

## ADDRESSES

### \*THE BOTANICAL OPPORTUNITY

JOHN M. COULTER, UNIVERSITY OF CHICAGO

In connection with the period of reconstruction, there has come to the science of botany a great opportunity, and botanists must rise to the occasion. It is a critical time for our science, for we may lapse into our former state and become submerged by more aggressive sciences that will rise to the occasion. You realize that at the present moment the scientific study of plants is more fully recognized as a great public service than ever before in the history of botany. The recent pressure for food, and for a wide range of plant materials and products has been met in the main, not by so-called practical men, but by trained botanists. Not only the practical government service, but also many industries are calling for botanists with fundamental training, realizing as never before that progress is based upon research.

A response to this opportunity for public service does not mean *less* science, but *more* science; but it ties up our science so closely to the human interest that it will be in large demand. We are on the rising tide of the greatest demand for trained botanists we have ever known, and it is our task to see to it that the tide does not ebb and leave the profession stranded. If we respond, the opportunities for research will be greater than ever before, as they always are when a science is recognized as of large service.

My purpose is to indicate certain things we must stress in ourselves and in our students if we are to rise to the opportunity.

1. *The synthetic view.*—As we all know, botany has developed many fields of research, and as these fields have multiplied, botanists have become more and more segregated into groups; in fact, in the history of botany we have just been passing through the phase of the *analysis* of our subject.

The development of research increased this narrowing process, for it deals with special regions of a general field. For example, in research there came to be as many kinds

---

\* Complete paper published in Science, N. S. Vol. XLIX, page 363.

of morphologists as there are great groups of plants, and so for other fields. This analysis was inevitable and desirable, for it developed technique, the essential equipment for research.

Now, however, the movement is in the other direction. We are passing from the analysis of our subject to its *synthesis*, and it is this synthesis that is being called for by the new botanical opportunity. The synthetic view recognizes, not the rigidity of separate fields, but the cooperation of all fields. Every phase of botany must be focused upon our important problems, for we recognize that every important problem is synthetic. Our superficial separate problems that we have been cultivating have introduced us to the fact that nature is a great synthesis, and must be attacked synthetically. In the days ahead, the botanist who remains narrow will be stranded.

2. *The practical outlook.*—The new opportunity demands this; in fact, it was this that created the new opportunity. This means that we are to see to it that botany is recognized as the greatest field for universal service. Medicine holds that position now in public estimation, simply because it ministers to the unfortunate, but they are in the minority. Botanical research underlies an essential ministry to all. Disarticulation of botany from its practical applications has been most unfortunate, and must not be continued. For example, to segregate botany and agriculture as two distinct fields is to damage both; a mistake that our recent experience has emphasized. The result has been that botany has not contributed to agricultural practice as it should; and agricultural practice has not called upon botany as it should.

This is very far from meaning that every investigation should have an obvious practical application. Research must be absolutely free, stimulated only by its own interest in advancing knowledge, but the importance of fundamental knowledge in solving practical problems should be emphasized at every opportunity.

3. *Cooperation in Research.*—Our isolated, more or less competitive investigations have resulted in a certain amount of progress; but it has been very slow compared with what cooperation would have secured. The important

problems today are either too complex for the training of any one investigator, or they call for too many data for one investigator to secure, at least in a reasonable time.

This suggests what is probably the most serious obstacle to any general adoption of the cooperative method. We have worked so long in our isolated way in a kind of monastic seclusion, that we have come to regard our problems as personal property, and feel a sort of resentment if any other investigator ventures within our territory. This means that, perhaps unconsciously, we are more concerned with our own personal credit than with the solution of the problem. If our old method has developed this attitude of mind among investigators, it is high time to change it and to realize that research is to advance knowledge, and is not for self-glorification. What the science wants, and what the world wants, is *results*, as quickly and accurately as possible. If we cannot be large enough to put truth above ourselves, the outlook for botany is discouraging.

The spirit of competition between individuals is depressing enough, but when it extends to competition between research establishments it is worse. This spirit of aloofness is the more emphasized between institutions that deal primarily with practical questions and those that deal primarily with fundamental research.

In conclusion, if I may venture a prophecy, it would be that if in response to the great opportunity that has come to us, we shall pledge ourselves to be synthetic rather than narrow in our point of view, to emphasize the possible practical connections of botanical problems, and to submerge our personal and institutional temperaments in a spirit of general cooperation to secure results, botany will come to be recognized as a great national asset, and research will enter upon a new era.