

the fact that since the importation of opium for smoking purposes had been forbidden, the solid extract of opium had begun to be used as a substitute. They had looked over their record of sales for several years back without finding any evidence of that fact, but nevertheless they wrote the Commissioner they would discontinue the sale of solid extract of opium for any purpose, and would inform their branches and salesmen that it had been taken from their list and would not appear in future. He understood that other pharmaceutical houses had followed the same course. The indications were, therefore, that the prohibition of opium for smoking purposes had been effective.

With reference to pending legislation, Mr. Woodruff said that he had opposed the Foster Bill before the Committee on Ways and Means on behalf of six of the large pharmaceutical manufacturers. He opposed it, not because his people were opposed to some reasonable and effective legislation, but for the reason mentioned by Prof. Anderson, that it would impose heavy burdens on the drug trade without restricting the traffic.

He had placed his Association on record, as he had authority to do, as in favor of national legislation to prevent the practical nullification of State police laws by the natural operation of interstate commerce. He held that the States had ample police power to regulate the intrastate traffic in narcotic drugs. The State laws lacked uniformity, however, and were defeated in a large measure by the fact that a citizen of one State could buy from one in another State under practically no restriction except as related to the Postal Laws. It was unlawful now for anyone not a manufacturer or dealer to mail cocaine or any other thing of like character into another State, except to another manufacturer of drugs, a physician or druggist; but that did not restrict the sending of these articles by express or other means of transportation. Mr. Woodruff concluded by saying that he thought the drug trade was a unit upon the necessity of reasonable and effective national opium legislation.

Mr. F. H. Freericks, of Cincinnati, said he did not understand the gentleman from California to say it was the druggist who was at fault with reference to the narcotic evil. He thought he was correct in stating that he had in mind the indiscriminate traffic from other sources, and he believed it was due him that this be stated.

Mr. Lichthardt replied that if any part of his paper could be construed to put the American Pharmaceutical Association in the wrong light, he would be only too glad to strike it out. He knew from experience in his own State that it was not the druggists who were doing these things, but somebody else. He disavowed any purpose of reflecting upon the pharmacists of the United States.

A MEDICINAL PLANT GARDEN 'A VALUABLE ADJUNCT TO A COLLEGE OF PHARMACY.

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The fact that the College of Pharmacy of the University of Minnesota, when it was organized in 1892, asked and received authority from the University regents to establish a medicinal plant garden for research and instructional purposes, evidenced on part of the faculty a recognition of the importance of a medicinal plant garden as an integral part of the equipment of a college of pharmacy. Although the garden was not begun until a few years afterward, and then soon abandoned because of its distance from the college (it was made part of the garden adjoining my residence) and because of lack of both the necessary ground and funds, the desirability and even necessity of such a garden was never out of the mind of the faculty, and continued to be a part of my

administration policy for development as soon as the regents could be convinced of the need of such an adjunct to the college. The conviction on the part of the regents came before their ability to provide the necessary funds, but finally patience and perseverance were rewarded two years ago, when it was found possible to provide the college with sufficient money to begin a new garden on a fairly large and representative scale. The garden, on which up to the present about \$2500 have been expended, exclusive of site and salaries, has now been in operation for nearly two years, and although by no means complete, is firmly established and of proven value as an indispensable addition to the instructional facilities of the college. A plant laboratory to amplify the value of the garden has been authorized, and is now under construction. The walls of a substantial building, 32x61 feet in dimensions, adjoining the main college building, are now being reduced to a level of about six feet from the ground, and upon these a superstructure of steel and glass is to be erected at a cost of about \$5000. The interior structural and other fixtures will soon be decided upon, and will be of the very latest and most suitable pattern. Before the current year is gone an expenditure of around \$10,000 will have been incurred for the garden and plant laboratory. I mention this only to emphasize the two facts that the faculty and regents are in earnest in backing up their conviction that such a garden and plant-house are desirable and necessary additions to an institution teaching pharmacy, and that to provide such additions of a sufficiently comprehensive and representative character costs money. This paper is designed to point out in what ways such additions are valuable and necessary in the conduct of a good pharmacy course.

I have asked Professor Newcomb, to whose agricultural knowledge applied to medicinal plant culture much of the success of the garden is due, to give me a statement suitable to embody in this paper, and much that follows is taken from the professor's statement, for which I wish to give him full credit.

With a sufficiently equipped medicinal plant garden at the disposal of the instructional force, the first year's work on the fundamental principles of morphology, plant physiology, ecology and systematic botany, can be carried on to a much greater degree of success to the pharmacy student by a study of medicinal plants rather than by the study of the ordinary house or ornamental plants. In these latter the student has little interest primarily because they are not directly associated with pharmacy and medicine.

The study of external morphology and systematic botany may be taken up early in the fall when abundant material is available for giving instruction pertaining to the different types of flowers, leaves, roots, etc. Our students work directly in the garden, observing, making notes and collecting material which is taken to the laboratory for drawings and additional notes.

By having the plants arranged in the garden as far as possible according to families, with the ascending and descending families adjoining, the characteristics of the more important families soon become impressed upon the students' minds and further systematic work is facilitated. Of course, this plan cannot always be carried out to complete satisfaction, because many plants of similar botanical characteristics require widely different cultural conditions. It is probably not necessary to name the specific plants most suitable for this arrangement, but

prominent positions in the garden and in the work should be given to the important medicinal plants belonging to the filicales, scrophularinea, solanaceae, ranunculaceae, umbelliferae, cruciferae, compositae, etc. A few plants representing the euphorbiaceae, cactaceae, araceae and other botanical groups of more or less medicinal importance are of value in giving students a broader conception of plant groups.

Attention may be given to plant physiology as soon as cold weather stops outside work. The plants can then be potted and taken in from the garden or grown in the plant laboratory. Sufficient of these can be provided so that individual students or small groups may work independently on respiration, transpi-



MEDICINAL PLANT GARDEN, COLLEGE OF PHARMACY, UNIVERSITY OF MINNESOTA, LOOKING NORTH.

Showing (1) *Digitalis purpurea*, (2) *Gossypium herbaceum*, (3) *Aconitum spec.*, (4) *Delphinium consolida*, (5) *Carthamus tinctoria*, (6) *Digitalis purpurea rosea*, (7) *Datura meteloides*, (8) *Matricaria spec.*, (9) *Atropa Balladonna*.

ration, root-pressure, photo-synthesis, etc. For this work the following plants from our own garden have been used successfully: *Datura stramonium*, *eucalyptus globulus*, *cucurbita pepo*, *sinapis alba*, *scilla* and *atropa belladonna*. Many others might be used or substituted.

A sufficient number and variety of plants can be potted to supply histological material. This latter work may continue until spring.

The major work in pharmacognosy proper may be done during the second and

third years, but drugs from the cryptogams can be studied at the time the lower plant groups are taken up botanically. Our students work with plants yielding some of these latter drugs, such as aspidium.

The collecting, drying and preparing of a few drugs may be included in the first year's work.

For the advanced work in pharmacognosy it has seemed well here to adopt a plan which directs attention mainly to the more important plants and drugs during the past year. At least five plants of the annuals or biennials were available for each student, and of the perennials, such as rheum spec., or of the shrubs, such as viburnum opulus, one plant sufficed for a number of students.



MEDICINAL PLANT GARDEN, COLLEGE OF PHARMACY, UNIVERSITY OF MINNESOTA, NORTHEAST VIEW.

Showing (1) Hedge of *Rhamnus cathartica* and *Ricinus*, (2) *Conium maculatum*, (3) *Digitalis*, (4) *Brassica nigra* and *Sinapis alba*, (5) *Rheum spec.*, (6) *Cannabis gigantea*, (7) *Coriandrum sativum*, (8) *Capsicum spec.*, (9) *Calendula officinalis*, (10) *Datura metelloides*, (11) *Nicotina Tabacum*, (12) *Atropa Belladonna*.

Each student collected a quantity of the material representing the drug and potted one or more plants. He then took this material to his desk in the laboratory, where it was submitted to a rather thorough study, along with commercial samples of the drug supplied by the market. During the winter outside work was, of course, discontinued, and previously potted plants were used. This extended work on the important drugs covered quite fully the outline for the study of drugs as presented by Tschirch. The order of study naturally depends

upon the condition and development of the plants. During the past year the appended order followed here by Prof. Newcomb has proven very satisfactory:

1. Name of the drug—synonyms—etymology.
2. Name of the plant—synonyms—etymology.
3. Systematic position of the plant.
4. Systematic morphological description of the plant (drawings).
5. Occurrence and propagation of the plant.
6. (Event) Culture of the plant—effect of cultivation.
7. Production of the drug—collection and preparation.
8. Commercial channels.
9. Commercial varieties—methods of packing.
10. Description of the commercial drug, including a comparison with the material from the garden:
 - (a) Morphological description.
 - (b) Anatomical description.
 - (c) Odor and taste.
11. Admixture and adulteration.
12. Tests and valuation.
13. Similar or parallel drugs.
14. History (if time permits).
15. Review, consisting of a set of home-study questions.

The living plant specimens play a very important part throughout the whole study, serving to elucidate the various characteristics so that they are impressed upon the student as can be done in no other way. The drugs prepared by the students are preserved with the commercial samples in special pharmacognosy trays. Frequent sight identification tests are conducted, not only upon the drugs, but also upon the plants. Free use is made of charts, models, permanent slides, etc., as would be done without the garden.

During the last two springs, students took great interest in planting and watching the growth, among others, of coriandrum, foeniculum, brassica, conium, datura, ricinus, etc., and some of this work is required of each student. Field trips are a part of the required course, and on these occasions students collect and bring in to the garden various medicinal plants, where they are conserved for further study.

So great does the interest in the garden become that it is not uncommon to see many of the students voluntarily at work studying the plants or assisting with the care of the garden.