, is the ideal time to study Taxonomy.

The course in Vegetable Histology should follow this preliminary course. Begin with the plant cell; onion epidermis is ideal for this purpose. It is easily obtained; it can be used, too, as material, when the student makes his first permanently mounted slide. Next, the tissues, parenchyma, collenchyma and sclerenchyma are studied and then epidermal tissue with its stomata and trichomes. Parenchyma, as storage tissue, follows, with the starches, aleurone grains, crystals, secretory ducts, mucilage sacs, intercellular air spaces, milk tissue, etc., etc. Next take up wood fibres, bast fibres, tracheids, vessels and then the various fibrovascular bundles. At some time during this part of the course the student is instructed how to calibrate the eyepiece micrometer, and he measures a number of starch grains and other microscopic objects; next, the arrangements of the tissues and fibrovascular bundles in the several plant organs, especially in stems, rhizomes, roots and leaves of the higher plants is taken up.

Vegetable histology, naturally, leads to the study of vegetable powders, and the remainder of the course can be given over to the study of a number of representative powders.

THE TEACHING OF PHARMACOGNOSY.

BY F. J. BACON.

The Section on *Materia Medica*, during the past few years, has heard papers on the teaching of Pharmacodynamics, Physiology, Toxicology, Bioassays and Bacteriology. This year papers on the teaching of other subjects under the general

head of *Materia Medica* will be presented. With the four-year course in the near future a rearrangement of our courses will be necessary to properly balance the content of a four-year curriculum.

The purpose of these reports, in my opinion, is to standardize to a certain extent the courses in pharmacy. I do not think that it would be desirable to make all Pharmacy Schools uniform in their course work, even if it were possible, but a certain amount of time must be spent on the several branches of *Materia Medica* in order to give the student a broad general education for all branches of Pharmacy.

The Charters' Survey divides the course in Pharmacy into three main heads: Pharmacy, Chemistry and *Materia Medica*. Under *Materia Medica* the following heads are listed: Bacteriology, Biologic Assaying, Botany, Glands and Gland Therapy, Insecticides, Pharmacognosy, Pharmacology, Physiology, Posology, Public Health and Toxicology.

The term, *Materia Medica*, includes the above subjects and is treated as a division of Pharmacy. It is evident that this field is the most diversified of any branch of Pharmacy. A study of the graphs presented by C. O. Lee and H. G. DeKay before the American Association of Colleges of Pharmacy last year shows that the three major divisions of Pharmacy, Chemistry and *Materia Medica* were given in all schools surveyed, but there were wide variations in the amount of time devoted to each subject. In presenting a paper on Pharmacognosy, I will discuss the subjects which are generally considered under this head.

As botany is a prerequisite to pharmacognosy the nature of the Botany course offered to pharmacy students should be carefully considered. General Botany as it is taught in our liberal arts colleges of to-day confines itself largely to a study of fundamental botanical principles. Pharmacy students as well as students of other schools should be given in their first courses sound, working, fundamental courses which may serve as a basis as they proceed in their specialized study. There are many suitable texts on Botany which may be used to augment a well-organized laboratory course. In general the course covers the following heads: The make-up of a plant; structure and function of cells, roots, stems, buds and leaves; the manufacture and utilization of foods, and a survey of the plant kingdom. The last part of the course may be devoted to field trips to study the taxonomy of plants and to apply the theories of botany in the field. A course as outlined will require about five hours a week for the school year.

General Botany is followed in the second year by Pharmacognosy. At Western Reserve six hours a week are allotted to the course, three being spent in recitation or lecture and three hours in the laboratory. In discussing the U. S. P. and N. F. drugs we follow a system devised by Dr. W. O. Richtmann at the University of

- | | |
|---------------------------|---|
| 1. Official Latin Title | 9. Ash |
| 2. Official English Title | 10. Assay |
| 3. Abbreviation | 11. Preservation |
| 4. Synonyms | 12. Description
(a) shape; (b) size; (c) fracture;
(d) color; (e) odor; (f) taste |
| 5. Scientific Name | 13. Constituents |
| 6. Part Used | 14. Medicinal Properties |
| 7. Habitat | 15. Dose |
| 8. Impurity | 16. Preparations |

Wisconsin. The drugs are arranged in a botanical classification after the Syllabus of Engler and Gilg, and studied under the heads given in the foregoing.

The student fills in a sheet for each official drug. The habitat, constituents and properties are supplied and discussed by the instructor, the balance of the information necessary to complete the sheet can be found in the U. S. P. or the N. F. Lantern slides, maps, authentic specimens and adulterants are used to familiarize the student with the drugs, and to build up an interest in pharmacognosy. The laboratory work consists of a macroscopic and microscopic study of the more important drugs. Laboratory sheets are issued to the student directing work on the gross structure, internal structure, micro-chemical tests and identification of powdered drugs. Special attention is given in this course to the definition and application of the terms used in the description of crude and powdered drugs, to enable the student to read intelligently the U. S. P. or N. F. monograph of a drug. Work in identification of drugs is carried on by means of a cabinet which contains an unlabeled sample of each drug considered. The samples are, however, numbered and a key sheet is available to the students for study. From time to time a written or oral quiz is given to cover an assigned number of drugs, and at the close of the semester the student is required to identify all of the drug samples.

The general course in Pharmacognosy is followed by an advanced course in Microscopy. In this course a more detailed study of the plant cell, non-protoplasmic cell contents, plant tissues and micro-chemical tests are carried out. The course consists chiefly of laboratory work on powdered drugs and their adulterants, but some attention is given to commercial fibres, starches and food products.

Medicinal Plant Gardens are an important phase of the Department of Pharmacognosy.

Work on the cultivation of medicinal plants is carried on at present in a general way by colleges of pharmacy. The garden serves as a source of authentic material for research problems and also offers a commercial supply of certain drugs for laboratory and hospital use. Practical experience in the cultivation of plants can be offered in this way to the student.

A student desiring to major in Pharmacognosy and to continue with graduate work should select courses in the following related subjects: Advanced Botany, Histology, Taxonomy, Plant Physiology, Genetics and the cultivation of medicinal plants.

U. S. CIVIL SERVICE EXAMINATION FOR SENIOR TOXICOLOGIST.

Applications for admission to the examination for Senior Toxicologist must be filed with the U. S. Civil Service Commission at Washington, D. C., not later than November 28th. The entrance salary for this position in Washington, D. C., is \$4600 a year; if appointment is made to the Field Service the entrance salary may be at any rate within the salary range of \$4600 to \$5400 a year, varying with

conditions obtaining at the headquarters where the vacancy exists.

Full information may be obtained from the United States Civil Service Commission, Washington, D. C.

Doctors and surgeons found guilty of carelessness or inexperience causing the death of a patient will be classed as criminals and subjected to punishment, under the terms of amendments to the penal code of Mexico, now being drawn up.