

## THE EDUCATIONAL VALUE OF A MEDICINAL PLANT GARDEN.\*

BY C. J. ZUFALL.

Medicinal Plant Gardens are of educational value to several classes of people. They are conducted by many schools of pharmacy both in this country and abroad and were established primarily for the benefit of the students of such schools. But, they may reach other groups of people as well. People of the community with an interest in "where things come from" may acquire such information from them by a single visit, and every school should endeavor to arouse this interest in the community.

Students of botany in college and high school may have their interest in the subject stimulated by a visit of a few hours to one of these gardens.

Physicians and pharmacists who are interested in broadening their knowledge have an opportunity to learn about the plants which supply the substances they prescribe and dispense.

It is the education of the pharmacy student, however, that we are mostly concerned with. And we want these students to do more than acquire facts, we want them to train their minds to *observe carefully*. I believe that a medicinal plant garden in a college of pharmacy may be used to bring about this training in proper observation.

The purpose of the medicinal plant garden in many schools may be solely to acquaint the students with some of the plants from which medicinal substances are obtained. This is very valuable to the student of pharmacognosy and considerable time should be spent in the garden to permit these acquaintances. In addition to this, however, the student may actually collect specimens of many of them. These should be dried and compared with commercial samples. It would be a good idea to have him press some of the leaf-drugs, such as Belladonna, Hyoscyamus, Stramonium, Digitalis and Peppermint to use in the laboratory study of these drugs. It is obvious that these will give a much better idea of the size and shape of the leaves than the ordinary dried drug. Pressed specimens of the flowers such as Matricaria, Arnica and Calendula may also be made and used in the laboratory study of these drugs.

The medicinal plant garden will serve to explain the reason for certain statements found in the Pharmacopœial descriptions of crude drugs. For example, the U. S. P. requirement that Hyoscyamus shall consist of the "leaves and flowering of fruiting tops." We may take the student to the garden and show him the two stages of Hyoscyamus, the first-year plants and the second-year plants. We can explain to him how this plant requires two years to flower and bear fruit. The first-year plants, bearing a large rosette of leaves on the ground, are quite a contrast to the tall flowering stalks of the second-year plants. The student should then be told that the authorities are of the opinion that the leaves of the second-year plants are the better for medicinal purposes and that the flowering or fruiting period is considered the best time to gather leaves. He will then understand why flowers or fruits are usually found in the official Hyoscyamus. This explanation will leave a more lasting impression on the student than a simple lecture-room statement of the facts.

Another very good object lesson is that of producing opium in the class room.

---

\* Scientific Section, A. Ph. A., Buffalo meeting, 1924.

One may incise an unripe poppy capsule in the same manner in which it is done in the opium fields of the Orient, show the milky exudate, and then exhibit another pod which was incised the day before and on which the exudate has turned brown; the student will thereby have been taught a lesson which would have required him ten times as long to learn from a textbook. The student may be permitted to taste the exudate and learn that this is bitter. He should then be told that alkaloids, such as morphine, are bitter and, of course, alkaloid-bearing drugs are bitter. The student could be shown that it would be a tedious task to gather opium from such small pods but that in the warmer Oriental countries the pods of the poppy are much larger.

To examine *Triticum*, as found on the market, the student would not think of it as being the underground stem of a plant, but if he pulls up a *Triticum* plant and sees the rhizome he would always remember the source of the drug.

Peppermint and Spearmint have very much the same appearance in the dry condition as found on the market and are difficult to distinguish between, but when the two are seen growing in the garden their differences can readily be seen.

A visit to the grove of the garden reveals the shade-loving plants such as *Hydrastis*, *Podophyllum*, *Sanguinaria* and *Asarum*. Here the instructor could give a short discourse on these plants, telling how they would die if exposed to the full sunlight for even a short period of time. He could also bring out the fact that all these shade-loving drug plants are natives of America. Two or three of the *Podophyllum* plants could be pulled up and the students shown how several plants are attached to the same rhizome. This illustrates one method this plant has of reproduction. The parent plant sends out rhizomes which in turn send up the leaves at short intervals and in this manner a "colony" is soon formed which sometimes covers a large area. The rhizome, which is responsible for the formation of so many plants, along with the roots, forms the drug.

The *Belladonna* beds, where the experiments are carried on to determine the possibility of increasing the alkaloidal content of the drug, help to fix in the mind of the students the fact that the alkaloidal content is important. The breeding experiments should also be instructive and interesting to the class in botany, as here the students can be shown how the crossing and selecting of plants are carried on.

The student may collect samples of such drugs as Coriander, Fennel and Anise at different stages of maturity and determine the oil content at each stage. Since the value of these drugs depends upon the oil-content, the student learns that the time of collection is an important factor in obtaining good drugs.

A similar series of experiments may be carried on with some of the root-drugs. When these are collected out of season they show their inferiority. The much-wrinkled and dried-up rhizomes of such drugs as *Podophyllum* and *Sanguinaria* which have been collected in mid-summer bear a striking contrast to the smooth plump rhizomes of the same plants which have been collected in the Spring or Fall.

Another way in which the medicinal plant garden may be made valuable to a school is in supplying material for the classes in botany and microscopy. The plants growing in such gardens have a great variety of form and structure and represent many families. For a study of leaves, a class will find here a great variation in size, shape, texture, covering, etc. In our gardens we have the thread-like leaves

of *Matricaria* to contrast, in size, with the enormous leaves of *Rhubarb*. There are smooth leaves of *Belladonna* to compare with the woolly leaves of *Mullein* and *Colts-foot*. The leaves of *Grindelia* are so saturated with resins that they are sticky to the touch and the plant is known to some as "Gum-plant." The leaves of *Sassafras*, *Cannabis*, *Salvia*, *Ricinus*, etc., make interesting material for such studies.

For studies of flowers and stems there will be found sufficient material to illustrate most every type, and the same may be said about all the other plant organs.

There is much valuable material in a medicinal plant garden for the microscopical study of plants. We may cite as an example the hairs or trichomes of our medicinal plants, some of which are quite interesting. The glandular hairs of *Peppermint*, *Spearmint* and *Pennyroyal* which contain the volatile oil; the glandular trichomes of *Hops* which constitute the drug *Lupulin*; the peculiar stellate hairs of *Mullein Flowers*; the multiserrate hairs of *Arnica Flowers*; the long hairs of *Hyoscyamus*, and the various forms found on other drugs serve for further investigation of plant hairs.

For a study of calcium oxalate crystals the student will find all forms in a medicinal plant garden if he will go to such drugs as *Belladonna*, *Hyoscyamus*, *Stramonium* and *Squill*.

The internal structure of the leaves, stems and roots of the medicinal plants show a variation sufficient to cover practically all types of these organs. An interesting discussion of the way in which Nature distributes her volatile oils to various organs of different plants could be brought up in a visit to our gardens. The sweet perfume of the *Rose* and *Lavender* resides in the flowers; the popular flavors of *Peppermint* and *Spearmint* reside in the glandular hairs of the leaves and stems of the plant; the pleasing odor of *Sassafras* oil originates in the bark of the root; *Wild Ginger* and *Orris Root* produce their pungent odors in the underground stem; the umbelliferous plants such as *Anise*, *Fennel*, *Coriander* and *Caraway* store their volatile oils in the fruit. And so we have every organ of the plant furnishing a desirable volatile oil.

#### ABSTRACT OF DISCUSSION.

Arno Viehoever called attention to the work of *Luther Burbank*, and of other horticulturists; of the development of hardy fruits that will withstand higher or lower temperatures, as may be necessary; of changing size and colors of flowers; larger food value, etc.; but, he said little had been done in the development along related lines of medicinal plants, and such gardening should be encouraged.

Caswell A. Mayo referred to recent books on flower culture and making the soil suitable for plants. The books referred to by the latter speaker were "Taming the Wilderness" and "American Wild Flowers."

PURDUE UNIVERSITY,  
SCHOOL OF PHARMACY,  
LAFAYETTE, IND.

---

#### PASTEUR MEMORIAL IN CHICAGO.

The Pasteur Memorial Committee (108 So. LaSalle St.) of more than 100 prominent Chicagoans is at work trying to raise a \$100,000 fund

with which to establish a monument to *Louis Pasteur*, famous French Scientist, in Chicago, and also a research scholarship which will be national in scope and open to all American students.