

before us as an ever-present reality, and I consider it a prerequisite to our continued success that we set before ourselves its solution as an objective to be finally attained with the ultimate result of 100 per cent representation of state boards at our national conventions.

If greater interest could be aroused in our district meetings I am sure the natural sequence would be increased interest in the national convention. This being the case, I think it would be well for the chairmen of the several districts to lay greater emphasis on the conferences during the coming year and thus see if their efforts in the districts will not bring about increased attendance at the national convention a year hence.

At this time I wish to express my appreciation to all officers, committeemen, members and the Editor of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION for the assistance that they have rendered during my administration. Though all of our committees have done everything that could be asked of them, I wish to make special mention of the outstanding contribution of the committee in charge of the Department of Education. The work done by this committee speaks well for pharmacy, and indicates to kindred professions that we are in step with progress of to-day.

PLANT SCIENCE SEMINAR.*

BY EARL B. FISCHER, COLLEGE OF PHARMACY, UNIVERSITY OF MINNESOTA.

The Plant Science Seminar, a national organization, affiliated with the AMERICAN PHARMACEUTICAL ASSOCIATION, opened its ninth annual convention in Gainesville, on July 20, 1931, the sessions being held in the Chemistry-Pharmacy building on the campus of the University of Florida. The opening address of welcome was made by Dr. Townes R. Leigh, dean of the College of Pharmacy. Dr. B. V. Christensen, Chairman of the Seminar, presented a splendid address on "Research in Pharmacognosy." It follows:

ADDRESS OF THE CHAIRMAN PLANT SCIENCE SEMINAR.**

RESEARCH IN PHARMACOGNOSY.

BY B. V. CHRISTENSEN.¹

Pharmacists are interested in plants as sources of crude drugs and because of the substances in them which give them physiological activity or medicinal value. Dragendorff states that anything that is of vegetable growth that is used in medicine is a medicinal plant. It has been estimated that about 75 per cent of the materials prescribed daily by the physician or purchased directly from the druggist for the relief or cure of the various ailments of mankind, are derived from the vegetable kingdom (1); yet it appears to be the general opinion that vegetable drugs have been largely displaced by medicochemical remedies. It appears also to be the opinion of many that pure chemical products are better and more effective medicinal agents than crude vegetable preparations, with their "superfluous inactive constituents or plant dirt."

An editorial in a recent issue of *J. A. M. A.* (2) explains this situation rather aptly. "The popularity of endocrine, vitamin and diverse synthetic medicinal products in recent years has tended to obscure the significance of active constituents derived from the plant kingdom. The greater number of dependable and useful substances of natural origin in the therapeutic armamentarium may be forgotten because of the emphasis placed on synthetic products offered by the

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** Ninth Annual Session of Plant Science Seminar, Gainesville, Fla.

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chemical industry. If it had not been for leads obtained from natural products, the synthetic therapeutic products might not have come into existence. Frequently the standard by which the usefulness of a synthetic product is determined depends on a natural product. For instance, the activity and suitability of synthetic products intended for local anesthesia is determined by comparison with cocaine, the alkaloid of coca leaves, a natural local anesthetic, which with its derivatives is not yet surpassed in general usefulness and efficiency by any synthetic product. The subordination of interest in natural products is the outcome of recognized commercial possibilities of synthetic products rather than a limitation of opportunities for achievement along fundamental and practical lines. The sterility that has possessed this field is to be deplored."

There is on the market at present a large number of supposedly isolated active constituents, many of them duplications with possibly minor modifications. However, there is a difference of opinion as to active constituents of many crude drugs and in some cases there is a question as to whether the therapeutic value of a vegetable drug is due to the activity of one constituent or due to the combined action of several constituents. Quinine has been for many years considered the specific active constituent of cinchona bark which makes it effective as a remedy for malaria; but that this may not be true is indicated in a recent report (3) issued by the Malaria Commission of the Health organization of the League of Nations, wherein it is stated that the Indian Public Health Service used powdered cinchona bark in the treatment of malaria during the World War and obtained 50% of cures as against 30 per cent with quinine. This report further indicates that the therapeutic value of the powdered bark was also found to be greater than that of "Quinetum," which term in India means "All the crystallizable alkaloids in the bark of *C. succirubra*."

Sollman states that isolated Digitalis principles have proven disappointing (4). Many physicians are returning to the old form of administering Digitalis, namely, the powdered leaf. They claim that they get more positive and certain results from this form of administration than from any of the so-called isolated active principles. According to Cushny, the most suitable preparations of Digitalis are the tincture and the powdered leaf (5). In discussing certain so-called pure principles of Digitalis, Solis-Cohen & Githens says, "It is doubtful whether any of these purified substances occur in the natural leaf. All may be artificial products" (6).

Referring again to the above-mentioned editorial in *J. A. M. A.*, it closes with this statement, "Thorough investigation of the natural products is likely to prove more instructive and important for a selected materia medica than the multiplication of synthetics, which in many instances represent minor modifications of a single product."

From the foregoing it may be implied that there is not only opportunity but urgent necessity for research in Pharmacognosy. This research should preferably be carried out along three lines, namely:

First, investigation or reinvestigation of vegetable drugs that are now used to a limited extent; those that have been dropped from our modern materia medica, and those now in regular use but with questionable standards. Much of our knowledge of vegetable drugs has come to us through empiricism and much has been obtained from the natives and laity of various countries. The uses of some of our most important drugs were learned from the Indians and it is only recently that the scientific basis for the therapeutic uses of some of them has been discovered. Many have been discarded because they have failed to respond to the usual tests of the pharmacological laboratory. There must be some basis for the use of such herbs as Boneset, Chamomile, Tansy, etc., which served for so many years as home remedies and which were found in the attics of the pioneers of this country. It may be that a thorough investigation would discover a valid scientific basis for their use or some important active principle as in Ephedra, used for centuries in China but only recently investigated.

Rusby has pointed out several cases of mistaken identity (7). Here again, is another line of reinvestigation open to pharmacognosists. There is a possibility that in some cases inferior substitutes have ruined the medicinal reputation of the authentic drug.

Further, there is the question of standards for many vegetable drugs now in use. In the April 1931, issue of *Drug Markets* (8) it is indicated by Dr. Durrett that U. S. P. standards are too high in some instances. It is said that the U. S. P. requirements would exclude great quantities of perfectly good nux vomica and that the Gum Benzoin standard is too high. It is also stated that there may be trouble in meeting the U. S. P. requirements for Hyoscyamus. These few illustrations not only indicate the opportunities but the necessity for research along this line.

Second, investigation of new plants suggesting possibilities of medicinal value. This point presumably requires little discussion. However, I presume that occasionally most of us get reports of cases of poisoning of animals or humans occurring from eating fruits, leaves, flowers or some part of a plant not previously known to be toxic. Such occurrences suggest medicinal possibilities of the plant concerned, as history tells us that the therapeutic uses of several of our most important drugs were suggested from such experiences. There are several such plants in this locality some of which are now under investigation. Pharmacognosists should note such occurrences and take advantage of such opportunities, not for the purpose of discovering another medicinal plant but rather because of the possibility of discovering a drug better and more efficient for some therapeutic purpose, than any now listed in our *materia medica*.

Third, cultivation of medicinal plants. Heretofore, we have depended largely on natural supplies of vegetable drugs to meet our needs. However, due to the advances of agriculture and industry and because of ruthless methods of collecting, natural supplies are being rapidly depleted and in some instances have already become exhausted.

This has been regarded with deep concern and, consequently, a serious and determined interest is now being manifested all over the civilized world in cultivation, as well as proper collection, of medicinal plants. This situation was anticipated by a wise government in the United States as early as 1883, when a resolution by a congressman from Massachusetts was passed by Congress appropriating \$25,000 for the study and cultivation of medicinal plants. From this as a nucleus has developed the present Bureau of Plant Industry which is fostering plant research and collecting and disseminating information pertaining to drug plants. Interest in the cultivation of medicinal plants in the United States has spread to the Colleges of Pharmacy and at the present time there are sixteen such institutions which operate Medicinal Plant Gardens (9).

In Europe there are several national associations for the promotion of cultivation of medicinal plants, which apparently have made some progress. For instance, in the report of the Fifth National Congress on the Cultivation of Medicinal Plants in France, held in 1928, it was stated that the culture and collection of medicinal plants in France and the French Colonies had been so extended and so successful that the importation of crude drugs had been materially reduced.

Apparently several of these national associations joined forces in 1928 to form "The International Association for the Promotion of the Production and Utilization of Medicinal, Aromatic and Allied Plants" the fourth Congress of which is now in session in Paris (July 16th-21st). (The Plant Science Seminar has been extended an invitation to join this association.) This association was organized "With the view of collecting all work relating to the cultivation, breeding, utilization and scientific testing of medicinal, aromatic and allied plants, and of spices, together with the commerce in them, and at the same time to secure the assistance of Agriculture, Commerce, Industry and Science." From a study of the reports of previous Congresses, furnished through the courtesy of Dr. Wolfgang Himmelbaur, it is observed that considerable progress has already been made in enlisting the interest of governments in legislating for the protection of native plants and in securing the cooperation and endorsement of industry in developing and maintaining high standards of quality.

The cultivation of medicinal plants is not only a problem of scientific importance but of commercial importance as well. The destructive methods of harvesting and the lack of foresight in providing for a continuous supply of cinchona has meant a financial loss of millions of dollars to South America. On the other hand a keen appreciation on the part of Europeans has provided Java with a stable income of considerable importance. That the United States may make the same mistake is indicated in a recent excellent article on *Cascara Sagrada* by Starker and Wilcox (10) and from the fact that other countries have been experimenting in the cultivation of this tree and in one instance, at least, with considerable success.

The cultivation of medicinal plants offers opportunities for scientific investigation otherwise difficult or impossible; for instance, the effect of fertilizers on quantity and quality of plant constituents. A study of the literature reveals that practically nothing has been done along this line. Then again, it would afford a means of correct identification and authentication of species, as referred to by Dr. Rusby and third, it would make possible the selection of species or varieties possessing the most desirable medicinal qualities. For instance, in this locality we have several varieties of *Monarda punctata* differing in yield of oil and also thymol content of oil. We are now separating and identifying these varieties for the purpose of determining which of them

will yield the most and best quality of oil. Fourth, it makes possible the combination of hardy qualities, such as resistance to disease, with producing qualities such as was done in grafting and budding the yellow cinchona on the red cinchona stock.

Finally, the cultivation of medicinal plants would make possible scientific experimentation on time of harvesting, methods of harvesting and methods of curing and preparing for the market as affecting quality of crude drugs. Undoubtedly up to the present, pharmacognosists have learned more from collectors and growers regarding methods of collection and curing than collectors have learned from pharmacognosists. The reverse should be true. Pharmacognosists should determine the best methods to be followed conducive to high quality and then disseminate this information to collectors and growers.

The Plant Science Seminar should be among the leading organizations in encouraging, planning and promoting research on the cultivation of medicinal plants. It is true that some work has already been done along this line but it has been largely isolated, spasmodic and lacking in unification. The U. S. Bureau of Plant Industry recently issued a list of Medicinal Plant Gardens in the U. S. together with the plants being grown in each. Would it not be a good plan for a committee from this Seminar to get in touch with the chief pharmacognosist of the U. S. Bureau with a view toward mapping out a coöperative scheme whereby experimentation could be conducted in these various gardens for the purpose of determining in what localities certain plants could best be grown, best cultural methods and methods of preparation for market? With such a unified scheme it seems that much more could be accomplished than through isolated and spasmodic experimentation. Might it not be possible, that in the course of time from information collected through such a scheme, to map out a plan for drug production that would be of immense value, and particularly in case of a national emergency. Furthermore, it appears that there should be more coöperation between this Seminar and the industries. Several pharmaceutical manufacturing concerns are cultivating medicinal plants and undoubtedly have collected valuable information which ought to be available to growers and collectors. Possibly a committee from this Seminar could arrange for a mutual exchange of information with these concerns and make arrangements for the dissemination of this information. Very likely these concerns also have many problems for solution and pharmacognosists could undoubtedly be of service in helping to solve such problems.

This Seminar might also render valuable service along the lines of education, not only within the colleges but outside as well. In the colleges more time should be devoted to the study of Pharmacognosy and especially with the inauguration of the four-year curriculum. That this is essential is evident from the fact that 75 per cent of the medicines handled by the druggist are of vegetable origin, as stated in the introduction. There is no danger that the pharmacist will know too much about drugs. We get many letters from pharmacists asking for information as to how and when to collect drug plants and how to cure and prepare them for market, undoubtedly for the purpose of passing this information on to a patron. Ability to give such information would, no doubt, increase the respect of the public for the pharmacist.

Information sent to growers and collectors through leaflets, bulletins or letters would aid in improving the quality of crude drugs placed on the market, especially if care is taken to emphasize that quality affects price. There is a crying need for education along the line of conservation of natural resources and in this we may also render a distinct service.

The Plant Science Seminar should serve as a central organization or as a coördinating unit for the encouragement, planning and development of research in Pharmacognosy. This organization should make recommendations regarding courses of study in colleges, particularly in relation to scope and character of information, *i. e.*, it should formulate and adopt educational policies. There has been considerable confusion regarding the use and meaning of such terms as—*materia medica*, pharmacognosy, pharmaceutical botany and pharmacology. A committee to study and make recommendations regarding the meaning of these terms was appointed at Rapid City in 1929, but apparently nothing has been done. This matter, consequently, is to be discussed before the *Materia Medica* section of the A. A. C. P. at Miami.

The science of Pharmacognosy is relatively new and this organization is young in years, but both have broad and far-reaching potentialities and it is up to us to develop these to the utmost.

SUMMARY OF RECOMMENDATIONS.

- (1) That a committee be appointed to draw up a constitution and by-laws to be considered at the next annual meeting.
- (2) That a committee be appointed to systematize all proceedings of this Seminar and to consider ways and means for publication.
- (3) That the advisability and feasibility of joining the International Association for the Cultivation of Medicinal Plants, etc., be considered by this Seminar.
- (4) That a committee be appointed to get in touch with Dr. W. W. Stockberger of the Bureau of Plant Industry with a view toward mapping out a systematic scheme of coöperative experimentation on the Cultivation of Medicinal Plants.

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- (4) Sollmann, "A Manual of Pharmacology," 3rd Edition, 1927, page 528.
- (5) Cushny, "Pharmacology and Therapeutics," 9th Edition, 1929, page 459.
- (6) "Solis-Cohen & Githens, Pharmacotherapeutics" (1928), page 1263.
- (7) *The Messenger*, 6 (1929), 232.
- (8) *Drug Markets*, Vol. XXVIII (April 1931), 333.
- (9) U. S. D. A., Bureau of Plant Industry, 1930 (*List of Medicinal Plant Gardens*).
- (10) *Am. J. Pharm.*, 103 (1931), 73, 147.

As is customary, the program consisted of papers on various phases of science concerning economic and drug-producing plants; addresses by a number of men prominent in the development of the important industries of Florida, such as the tung oil, turpentine and sponge industries; inspection of the medicinal plant garden of the College of Pharmacy of the University, trips through the campus and to outlying districts offering opportunity for the study of local trees, shrubs and plants of tropical and subtropical nature; and a round table discussion of methods of teaching pharmacognosy and botany in colleges of Pharmacy.

A number of papers and addresses are worthy of special mention. Dr. Lenthall Wyman, of the United States Forestry Service at Starke, Florida, gave an address on methods of turpentine as followed in Florida. The address was illustrated by slides showing the different methods of scarifying trees for the production of oleoresin of turpentine. Mr. Wyman gave figures to illustrate the variation in yield according to the method followed. He also pointed out the enormous loss to the State of Florida caused by forest fires, stating that a well-organized program of reforestration with prevention of forest fires would allow for the utilization of thousands of acres of land now idle and non-productive.

Another address was delivered by C. F. Speh, secretary of the Pine Institute of America, on uses of turpentine and other naval stores products. Mr. Speh exhibited specimens of various commercial products and pointed out their importance. He stated that more rosin is used for the manufacture of soap than for any other purpose and that its second most important use is for sizing writing and printing paper. The importance of turpentine in the industries was emphasized by the statement that its adaptability to many special uses is so perfect that no substitute can satisfactorily take its place. Among the important uses mentioned were, as a volatile thinner for paints, in the manufacture of patent leather and as a raw material for producing synthetic camphor. In closing, he pointed out that the turpentine industry is gradually increasing and that Florida is one of largest producers of turpentine and its products in the world.

Dean Floyd of the College of Agriculture, and Harold Mowry of the Agricultural Experiment Station conducted a tour of the campus and the Experiment Station grounds, pointing out the many trees and shrubs of particular interest to the visiting scientists. Members of the Seminar were very much interested in the tropical and sub-tropical plants, particularly such as camphor, eucalyptus, holly, sweet gum and numerous species of palms.

Another address of particular interest and value was made by B. F. Williamson of Gainesville, on the tung tree and tung oil. Mr. Williamson discussed the history of the tung tree, its introduction and propagation in Florida, methods of harvesting the fruits and extracting the oil. He also exhibited specimens of the tung fruit and samples of Chinese and American oil obtained therefrom. The tung oil industry represents one of the newer developments in the industries of Florida, the oil being of value in the manufacture of varnishes of the spar type, as well as in paint manufacture.

A round table discussion of methods of teaching botany and pharmacognosy was the feature of the Wednesday morning session, together with an address by Dr. E. L. Newcomb, on the aims and purposes for which the Seminar was founded. The round table discussion of teaching methods was led by Dr. H. W. Youngken, and his introductory address was stimulative of considerable discussion, those taking part being Dr. B. V. Christensen of Gainesville, Dr. L. K. Darbaker of Pittsburgh, Dr. E. N. Gathercoal of Chicago, Dr. E. L. Newcomb of New York, Dr. H. B. Lemon of Buffalo, N. Y., Dr. O. P. M. Canis, Prof. E. B. Fischer of Minneapolis and others.

A trip of inspection was made to the plants of the Retort Chemical Company, near Gainesville and to the turpentine distillery at Pifer. This trip afforded an opportunity for first-hand



MEMBERS AND VISITORS IN ATTENDANCE AT THE NINTH ANNUAL MEETING OF THE PLANT SCIENCE SEMINAR.

Front Row, left to right.—Mrs. B. V. Christensen, Mrs. J. A. Koch, Dr. B. V. Christensen, Prof. E. B. Fischer, Dr. A. B. Lemon, Dr. H. W. Youngken, Dr. O. P. M. Canis, Dean J. A. Koch, Dr. L. K. Darbaker. Back Row.—Mrs. L. K. Darbaker, Miss Koch, Mrs. L. E. Harris, Dr. L. E. Harris, Dr. P. A. Foote, Mrs. E. N. Gathercoal, Prof. E. N. Gathercoal, Dr. E. L. Newcomb, Dr. A. W. Matthews, E. P. Claus.

study of the destructive distillation of old, dead, resinous pine wood and of the various operations and processes followed in the production of turpentine, rosin and other naval stores' products.

Dr. F. H. Heath and Dr. P. A. Foote of the University of Florida, gave an illustrated lecture on the sponge industry, another important economic item produced in the State of Florida. Methods of collecting the sponges by specially trained divers and collectors, mostly of Greek descent, methods of treating the sponges to make them commercially useful and of marketing them were described and illustrated by means of slides. Specimens of the natural sponge, of the various types of sponges, such as the sheep's wool, elephant's ear, grass sponge, wire sponge, silk sponge, etc., were illustrated and exhibited.

The Thursday sessions marked the close of the meetings of the Seminar at Gainesville. The morning was devoted to an inspection of the Medicinal Plant Garden of the University of Florida. Dr. B. V. Christensen, director of the gardens, described the experimental work which is being carried on to determine the practicability of growing various species of mints and other plants of medicinal importance in the state of Florida and the production of oil and other products

from them. Of particular interest was the work on spearmint, peppermint, monarda, etc. The method of tapping the sweet gum tree to obtain American styrax, a balsam used in pharmaceutical practice, was also demonstrated. In the afternoon Dr. H. W. Youngken, of Boston, delivered an illustrated address on the anatomy of Derris, a vegetable substance said to be non-toxic to humans but to be of value as an insecticide. Dr. E. L. Newcomb, of New York, presented a paper on the "Valuation of Medicinal Plant Gardens." It was brought out in the latter paper that many colleges of Pharmacy, maintaining medicinal plant gardens as a part of their educational facilities, do not place an inventory value on them, which they should properly have, since a considerable expenditure is made annually in their maintenance.

Not all of the meetings of the Seminar, however, were devoted to scientific study. Opportunity was afforded and time allotted for pleasurable outing. On Monday evening the entire group was entertained at a lawn supper at the home of Dr. and Mrs. B. V. Christensen, and on Tuesday afternoon the entire group was taken to Silver Springs to enjoy the boat ride in glass-bottom boats over the springs, and dinner at the lodge which followed. On Thursday evening, to mark the close of the Seminar, Dr. and Mrs. T. R. Leigh, entertained at a typical Mississippi watermelon cutting. The singing of negro spirituals by a negro quartet, the "toting of the watermelon" and the testing of its ripeness were carried out according to typical southern custom.

Opportunity for a further study of the flora of Florida was given when the Seminar group started its journey by motor to Miami, the meeting place of the 79th Annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION. Stops were made en route at the Bok Tower and at Avon Park, where Mayor C. S. Donaldson described and pointed out various native and exotic plants in the unique municipal collection maintained by the city of Avon Park. On Saturday the journey was continued, the route leading across Southern Florida from Ft. Myers through the everglades to Miami. On Sunday various side trips were arranged in and around Miami, inspection of plants being made at Orchid Jungle, Chapman Field, Matheson's Hammock and the Deering Estate.

At the closing business session, Toronto, Canada was selected as the meeting place for the tenth session of the Plant Science Seminar. Earl B. Fischer, professor of Pharmacognosy and Pharmaceutical Botany of the College of Pharmacy, University of Minnesota, was selected to serve as chairman for the coming year with Dr. O. P. M. Canis as secretary. Resolutions were unanimously adopted expressing the thanks of the Seminar to President J. J. Tigert of the University of Florida and Dean Townes R. Leigh for the use of the splendid facilities of the University and the College, all of which had been placed, unqualifiedly, at the disposal of the Seminar; also, the press of Gainesville for its coöperation in making the meetings a success, and especially to Dr. B. V. Christensen, chairman, who so capably and efficiently arranged the interesting program and conducted the meetings. The opinion was unanimous among the members, that the present seminar had proved the most instructive and the most valuable of any so far held.

For program of the Seminar see Official Program, page 12; also June JOURNAL, page 613 and July, page 729.

PHARMACY WEEK PLANS.

At a joint meeting of members of the Executive Committee of the N. A. R. D. and members of the Council of the A. PH. A., held during the recent pharmaceutical meetings in Florida, plans were approved for aggressively promoting support of observance of Pharmacy Week—October 11–17, 1931.

The splendid and outstanding work of the late Dr. Robert J. Ruth, former Chairman of the National Pharmacy Week Committee, representing the N. A. R. D. and the A. PH. A., which has functioned for the past seven years, was reviewed by the Committee.

On account of the close coöperation between Dr. Ruth and Dr. E. L. Newcomb, secretary of the N. W. D. A., and the great service which the N. W. D. A. has rendered during the past three years in supplying beautiful lithographed material for use during Pharmacy Week, the joint committee asked Dr. Newcomb to carry out the plans laid by Dr. Ruth for observance of Pharmacy Week this coming October.

The selection of a permanent chairman will not be made until after the 1931 observance has been completed.