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TAXONOMY AS A FIELD FOR RESEARCH¹

By Dr. J. M. GREENMAN

MISSOURI BOTANICAL GARDEN

It has been customary for the retiring vice-president of Section G of the American Association for the Advancement of Science to present at the expiration of his term of office a retiring address. I shall adhere to that established custom. However, realizing that we have a very full program ahead of us, and that an important symposium is to follow this address, I shall be very brief. Knowing also, that it would be expected of me to deal with some phase of taxonomy, I have chosen for my subject "Taxonomy as a Field for Research." I have done this with some degree of hesitation, but with the profound conviction that taxonomy furnishes a fertile field for the apt student, that it has much to contribute to related sciences and

therefore merits a place along with other botanical subjects in the domain of pure research.

That taxonomy has made marked advances during the past three or four decades, I think few would be inclined to question. Interest in this subject in recent years has been stimulated in many ways, particularly by numerous scientific expeditions, which have been concerned either wholly with botany or in which botany has taken an important place. The results of these expeditions to various and little known parts of the world have greatly added to our knowledge of the world's flora. Extensive collections of plants from hitherto little-known regions have furnished material for floristic studies on which new floras have been based, and they have also furnished material for monographic research.

New methods of attack have been brought to bear

¹ Address of the vice-president and chairman of the section on the Botanical Sciences, American Association for the Advancement of Science, Indianapolis, December 28, 1937.

on taxonomic problems, such as studies in comparative embryology, life histories, detailed anatomical studies, particularly in floral anatomy, and cyto-genetic researches—all revealing hitherto unrecorded characters and presenting convincing evidence of genetic relationship and phylogeny. Many of these considerations are reflected in much of the literature of to-day, and all are destined to play an important part in the systematics of the future. I do not mean that a new taxonomy has developed, but merely that a more intensive and comprehensive taxonomy is being pursued. The fundamental basis of taxonomy always has been and always will be comparative morphology.

There has been in recent years an increasing demand on the part of advanced students for more training in taxonomy and for opportunities to carry on research in this field. It is of interest to note how our educational institutions, particularly our universities, through the graduate schools, have responded to this growing importance of taxonomy in its broader aspect. Additional courses in taxonomy and in cognate subjects have been established, and opportunities for taxonomic research have been provided. Thus, it has become possible for the individual, interested in systematics, to major in this subject and to carry forward his main interests until qualified to pursue a life work either in teaching or in research or in a position combining both teaching and research.

Furthermore, there has been during the last three or four decades, except during the period of greatest depression, or recession, an increasing demand from universities, colleges and research institutions for the trained taxonomist. I mean by trained taxonomist the individual who has had a broad fundamental training in the general field of botany, supplemented by a practical experience in an intensive and comprehensive study of a carefully selected genus consisting of a limited number of species. Such a training gives the student a mastery of evaluation of characters involved in relation to a taxonomic treatment and, furthermore, enables him to pursue independently a research problem in taxonomy or to conduct work in taxonomic research.

While I have the most profound respect for careful floristic studies, and I fully realize their importance, yet floristic studies alone in my judgment do not give the essential background and experience for the complete evaluation of the factors concerned in terms of taxonomy.

Profitable research in taxonomy presupposes then a broad foundation in general botany, and aptitude on the part of the individual, as well as adequate library and herbarium facilities, and also opportunity for experimental work and field studies. I do not mean that a library must be absolutely complete in the field

of taxonomic literature, nor do I mean that every known species must be represented in the herbarium. Such completeness does not now exist and in all probability never will exist anywhere. But, excellent library and herbarium facilities for pursuing research work in taxonomy do exist at several institutions in this country; and these conditions are constantly being improved. In addition thereto, however, a study of living plants under cultivation, as well as a study of plants in the field in their natural habitats are important adjuncts to the proper understanding of every group of plants constituting a problem of taxonomic research.

I have pointed out the general trend of taxonomic study during recent years; but there is one more matter which I would like to mention, and that is an international spirit of cooperation in science. I refer particularly to the willingness and desire on the part of foreign botanists to cooperate with Americans in the field of taxonomic research. It is no longer an uncommon occurrence to receive from European and South American institutions relatively large collections of plants, loans of types, copies of descriptions and of illustrations of rare publications, without which it would be impossible to proceed satisfactorily with monographic studies. Thirty years ago it would have been considered impracticable to send over seas old, scientifically valuable and irreplaceable material for fear of loss in transit.

I might cite numerous instances where relatively large and historically important collections have been sent on loan from the great scientific centers of Europe to institutions in the United States for study by experienced taxonomists and monographers. Furthermore, American students are always welcome to visit the great European herbaria and to make free use of their facilities.

Summary: I have tried to point out as briefly as possible some of the main lines along which taxonomy has advanced during the past three or four decades and to indicate some of the new methods of attacking certain problems in taxonomy. I have tried, moreover, to show that there has been an increasing demand on the part of advanced students for better facilities to obtain the necessary training in this field. I have shown also how educational institutions are meeting this demand. It is significant, moreover, that meanwhile there has been an increasing demand from universities, colleges and other institutions for the individual trained in taxonomy.

All things considered, I believe that taxonomy as a field for research offers greater opportunities than ever before for advancing our knowledge of plants and their classification.