

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

This second paper on the "Teaching of Incompatibilities" presents the subject from a different point of view than that taken by Professor Husa in the recent paper in this Department. We are glad to present views of different teachers of important subjects in this Department of the JOURNAL and we welcome contributions from any teacher of pharmacy on any subject in the pharmaceutical curriculum. In fact, if space permitted, we would be glad to conduct in this Department an open forum on pharmaceutical teaching.—C. B. JORDAN, *Editor*.

WHY TEACH BOTANY IN PHARMACY SCHOOLS?

Because—Botany Is a Cultural Subject.

BY C. J. ZUFALL.*

Much attention is given to the study of "The Arts" dealing with man-made subjects. More profound and broadening is the study of the plants made by the Creator.

Can one's education be complete without some knowledge of the wonderful structures all around him, the plants?

How much more does travel mean to one who knows about the changing vegetation as he passes from one zone to another. To the student of botany the vegetation of the moist hot zone is not a tropical "jungle" but the richest of all nature's gardens in which grow the magnificent palms and ferns and the gorgeous orchids which hang high in the trees.

Who wants to be the man referred to in the poet's lines when he wrote:

"A primrose by the river brim;
A yellow primrose was to him,
And it was nothing more."

What if all of us could have the feeling of Tennyson as he wrote:

"Flower in the crannied wall,
I pluck you out of the crannies,
I hold you here, root and all, in my hand,
Little flower—but if I could understand
What you are, root and all, and all in all,
I should know what God and man is."

To the botanist the dandelion is not a weed simply to be dug out of the lawn, but a flower of most exquisite design and beauty.

To the golf player grass is simply a velvety carpet for his green, but under the microscope the botanist sees the flower of the grass as a very delicate and attractive picture.

To the angler the pond scum is simply a nasty mass of "something" which clings to his line and clutters up his bait, but the botanist puts it under the microscope and sees the wonderful spirogyra. The angler may be bothered by the dense growth of dodder on the water plants as merely an entanglement to impede his wading, but the angling botanist sees the dodder as an interesting plant which

* Prof. of Materia Medica, Purdue University School of Pharmacy.

loses its independence shortly after germination and becomes a parasite, forming the large yellow patches which stand out so prominently on the landscape.

Many things all about us are mysterious until the student of plants explains them. The north side of a tree is green simply because the sun permits enough moisture to remain there to support the millions of microscopic green algæ.

The fact that a pasture or lawn is cooler than the barren soil adjacent to it is well known to the ordinary observer but the why is explained by the student of plants, who has learned that the millions of blades of grass give off enormous quantities of water vapor and this act accounts for the lower temperature.

Modern physicians may not be interested in botany, but it got a hold on such physicians as Asa Gray, John Clayton, John Torrey, John Bartram and George Engelmann and compelled them to give up their practice so that they could give their entire time to plant study and thereby become America's foremost botanists.

Likewise in pharmacy. Many of our graduates either go directly into botanical fields or take it up some time later, undoubtedly because of the stimulus given by the instructors.

Because—Botany can be taught in such a manner that it will *train the mind* to think "in a straight line" just as effectively as mathematics will.

Of course, the study of plants might be simply the learning of the parts of a plant, but in plant histology, plant physiology, genetics or in any phase of botany, reasoning is absolutely necessary and the subject is "built up" in just as systematic a manner as algebra or geometry. We might claim that botany has a distinct advantage over algebra in the fact that concrete objects are used.

Because—Botany is *interesting* and *attractive* if taught in an interesting manner. Some of our students have an aversion to botany when they first come to us because they state that it has been a drudge to them. Botany need not be a drudge. The subject can be humanized in our schools of pharmacy by connecting it up with medicine and using medicinal plants for our laboratory material.

One big mistake made in botany, as in many other subjects, is in learning about plants instead of learning plants.

Because—Many *practical items* in pharmacy can be and should be learned in the botany class.

In the study of enzyme action in plants the botany student learns how the germinating seed must secrete the amylolytic enzymes which convert the insoluble carbohydrates into the soluble form so it can be used in growth. Knowing this the pharmacy student understands why malt is a medicinal product, while the barley grain from which it is prepared is not. Malt contains the amylolytic enzyme and also soluble and easily digested carbohydrates.

In this connection the source of the well-known Taka-diastase is understood after the student of botany has learned how molds secrete the diastase in order to predigest starches for their use. Taka-diastase is prepared by simply removing it from a culture of a certain species of mold.

Alcoholic fermentation is another illustration of enzymatic action studied in connection with the metabolism of the yeast plant. A study of this kind makes both botany and chemistry more interesting, especially to pharmacy students.

Just what toxins and antitoxins are and what they are used for can be taught to beginners in botany while studying bacteria as one group of the fungi. To be

sure there will be much more to learn about bacteria in bacteriology, but to humanize botany by the use of such subjects is bound to keep the students' attention.

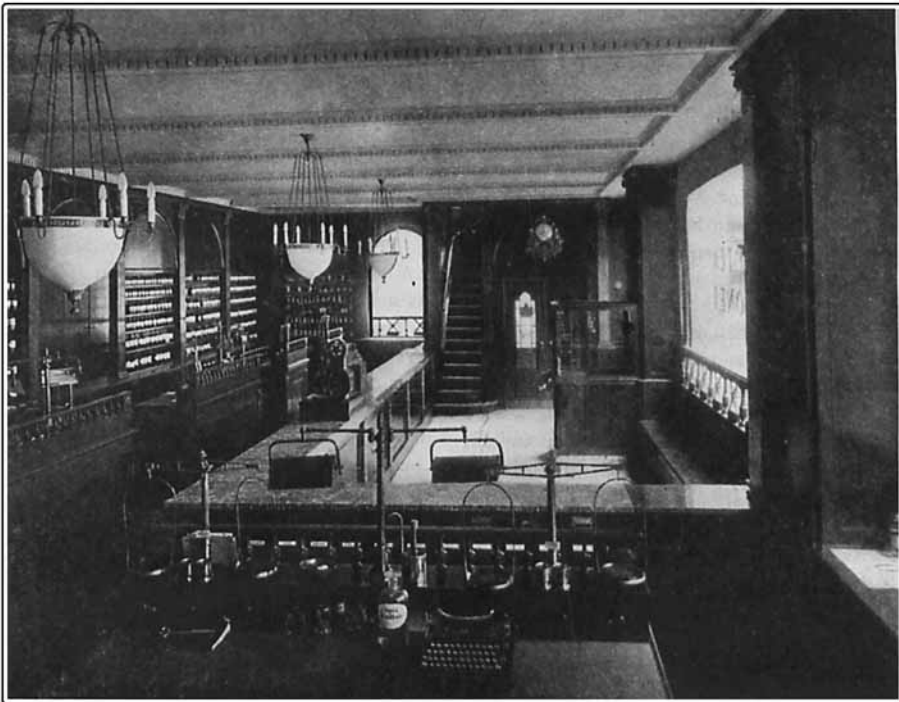
Spray materials can be handled more intelligently by the pharmacist who has studied botany. Many pharmacists understand the proper uses of the sprays from practical experience in their own gardens and orchards. Such men win the confidence of their customers.

Because—The subject of pharmacognosy cannot be taught effectively unless preceded by a course in botany. This is self-evident, since pharmacognosy is the study of plant parts used in medicine.

Because—*Organic Chemistry* will be better understood after a course in botany. Alcohols, aldehydes, esters, cyanogen compounds, sugars, starches, gums, cellulose, alkaloids, glucosides, fats, waxes, plant pigments, enzymes and vitamins are all associated with plant metabolism, which indicates a need for plant study. Cellulose alone is a life-time study for both a botanist and a chemist.

The plant cell can secrete so many catalytic agents and with them synthesize so many compounds that a chemist can take a great many lessons from it.

Because—*Plant Chemistry*, which many pharmacy students later pursue, must be preceded by a course in botany. It seems to me that at the present time, with the work going on with vitamins, irradiation, bacterial fermentation, cellulose, etc., that the man thoroughly trained in both chemistry and botany has tools of far-reaching effect.



Interior of Lion Pharmacy, Stockholm. Courtesy of William Mair and the *Journal and Pharmacist*. The pharmacy was founded in the 15th century—a history and sketch will be given in a succeeding issue. It is modern, the leading pharmacy of Stockholm; ten dispensing counters are fully equipped for the corresponding number of pharmacists at work.