Systematic Botany

THE prime factor for biological research is the organism itself. When one speaks of "hybrid corn," the term covers hundreds of biologically different entities; and likewise the name "Drosophila" does not apply alone to one ubiquitous species of fruit fly that can produce a host of mutations, but to scores of similar species. The biologist must be specific in his selection of his research material, because the very character or quality that absorbs his interest may be specifically limited within the species or strain of organism with which he works.

It is the function of the systematist to organize and catalogue information on relationships among organisms, particularly in the taxonomic categories of family, genus, species, etc. Upon this work all other biological endeavor depends and builds.

In order to classify correctly the present-day end products of the natural evolutionary process in any given group, it is necessary to determine as accurately as possible the number and kind of discrete biological units existent in nature. Then, on the basis of all the available evidence, a logical and utilitarian classification of these may be made. Historically, the approach of the systematist has been purely morphological, and for the present, at least, morphology remains by far his most significant tool.

Speaking for the botanist: for many decades he has, in addition, given much weight to geographical distribution, with its resultant development of isolation. More recently he has been absorbing rapidly such help as he could obtain from genetics and cytology toward the perfection of his classifications. These newer disciplines are throwing abundant light on fundamental relationships with which he must reckon if he is to sharpen his view of the biological picture. Their methods and data are often interrelevant, so that border-crossing fields, burgeoning with hybrid vigor, such as cytogenetics, genecology, physiological genetics, cytotaxonomy, and biosystematics, are widely recognized.

In assaying relationships the primary question, as aforetime, remains: What are the relative roles of heredity and environment in developing the variation one observes? These roles are becoming clarified by reproducible experiments in which the one is changed while the other is held constant.

Out of transplant experiments in which related plants of different heredity are grown together in uniform environments have developed others in which the effects of one environmental factor at a time are tested on genetically uniform material under rigidly controlled conditions. Some of the biological variation thus examined is too minor to concern the systematist. Nevertheless, classification is now seen to be intimately dependent upon more data than morphology alone provides.

But the plant systematist's task does not begin and end with making applications from the experimental field. The descriptive phases of his work are far from over, particularly in the tropical floras of the world, where the abundance of variation is such as to continue to reveal vast numbers of entities new to science as exploration progresses. Although strides are being made, the ordering up of these floras can scarcely be completed before their constituents become adequately known. Yet in these floras, too, often lie hidden the plant resources urgently needed to augment or replace meager or depleted stocks of critical materials.

War and rumors of war have affected this field of botany in many ways. On the one hand, they have interrupted planned programs, withdrawn personnel, dried up sources of support, produced shortages, and even destroyed irreplaceable collections; but, as if in partial compensation, they have made accessible to botanists many little-known outposts of civilization, interested numbers of people in floras new to them, furthered exploration, and instigated research on new uses for the world's plant resources.

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SCIENCE, founded in 1880, is published each Friday by the American Association for the Advancement of Science at the Business Press, 10 McGovern Ave., Lancaster, Pa. Entered as second-class matter at the Post Office at Lancaster, Pa., January 13, 1948, under the Act of March 3, 1879. Acceptance for mailing at the special rate postage provided for in the Act of February 28, 1925, embodied in Paragraph (d-2) Section 34.40 P. L. & R. of 1948

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Annual subscriptions, $7.50; single copies, $.25; foreign postage, outside the Pan-American Union, $1.00; Canadian postage, $.50. Special rates to members of the AAAS.

The AAAS also publishes THE SCIENTIFIC MONTHLY. Subscription and advertising rates on request.

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Science **113** (2935), 3.
DOI: 10.1126/science.113.2935.3