

mens, particularly of plant drugs, is encouraged to start an herbarium, and is given opportunity to enlarge this collection throughout his school career. Last year a number of our students displayed such mounts of medicinal plants in drug store windows during pharmacy week. The second half of the biology course is devoted to zoölogy in the same anatomical manner, from the higher, more familiar forms to the lower forms, macroscopic work only being considered. Field work, museum trips and trips to the medicinal plant garden are essential parts of the biology course.

The second year microscopy work first considers the microscopical animals, completing the zoölogy course, and then microscopical plants, of the algæ and fungi groups. Hence, this particular part of the work might be termed microbiology, with the exception that bacteriology proper is not touched upon in laboratory until the student's senior year. After the student has completed the microscopical botany course, observing single-celled plants as *gleocapsa*, *pleurococcus* and the like, the next natural step is the simplest cell of the higher plants, the parenchyma cell. This relationship is stressed, comparisons being made in the manner of structure, functions, reproduction, etc. From this point on through, the sophomore year might be termed elementary histological pharmacognosy, since in each laboratory period, the student learns of new cells and tissues, and of official plant drugs in which these cells and tissues are found. Instruction is given in the preparing, sectioning, staining and mounting of plant drugs. A study of starches, crystals, cell contents and fibrovascular bundles is also considered.

The third year histological pharmacognosy course enables the student to study how the various combinations of cells and tissues constitute the various plant parts. He studies the official plant drugs in groups: *i. e.*, barks, woods, roots, rhizomes, leaves, flowers, seeds, fruits, etc. Then, since he has a thorough knowledge of each individual cell, he can readily identify the plant part and tissues present in, for instance, a section of *Apocynum cannabinum* or in a powder of the same drug. Also he can identify powdered drugs and upon examination of a powder, he can state whether it is adulterated or not by the mere presence of a number of cells foreign to the plant part in question. His microchemical tests would enable him in some cases to name the adulterant. Since such products as talcum powders, artificial foods, infant foods, spices and condiments are commonly sold in the retail pharmacy, microscopical examination and microchemical tests for these products form an important part of the student's training.

All of the laboratory work is supplemented with lectures, recitations, displays, lantern slides, motion pictures and demonstrations as well as field work. By means of this orderly arrangement and obvious relationship of courses, we are convinced that the average student is encouraged to do better work, and is able to grasp the subject matter more easily and in a more coördinated form.

SHALL THE RELATIONSHIP OF BOTANY TO PHARMACOGNOSY BE MAINTAINED?

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Editor's Note: The old question as to whether basic subjects should be taught by men trained in pharmacy is presented by Dr. Ballard in so far as it applies to botany. His arguments

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are excellent and no one will gainsay that it is not better to have these subjects taught by men trained in pharmacy *provided* they are specialists in their fields. Such teachers can make the application to pharmacy much better than can a teacher who is not so trained. However, we must recognize the fact that it is exceedingly difficult to secure well-trained specialists in general subjects who are also well trained in the professional subjects that are based upon them. Dr. Ballard's paper is worthy of careful reading by all interested in teaching pharmacognosy.—C. B. JORDAN, *Editor*.

The procedure of the current Pharmaceutical Syllabus in its division of subjects into basic and professional groups is excellent. However, owing to the close relationships between botany and pharmacognosy, it is unfortunate that the content of the basic botany is not definitely stated. The subject matter of pharmaceutical botany in previous editions was manifestly too restricted to give the student a general knowledge of plants but it was a clear-cut statement of what the pharmacy student should have covered in his course. It diminished the difficulties of drawing a line of demarcation between botany and pharmacognosy as regards content.

The policy of extreme generalization is just as objectionable as that of specialization in planning any professional curriculum. This is especially true in pharmaceutical education because of the varied nature of the subjects included in the course. It is entirely possible in a university maintaining schools or divisions of business, chemistry, medicine, botany and the usual academic or collegiate courses to cover all the subjects of the outlined pharmacy curriculum, with the exceptions of pharmacy and pharmacognosy. Economic conditions are perhaps increasing the frequency of this procedure. It is desirable that purely academic subjects as English, languages and mathematics be taught by those qualified in these branches and not by pharmacy school instructors. However, in subjects of the science group it is desirable that the instructor consider both the general aspects of the subject and its relations to pharmacy. In this manner we can better further the claims of pharmacy as a vocation requiring a thoroughly integrated course of professional education.

The advisability of securing contact between botany as a basic subject and its specialization, pharmacognosy, has been frequently commented upon. The general tenor of these comments is reiterated in a paper, "The Teaching of Pharmacognosy," by Prof. Bacon (JOUR. A. PH. A., Nov. 1930), in which the following statements occur. "The nature of the botany courses offered to pharmacy students should be carefully considered . . . pharmacy students as well as students of other schools should be given in their first courses sound, working fundamentals . . . to serve as a basis in specialized study." That this advisability of a proper coördination between basic and professional work applies equally well in other subjects, is evidenced by the following quotations from the current syllabus:

Page 32 (Applied Bacteriology): "When laboratory courses in Bacteriology are given to pharmacy students in medical, biologic or other departments, the attention of instructors should be called to the specific pharmaceutical applications listed below."

Page 51 (Inorganic Pharmaceutical Chemistry): "Experience has proven that it is unwise to rely too much upon an understanding of subjects previously studied."

Page 128 (Pharmacognosy): "Terms which students have supposedly learned in botany are not repeated but these terms should be used and applied."

I am not unmindful that the adoption of the blanket statement "standard college grade" for botany presents the following possible advantages—it checks tendencies to narrow the botanical teaching to those portions applicable to pharmacognosy, thus limiting its general educational features; it favors a mingling of the pharmacy men and the students of other schools; it relieves the pharmacy school of the labor and expense of a division of botany; it is a convenience in schools where the bulk of the general education is segregated as a pre-pharmacy year; it facilitates transfer of students to or from a pharmacy school to other schools of a university. But against all these possible advantages is the question of what constitutes standard college grade, particularly in botany, and the interpretations which individuals and colleges may place upon this term. A statement of hours does not remedy the situation. There is probably a greater diversity of opinion as regards content of the courses in the botanical subjects than there is in pharmacy and chemistry. Hence, there is a greater necessity for definite statements as to the content of the botany course. Furthermore, the statement in the Syllabus of the reason for the omission of syllabi for the basic subjects is perhaps the strongest argument for their inclusion. If the emphasis on integral parts of a given basic subject varies so appreciably in different colleges, it would appear advisable to establish some guide as to where, in the opinion of pharmaceutical educators, the emphasis should be placed. Notwithstanding the general statement that basic subjects are not applied, I hardly think there will be a difference of opinion among us as to the applications of botany in the teaching of pharmacognosy.

Failure on the part of the teachers in pharmacy colleges to at least attempt to influence the trends of teaching in the basic subjects may be construed as due to lack of necessity, lack of interest or, what is worse for pharmaceutical education, incompetency and I do not believe that these conditions prevail. Formerly in many instances, the instruction in botany and pharmacognosy in the pharmacy school was given by men whose sole botanical training was received in the pharmacy course. Frequently this specialization, together with lack of time, resulted in a restriction of the course in botany to its strictly pharmaceutical applications. At present, in a goodly number of schools, pharmacognosy and botany are taught by men who have not only been pharmaceutically trained but in addition have studied botany in other institutions and in some instances have majored in this subject for an academic degree. Their viewpoint is broadened and they are as capable of teaching general botanical science as the instructor in an academic college. I believe that these men can outline a course in botany which will be acceptable to our universities as of standard college grade and which will serve as a better foundation for pharmacognosy than the usual academic course.

The construction of a syllabus in botany to meet our requirements, both general and specialized, offers no serious difficulty. Undoubtedly each of us would find that the introductory course in botany in our respective universities is considered a course of standard college grade. With this as a working basis, the planning of a course to maintain the integrity of botany as a basic or cultural subject and at the same time place the proper emphasis on its relations to pharmacognosy, is entirely feasible. The syllabus for botany submitted by Prof. H. R. Totten in the preliminary draft of the present Syllabus, is an excellent example of the coördinating of botany with pharmacognosy without sacrificing the interests of either. In our

university class, for the past eight years, we have been giving a course along similar lines. The basis for our course is Botany 1-2 of Columbia College in an amplified and supplemented form to better meet our needs as a preparation for pharmacognosy. Pharmacy men who subsequently enter other schools in the university receive 6 points of credit for the botany of the pharmacy school. The time allotted is 240 hours, 96 didactic and 144 laboratory.

Our foundation course in botany must also be considered as related to microscopic pharmacognosy and here the desirability of correlation is even greater than in macroscopic pharmacognosy. Many of the academic courses in botany very properly present the topics of cellular structure and cell contents merely as incidental factors in plant organization and function. This plan fits the needs of the college freshman rather than those of the pharmacy student as the former may or may not apply his knowledge of botany in subsequent work, whereas the pharmacy man must do so in pharmacognosy. Where school organization compels a separation of botany and pharmacognosy, the content of the latter course must be increased and duplication is almost unavoidable. The difficulties of maintaining correlation between separated courses are known to all teachers. If the student receives part of the instruction on fibres, trichomes and starch grains in the botany course and another part in pharmacognosy, it is more than likely that duplication will be necessary. The instructor in pharmacognosy must review the previous work or rest under the uncertainty as to how well it has been retained by members of a class. His uncertainty is materially increased if the teaching in botany is without specification as to content.

It is to be regretted that microscopic pharmacognosy has been classed as an optional subject. The legal standards for drugs require familiarity with the microscopic as well as the macroscopic characters. In the pharmacy curriculum the purpose of our instruction in pharmacognosy is to enable the pharmacist to intelligently read the official descriptions. Giving microscopic pharmacognosy a secondary classification not only permits the elimination of a necessary professional subject but one which gives promise of ready recognition in academic botanical circles.

We are all familiar with the tendency on the part of other educational institutions to minimize the work of the pharmacy college. Of all the subjects in our curriculum, pharmacognosy is perhaps the one upon which we can rest our strongest claims for academic recognition. It is a type of work which is not duplicated in any other part of a university. Its scope and research angles are sufficiently broad as to warrant it being included with graduate courses in the division of botany in any university. To further this recognition we must assume responsibility for the botanical courses which are the foundation for pharmacognosy. We must not concede that an introductory course in botany without qualification as to content, constitutes an adequate preparation for pharmacognosy.

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Hungary.—Pharmacies must always be open to the public. An edict of 1919 fixes the opening hours from 8:00 A.M. to 7:00 P.M. For night service, Sundays, holidays, the authorities arrange a rota with the pharmacists for opening from 1:00 P.M.