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About the Institute
The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

SUMMARY REMARKS

While the major objective of this book has been to indicate the fundamental role of plants in our lives, one may also see that there have been other objectives. One of these has been to teach, in a relatively painless manner something about the science of botany itself. Many times in the past, I have been told by one adult or another, that the botany they were taught in school was dull, lifeless, and nothing but a recitation of useless "facts." I hope that I have shown in this book that the study of plants can be exciting, useful and enjoyable. It is true that the individual has to have some motivation of his own, but without some direction, this motivation can be diverted, dulled, even destroyed. Perhaps this work shows that there is much more to be learned about the kinds, the function, the inheritance, the structure of plants. Economic botany, as I have used the term, is not as much applied botany as an explanation about the plants themselves. One question I have tried to answer is "what is there about plants that mankind finds so useful?"

I said in the introduction that we might get a glimpse of what the future holds in the way of using plants, but as I read through the chapters, I find that I did not give the glimpses as clearly as I thought I could. That mankind will find new uses for well-known cultivated species, and bring new species to usefulness, is a certainty. But what these will be is left to the fertile imagination of the people who study them. It is clear that I have not covered all the areas of plant utilization and relation to mankind. Many will point out that I omitted this or that vital role of plants in our lives. So I have, but I did say something about those that I have found interesting, and hope that this leads to the investigation of the others intentionally or unintentionally omitted.

One of the most noticeable omissions from the book is in the area of plants that have deleterious effect on man. Plants cause diseases, allergies, and violent skin reactions. Much time, effort, and energy are expended to alleviate the discomfort caused by certain plants. The diseases most frequently encountered are those caused by the lower organisms, the bacteria and fungi, and some of our most dramatic successes in medicine have been the overcoming of these diseases.

Another important category omitted is a discussion of weeds, and how these plants have influenced our agriculture and economy. There is no one satisfactory definition of all weeds, though many people have attempted to provide one for plants whose effects are disturbing in some way. Different plants are weeds in different settings. Water hyacinth, now found clogging many southern waterways, is certainly a weed. In its native habitat in northern South America, no difficulties with it exist. Weeds in corn fields cause much effort to be expended to eradicate them. Some members of the grass family are our most pernicious weeds. The related sedges (family Cyperaceae) are also troublesome for certain types of farming. Since the discovery that a chemical, 2-4D, killed weeds, a very large chemical industry has grown up, providing a bewildering group of trade-named weedicides. Though many of these chemical substances do kill the weeds they are intended to, their side effects are not fully known, and may be more troublesome to agriculture in the long run than the weeds they were intended to kill. One such problem was discussed in the chapter on cranberries. This example was intended to show that no activity is completely isolated in its effects, and problems arise in a manner least expected by those who had the best of intentions in their first applications.

In all situations, however, we should focus our attention on the plants

themselves. Other books in this series indicate some of the fascinating, basic scientific botanical investigations now going on in this country. We find new ways to investigate old problems, and along the way discover problems in plants that were not even thought of in earlier times. With some curiousity, you can enter a fascinating world through these books. I hope you will.

Summary Remarks

~~Some Loose Ends~~

While the major objective of this book has been to indicate the fundamental role of plants in our lives, one may also see that there have been other ~~xxxxxxx~~ objectives. One of these has been to teach, in a relatively painless manner, something about the science of botany itself. Many times in the past, I have been told by one adult or another, that the botany they were taught in school was dull, lifeless, and nothing but a recitation of useless "facts". I hope that I have shown in this book That the study of plants can be exciting, useful and enjoyable. It is true that the individual has to have some motivation of his own, but without some direction, this motivation can be diverted, dulled, even destroyed. Perhaps this work shows that there is much more to be learned about the kinds, the function, the inheritance, the structure of plants. Economic botany, as I have used the term, is not ~~xx~~ as much applied botany as an explanation about the plants themselves. ~~The~~ One question I have tried to answer is "what is there about plants that mankind finds so useful?"

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Captions

Fig. 1. Interrelationships of the 31 members of the Oncidiinae at the 12th clustering, expressed as subgraphs.

Fig. 2. Interrelationships of the 31 members of the Oncidiinae at the 15th clustering, expressed as subgraphs.

Fig. 3. Interrelationships of the 31 members of the Oncidiinae at the 16th clustering, expressed as subgraphs.

Fig. 4. Interrelationships of the 31 members of the Oncidiinae at the 19th clustering, expressed as subgraphs.

Fig. 5. Interrelationships of the 31 members of the Oncidiinae at the 21st clustering, expressed as subgraphs.

Fig. 6. Interrelationships of the 31 members of the Oncidiinae at the 23rd clustering, expressed as subgraphs.

Fig. 7. "Moat" chart of the 31 members of the Oncidiinae.

Fig. 8. Interrelationships of the 31 members of the Oncidiinae expressed as a contour map.

violent skin reactions. Much time, effort, and energy are expended to allieve the discomfort caused by certain these plants. Man may react to representatives of the whole plant kingdom. The diseases most frequently encountered are those caused by the lower organisms, the bacteria and fungi, and some of our most dramatic successes in medicine have been the overcoming of these diseases.

Another important category ommitted is a discussion of weeds, and how these plants have influenced our agriculture and economy. There is no one satisfactory definition of all weeds, though many people have attempted to provide one overall definition for plants whose effects are somehow disturbing in some way to the growth of some other group of desired plants. Different plants are weeds in different settings. Water hyacinth, now found clogging many southern waterways, is certainly a weed. In its native habitat in Northern South America, no difficulties with it exist. Weeds in cornfields cause much effort to be expended to eradicate them. Some members of the grass family (family Cyperaceae) are our most pernicious weeds. The related sedges are also troublesome for certain types of farming. Since the discovery that a chemical, 2-4D, killed weeds, a very large chemical industry has grown up, providing a bewildering group of trade-named weedicides. Though many of these chemical substances do kill the weeds they are intended to, their side effects are not fully known, and may be more troublesome to agriculture in the long run than the weeds they were intended to kill. One such problem was discussed in the chapter on cranberries. This example was intended to show that no activity is completely isolated in its effects, and problems arise in a manner least expected by those who had the best of intentions in their first applications.

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5c Defn. As a measure of dispersion for c-C, take

$$D[c\text{-}C] = \frac{M(M-1) - S(C\text{-}C)}{M(M-1) - 2(M-1)}$$

$$= \frac{M(M-1) - S(c\text{-}C)}{(M-2)(M-1)}$$ where c-C has M members, $M > 2$.

Note that D[c-C] varies from 0, or no dispersion (strong circle) to 1, much dispersion (cline).