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Why a Career in Botany?

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What will my vocation be like if I choose to major in Botany, is a question very frequently asked by students. It is imperative that botanists be prepared to answer this query as concisely and effectively as possible. Frequently professional vocational counselors are confronted with the problem of delineating botany as a career for their clients. I know of two vocational research agencies which have attempted to provide an answer through the publication of a bulletin (1, 2). A few educational institutions have prepared guides for the use of prospective students in the plant sciences (3, 4, 5), and the Botanical Society of America has a Committee on Counseling and Guidance which is now preparing a manual on botany careers. The sources of information about botany as a career, available to counselors and adequate to cope satisfactorily with the query of the student seeking an area for study, are truly meagre in number and content as compared with those in many other fields.

I usually try to answer the question posed above by describing some of the positions our graduates now hold, because I feel that by the time the student has reached the stage of plying me with his question, he is sufficiently realistic to be no longer interested in generalities. Some of the former students of this department of botany are in industrial research work. One of these works as a technician in the fiber division of a textile corporation. One is interested in keeping wood rotting fungi out of telephone poles and railroad ties. One is writing plant science articles for a nationally distributed farm journal. Several are employed by pharmaceutical companies searching for new sources of antibiotics. One is with the rapidly growing seaweed industry on our east coast seeking new methods of harvest and utilization of red algae. Several are associated with companies producing seeds. Several others are with firms that make chemical fertilizers and soil conditioners. A host of other industrial activities of former students might be cited as examples.

Frequently men trained in plant sciences have found jobs in government service. Several have spent nearly a lifetime exploring in other parts of the world for new plants to be introduced into this country. Some are in control of large tracts of timber and grazing land in the Forest Service. Many are employed as plant pathologists in the Bureau of Plant Industry and various federal and state experiment stations throughout the United States and possessions. A few are civilian scientists with the Army and Air Force studying problems of camouflage.

Several are practicing geneticists developing new and improved varieties of trees at the Institute of Forest Genetics or new strains of wheat, oats, and maize in one of the several agricultural experiment stations.

Probably more than in any other general area, former botany majors are now teaching and doing fundamental research in educational institutions. People trained in plant science are teaching, in addition to general biology and general botany, such courses as bacteriology, microbiology, mycology, plant physiology, genetics, cytology, plant taxonomy, plant pathology, plant anatomy, economic botany, plant morphology, paleobotany, agronomy, horticulture, agriculture, and forestry. Associated with their program of training new plant scientists, teachers frequently act as consultants on matters dealing with plant life, such as gardening, plant disease control, wood identification, water supply pollution, air pollution, identification of crude drug adulterants, and act as experts in various criminological investigations involving plant materials. This type of activity constitutes some departure from teaching, especially if one is called upon to be an expert in a relatively unfamiliar specialty. Most teaching botanists find that research orients them best for teaching and puts another creative spark into the occupation. The fundamental investigative approach to some frontier in our knowledge of plant life provides the very best stimulus to creative and effective effort in the teaching profession. The enthusiasm gained in pursuit of the solution of some current research task cannot help but be transmitted to students. Some of these students may be interested thereby in taking up a career in botany. For this and for other reasons, research becomes a vital characteristic of a botanical career.

Once it is clear to him what the characteristics of botanical work are, the advisee would like to know, in addition, why he should take up a career in botany. What are the inducements? Here the undecided undergraduate or graduate wishes to understand what it is that makes plant science satisfying enough to induce people to spend a lifetime in the profession. Realizing that large financial gain is not a motive in the choice of botany as a career, I resorted to asking a selected sample of plant scientists and graduate students why they became interested in botany. Several indicated that, as boys they had lived on a farm or near a forest preserve and had developed an abiding interest in plant life which carried over or reexpressed itself at college. Several were generally interested in nature and field work and chose botany as a career when they realized that a paying profession might be created from their hobbies. A few of those polled said they had been led into a botanical career through the influence of a thoroughly inspiring, enthusiastic teacher. Several had tried to follow the ex-

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ample of a well trained, active, research leader whose zeal in the search for the solution to problems of plant growth and reproduction seemed to be contagious. Two or three men suggested that they had been induced to major in botany by a teacher who was not a scintillating lecturer but who was continually pointing to aspects of the field where all was not known, where additional investigation was needed, or where experimentation would bear fruit. This approach, along with the fact that in many of their other courses the subject was presented as if all investigative work had been completed and the final word was now being written, left them with the impression that opportunities for work along new frontiers were greater in botany. Perhaps the most satisfying aspect of any career is the clear understanding that the chances for discovery are high. If we can make it plain through careful teaching that many worthwhile contributions to our knowledge of plant science are needed and that the chances for investigative discovery are great, we can effectively answer the undecided college undergraduate or high school senior who asks, "Why a career in botany?"

The student who is curious about a career in botany is usually beginning his scientific training. He is therefore more interested about job opportunities in the future than in presently available ones. The demand for botanists in the teaching profession is due to rise as the school population increases. We are told that student enrollment in colleges by 1970 may be double the present enrollment. This will probably result in somewhat comparable increases in the need for teaching botanists. In predicting the future, it would seem even more important to consider how many new aspects of plant science may evolve in the years ahead. We know that careers have developed during the past 15 years in such industrial specialties as the search for and development of antibiotics, in the improvement of hybrid seed, in hydroponics, in the utilization of microorganisms for food, and in the utilization of seaweeds. Careers for botanists have also been generated from such research activities as the fundamental studies of growth regulators and their adaptation as weed killers, and the use of radioactive isotopes as tracer elements in investigations of a wide variety of metabolic processes in plants. It seems reasonable to expect that the use of new techniques and processes is as likely to create new job opportunities in botany as in any other occupation. This is only an individual interpretation of the question under discussion. Anyone else could answer the questions posed by an advisee in a different manner. It behooves each of us

to be constantly imaginative and realistic in making clear to students and laymen what the botanical profession is and why it is a satisfying and rewarding occupation. Our profession can progress and develop a sound foundation only by attracting the very best men. We face the sharpest kind of competition with other scientists as we attempt to persuade the undecided undergraduate and graduate to elect a career in botany. It will take careful and repeated consideration of the questions posed here and a continuing enthusiasm, plus a little inspiration, in teaching and research to get our reasonable share of talent.

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2. Rice Research Associates. 1950. The Biology Careers Chart-Manual. Chicago.
3. Loehwing, W. F. 1952. Careers in Botany and Plant Sciences. State University of Iowa Department of Botany. Iowa City.
4. Zuck, Robert K. 1949. Plant science as a profession. Bios Vocational Series Number 10. Mount Vernon, Iowa.
5. Ohio State University. 1954. The Institute of Genetics. The Graduate School, Ohio State University. Columbus, Ohio.

(Editor's note: several botany departments have prepared brochures on botanical vocations; it might be helpful to the Editorial Board to have a complete collection of such brochures as a possible basis for another article on this subject. Therefore, if your department has prepared such a pamphlet, will you please send one to the Editor? Thank you for your cooperation).

PERORATION OF PRESIDENT WETMORE'S ADDRESS TO THE SOCIETY (Gainesville, 1954)

The Editor presents Dr. Ralph Wetmore's concluding remarks from his address as retiring president of the Botanical Society of America in the belief that these remarks contain some thought-provoking ideas for all members of our Society:

"Age is no barrier. I have had more excitement in my work, more interest in my classes, and more fun, in the studies of the last five years than at any time in my life. I do believe that it is possible for the members of this Society to concern themselves in making this field one of excitement and not of discouragement. Possibly I live in an ivory tower. But when I come to meetings of the Society and find that it has been thought necessary to appoint a committee to examine the status of Botany in the country and that committee brings in a report which castigates their zoological colleagues and in some cases their college administrators, I find myself greatly disturbed. I have seldom found criticism to be the more desirable way of rectifying a bad situation. Can one find something constructive to suggest which has a chance to achieve the desired end: Right now we have an Education Committee in the Society. We have laid the groundwork for an informative journal which is planned as an organ of this Society for soliciting ideas and comments, thereby serving as a clearing house. Certainly the Editor, Dr. Harry Fuller, does not want to be the doctor here; rather, he wants to be a person to whom you will write your problems to that others may help in their solution. It can be a corrective clearing

house for our grievances and our constructive suggestions. I for one am interested in seeing the Society set up summer sessions with the help of a few universities, for the consideration of problems in teaching, for refresher courses and the introduction of new material, for help in the use of new techniques in botanical research, for the application of botanical knowledge to the needs of agriculture and horticulture. We need offer no apologies for our existence. Physics may have, for some time, to be concerned in destruction; botany is concerned in survival. I do believe we must recognize Botany for what it is, a science so concerned in man's affairs that we must see to it that all recognize its value. We must make it command the respect of the administrators, and of our zoological colleagues as well.

"All in all, your retiring president has shot his bolt in a plea for the members of this Society to continue to get excited over this field in which we are."

NOTES FROM THE COUNCIL MEETING Gainesville, September, 1954

The Treasurer reported that, as of August 31, 1954, the Society had 1819 active, paid-up members . . . The Council voted to propose to members of the Society the deletion of the last sentence of paragraph 1a of Article II of the By-laws. This change will make it unnecessary for the Council to go through the formality of electing members to the Society, for all applicants for membership in the past have been automatically elected. As you are aware, the signatures of sponsors on our membership application forms are no longer requested . . . Paul B. Sears (Yale) was appointed to represent the Society in the AAAS Council for the term 1955-1958. Fred H. Norris (University of Tennessee) was appointed to represent the Society on the AAAS Cooperative Committee on Teaching of Science and Mathematics for a 4-year term. A. C. Smith (Smithsonian Inst.) was appointed for an indefinite term to represent the Society in working with the Chemical-Biological Coordinations Center on the coding of biological taxonomic entities. ~~Three names (Paul Sears, E. F. Castetter, and W. O. Billings) are to be submitted to the committee organizing the International Arid Lands Conference to represent our Society; one of these will be selected by that conference. . . .~~ The Treasurer was authorized to reinvest the \$4,000 U.S. Series G bonds which the Society has owned for several years and which matured in Sept., 1954, in Series K bonds, and to purchase two additional K bonds for \$2,000. The Business Manager of the American Journal of Botany was similarly authorized to reinvest \$5,000 in U.S. government bonds maturing in 1954 and to purchase up to \$5,000 of additional Series K U.S. government bonds. . . . Reports were received and approved from the Committee on Membership (Charles Heimsch, Chairman), the Committee on Education (Sydney Greenfield, Chairman), and the Committee on Guidance and Counselling (Robert Zuck, Chairman). Chairman Ralph Cleland reported that the Committee on the Use of Botanists in National Emergency had not been

active, but that the committee was still in existence. The Committee on the Status of the National Herbarium (H. H. Bartlett, Chairman) is to be continued with an extended mandate, namely, that it should be concerned with the relations of the Society and of botanists with the federal government. It was voted that prior to the time of the next International Botanical Congress (1959) to be held in Canada, a new committee should be appointed to work with the Canadian botanists planning that event; this recommendation was made by Chairman Ralph Wetmore of the present committee. The Committee on Corresponding Members recommended the election of the following to corresponding membership status: J. Hutchinson (Kew, England), A. J. Kluyver (Delft, Netherlands), H. G. Lundegardh (Uppsala, Sweden), Friedrich Oehlkers (Freiburg, Germany), W. Wright Smith (Edinburgh, Scotland), and John Walton (Glasgow, Scotland). . . . All committee reports are in the Secretary's files, and questions concerning them should be directed to him . . . The Secretary was instructed to recommend to the Postmaster General that a commemorative stamp honoring Asa Gray should be issued. . . . It was agreed that the President should appoint a committee to plan for suitable commemoration of the Society's fiftieth anniversary in 1956. . . . The Council voted to request AIBS to arrange for the annual meetings of the Society in 1958, 1959, and 1960 . . . The Council voted approval of AIBS's new constitution, following a contingent vote of the Society on this new constitution . . . It was agreed informally that an item of business for the 1955 Council should be consideration of the desirability of establishing a means of refusing to enter upon programs of the sections papers which the Chairmen and Secretaries of the sections believe to have no scientific value.

Personal

~~Recent deaths: Frank C. Gates (67), Professor of Taxonomy and Ecology, Kansas State College. August A. Pulle (77) Professor-emeritus of Systematic Botany and Plant Geography and Director-emeritus of the Botanical Museum, Herbarium, and Botanical Garden of the University of Utrecht.~~

Prof. Constantine J. Alexopoulos, Dept. of Botany, Michigan State College, is spending the academic year 1954-55 in Greece and Egypt studying fungi and the teaching of mycology and plant pathology in those countries. He will return to his academic duties in September, 1955.

Dr. Theodore Delevoryas has been appointed Assistant Professor of Botany at Michigan State College, effective Sept., 1955. Dr. Delevoryas, who has spent the academic year 1954-55 at the University of Michigan as a National Research Council postdoctoral fellow, will develop a program in paleobotany at Michigan State College.

Dr. Clyde Ritchie Bell, Instructor in Botany at the University of Illinois, has resigned that post to become Assistant Professor of Botany at the University of North Carolina, effective Sept., 1955.

Dr. Joseph Sacher, Instructor in Botany at the University of Illinois, has resigned that post to become Assistant Professor of Botany in Sept., 1955, at Los Angeles State College of Applied Arts and Sciences.

Arthur George Tansley, Professor-emeritus, Oxford University, Honorary Fellow of Trinity College, Cambridge, Chairman of the Nature Conservancy, and President of the Council for the Promotion of Field Studies (home address: Grantchester, Cambridge, England) has recently been knighted. Sir Arthur is well-known for his fundamental investigations in plant ecology and geography and is a corresponding member of the Botanical Society of America.

REPORT OF NATIONAL SCIENCE FOUNDATION FELLOWSHIPS

Mr. Bowen C. Dees, Program Director for Fellowships of the National Science Foundation has sent the Editor the following summary of NSF fellowship awards for 1954-55 in plant sciences:

Predocctoral fellowships (total awarded in all sciences—657): Botany—14; Agriculture—11; Genetics—7.

Predocctoral fellowships renewals (total awarded in all sciences—133): Botany—5; Agriculture—2; Genetics—5.

Postdoctoral fellowships (total awarded in all sciences—80): Botany—12; Agriculture—0; Genetics—4.

Total number of fellowships (predocctoral and postdoctoral) awarded in all biological sciences—214.

Total number of fellowships (predocctoral and postdoctoral) awarded in all physical sciences—523.

APOLOGY!

Number 1 of Volume 1 of *Plant Science Bulletin* should have reached you at the end of March. Through an error (not the Editor's!) the printed postal-permit envelopes for mailing the Bulletins were sent to the AIBS office by truck freight, while the Bulletins were sent to Washington by Railway Express. The *Bulletins* thus reached Washington long before the envelopes. Then, as a consequence of the change of address of AIBS, the trucker had difficulty in locating the new AIBS office. Result: Number 1 of Volume 1 reached you three weeks later than it should have. The Editor apologizes to all members of the Society for the unfortunate series of events (all beyond his control) which caused this delay and especially to members of the Darbaker Committee, whose deadline was April 15th, the day the *Bulletins* were mailed from Washington!

The Editor urges members of the Society to send him items for *Plant Science Bulletin*.

ANNOUNCEMENTS

The American Institute of Biological Sciences, formerly at 2101 Constitution Ave., Washington, D. C., has moved its offices to 2000 P St., N.W., Washington 6, D.C. The Botanical Society of America is one of the thirty societies which support AIBS. Mailing of dues bills, *Plant Science Bulletin*, and various other materials of the Botanical Society is one of the functions of AIBS.

The National Association of Biology Teachers will hold a conference on biology teaching at the University of Michigan Biological Station from August 19th through August 30th, 1955. Botanists interested in attending this conference may obtain information concerning program details, room reservations, and transportation from Dr. Richard L. Weaver, P.O. Box 2073, Ann Arbor, Michigan, who is director of the conference.

Blakeslee Memorial Fund

Donations are being received by the A. F. Blakeslee Memorial Fund, Smith College, Northampton, Mass., for the purpose of endowing a Blakeslee lectureship at Smith College. Persons wishing to make donations should send their checks to the A. F. Blakeslee Memorial Fund, Smith College.

Florida Summer Session in Statistics

Dr. Herbert A. Meyer, Statistical Laboratory, University of Florida, Gainesville, has announced that his university, North Carolina State College, Virginia Polytechnic Institute, and the Southern Regional Education Board, are jointly sponsoring a series of summer sessions in statistics. The first session, that of summer 1954, attracted 89 students. The second session will be held at the University of Florida from June 20-July 29, 1955, the third session at North Carolina State College in 1956. Emphasis will be placed upon statistics in biology, as well as in other scientific fields. Further information may be obtained from Dr. Meyer.

Spring, 1955, Books in Plant Sciences

Lawrence, George H. M. (Cornell)—*An Introduction to Plant Taxonomy*. Macmillan, New York.

Sinnott, Edmund (Yale) and Katherine S. Wilson (Yale)—*Botany: Principles and Problems* (5th ed.). McGraw-Hill, New York.

Thimann, Kenneth V. (Harvard)—*The Life of Bacteria*. Macmillan, New York.

Fuller, Harry J. (Illinois)—*The Plant World* (3rd ed.). Henry Holt & Co., New York.

Core, Earl L.—*Plant Taxonomy*. Prentice-Hall, New York.