

The Modern Arboretum

A Center of Regional, Botanical and Horticultural Synthesis

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on the occasion

of the

first meeting

of the

Southern California Botanical Society

at the site of the projected

Los Angeles County Arboretum

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by

Frans Verdoorn, Ph. D.

Managing Editor of *Chronica Botanica*

Research Fellow in the Arnold Arboretum of Harvard University

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Some weeks ago I was asked by colleagues who are familiar with my current work on the history of botanic gardens, if I would be able to come West for some days to help them and the Trustees of the Los Angeles County Arboretum with the planning of certain features of the interesting arboretum in the midst of which we are gathered, on this enjoyable day. This in an interesting arboretum, indeed, as most of you will already have seen. It differs from almost any of the existing and of most of the new arboretums now being planned (not less than 40 arboretums are being established this year in North America) by having its nucleus in a historical park with the REID adobe and BALDWIN home, unique landmarks in the history of Southern California, with a picturesque lake and a variety of fine old trees. On the other hand no offices, scientific and technical staff or even the necessary endowment to keep a modern arboretum functioning are yet available. However, there can be little doubt that the phytophilous citizens of Reina de Los Angeles will endow this new arboretum in a variety of ways, particularly as the County of Los Angeles undertook to make funds available for research, as well as for new buildings, the physical

*) Dieser Vortrag wird — nach Mitteilung des Autors — gleichzeitig noch an anderen Stellen veröffentlicht. Die Redaktion.

improvement of existing facilities, etc., as soon as some endowment will have been built up.

When being asked to talk to a group of scientists as you are, I mostly like to discuss such useful things as the methods of biological history or the improvement of international scientific relations, or perhaps certain publication problems from an international point of view. Today such pet subjects seem almost small and insignificant, if we look up at the Eucalyptus trees and Palms, well over a hundred feet high, around us.

Without going into any details specifically referring to the projected Los Angeles Arboretum, I should prefer to discuss with you the scope of the modern arboretum and botanical garden.

Botanical gardens belong, with astronomical observatories, among the oldest scientific research institutions. Gardens in which a variety of plants were grown for ornamental, experimental and educational purposes are almost as old as human civilization. At one time their use and development was linked up closely with that of medicine and pharmacy. From the years of the early Renaissance to about a hundred years ago almost all botanical work was done in botanical gardens. As soon as botanical laboratories, museums and herbariums started to develop along new lines, the relationships between botanical gardens and the other plant science institutions became weaker and weaker. This has not been the case everywhere in the world, and I think it would not be difficult to prove that where a botanical garden and a botanical research unit remained closely connected this has been to the advantage of all concerned. Certainly I would not be a good Dutch-American if I would not use this opportunity to refer proudly to the Buitenzorg Gardens and the part they, with the Institutions directly belonging to them, played in the development of tropical biology.

My thesis, then, is that the modern botanical garden or arboretum, in any region, should be not merely a collection of living plants but a center, coördinating the interests of all those, in the region, concerned with plants. Directors of large botanical institutions dwell increasingly on the interrelationships between plant life and the life of man in addresses delivered for the general public at special occasions. A broader concept of horticulture is making its way all over the world. I believe that many of the efforts to establish new arboreta and botanical gardens are symptoms of a general feeling that there should and could be a stronger band and link between those who grow plants, who play with plants, and who study plants, as well as those who are responsible for the conservation and development of natural resources as far as they concern plant life. This feeling, this worldwide new concept, ill-devised though it still is in its immediate objects, may well become

something of great national and international value, both in plant science and practice, as well as in human relationships generally.

To fulfill its task the modern arboretum will first have to consider the various groups of the population which it will have to serve. In a book on the history and methods of arboretums and botanical gardens, on which I have been working for some time, I distinguish ten groups of citizens, etc., with which an arboretum may be concerned:

- 1) school children (and their teachers),
- 2) the general public (whether it has only a few potted plants or a sizable garden),
- 3) the horticultural amateurs (considered as individuals),
- 4) the owners of large, diversified gardens,
- 5) commercial and semi-commercial growers,
- 6) the gardeners employed by commercial growers and on estates,
- 7) amateur botanists and other amateur naturalists,
- 8) professional botanists, horticulturists, and many other biologists,
- 9) the horticultural and other biological societies in the area served by the arboretum,
- 10) last but not least, the city, county and federal governments and several of their special agencies.

I do not believe that there will be many arboretums which will be concerned with the needs of all ten groups enumerated above. In almost any region the needs of some of them will be taken care of quite properly by existing organizations, colleges, etc. And yet, I believe that the modern arboretum will have to watch the interests and will have to do what it can to meet the needs of each of the ten groups listed above, as well as coöperate closely with the existing organizations also engaged in this task, rather than to proceed mainly along the personal interests of the director and certain members of its staff.

At this moment we may consider together the meaning of the word arboretum. Though it literally means a collection of trees, it has been used since the days of Count PÜCKLER, the famous designer of the Park at Muskau, to designate a large collection of living plants, trees, shrubs and herbaceous plants, laid out more or less as a naturalistic landscape. We may well say:

- a botanical garden is a collection of living plants brought together for certain educational purposes,
- an old-fashioned arboretum is a large collection of living plants, mostly trees, landscaped according to certain principles,
- a modern arboretum is a large collection of living plants, without undue emphasis on the trees, landscaped according to certain principles, which forms the nucleus of a botanical and horticultural center, serving the needs of several groups of the regional popu-

lation, as far as these needs are not yet well taken care of otherwise.

This is a long, though helpful definition which can perhaps be made clearer by some suitable examples.

When considering an arboretum, we may see it as a precious stone with four facets:

- 1) The men who make and develop it,
- 2) the living collections,
- 3) the research, educational, and administrative departments,
- 4) the publications which link the arboretum with the outside world.

As to the men who will make and develop an arboretum, we may distinguish between the trustees, benefactors and other members of the arboretum foundation who make its existence possible, on the one hand, and the staff on the other hand. As many arboretums now offer a simple one year and a more extensive two or three year course for student gardeners, it will be important that the director have the assistance of a horticulturist able to handle the details of such a school. Amongst the assistant horticulturists we may well expect men who will be specialists in horticulturally important groups of plants, as roses, orchids, etc.

In any arboretum, however small, I think there should be a phanerogamic botanist in charge of the garden and general herbarium, who must be able to identify, at least to genus, any wild or cultivated plant brought in, and a cryptogamic botanist, familiar with the diseases of garden plants and able to identify the principal genera of the lower plants.

In almost any arboretum funds will limit the number of scientists the trustees and director would like to see on the staff. Nevertheless, whatever public and educational services an arboretum renders, its ultimate fate depends on the quality and quantity of the scientific work produced by its staff. Consciously or unconsciously we all know this, and certain standard procedures are followed to meet these problems. In some cases nearby scientists are asked to join the staff as honorary research fellows or as honorary curators for special groups. The services of outstanding local horticultural authorities are often secured in the same way, or coöperation with specialized horticultural societies is sought by appointing an official representative on the arboretum's advisory committee or staff.

Some of these methods have been successful, some have not been too successful. I often wonder why the biological station idea has not been applied to a much larger extent in our large botanical gardens and arboretums. In normal times it must be easy for a botanical

garden to secure the services of intelligent young colleagues, on a three to twelve months basis, by appointing them as visiting fellows and boarding them in a small dormitory at a nominal rate, or without charge. Small dormitories can be operated relatively easily in most arboretums, as they now usually have coffee-shop or cafeteria facilities for staff and visitors. I strongly feel that botanical-horticultural stations of the same type as the biological stations, with which we are all familiar, within the framework of a large arboretum, have considerable possibilities.

This is not the place to say much more about the men, the staff who will develop an arboretum, though they are very important; plants alone, however skillfully planted and however well kept up by able gardeners never form an arboretum!

Let us now consider the living collections of an arboretum. At one time an arboretum was considered complete after the grounds had been landscaped and planted with a variety of trees, shrubs and, in most cases, also herbaceous plants. Today we expect more in an arboretum, though the trees, shrubs and herbaceous plants scattered over the grounds will, of course, always continue to form the nucleus of any arboretum.

The idea of several smaller gardens, within a larger garden, is about as old as the garden idea itself. In recent times it has been given great stimulus by Dr. STUART GAGER. In developing the not very extensive grounds of the Brooklyn Botanical Garden he showed that several smaller gardens can find a place well within a larger garden. I think that most modern arboretums should develop several series of such subgardens, as for instance:

1) **Society Demonstration Gardens**, where the principal, local, specialized societies may develop test- or demonstration gardens for such plants as geraniums, roses, orchids (these in green or lath houses), begonias, irises, rarer bulbous plants, camellias, azaleas, etc., depending on the region where the arboretum will be located.

2) **Ecological Gardens**, gardens which show such natural vegetation types as can be imitated well in a given region, in the case of the Los Angeles Arboretum, e.g. many of the vegetation types of the Southwest as well as certain Mexican, South African and Australian formations. Other formations can be imitated in modern greenhouses or in dioramas in a special building. Botanical dioramas, as shown in the Bloomfield Hills Museum, with proper backgrounds, suitable lighting and skillful new preparation techniques, can now be made as beautiful and fascinating as the animal habitat groups in the American Museum of Natural History. There are other new possibilities; as Dr. WENT told me the other day, it should be possible to make a real rain forest, with various epiphytes, by growing a group

of plants with their epiphytes of the wet subtropics, in a modified lathhouse with a special sprinkler system.

3) **Biological Gardens**, ranging from the classic rock and fern gardens via groups of the carnivorous plants to more modern exhibits illustrating the principal chapters in the biology of plants.

4) **Plant Physiological Demonstration Gardens**, where the results of recent advances in such fields, as, e.g., photoperiodism may be demonstrated by having artificial light directly over the plants in the field.

5) **A School Garden**, both for the younger generation accompanied by their teachers as well for the supply of plants to schools. The possibilities of modern school gardens, often conducted in coöperation with the local nature teacher's association, are almost endless. The extensive English and Continental literature on this subject is little known in the eastern U.S., which has not too much use for school gardens, as the short growing season coincides for a good deal with the summer vacations.

6) **A Fossil Plants Garden**, as developed first so successfully at Breslau in the 1860's.

7) **Historical Gardens**, which show the gardens of former periods, often in foreign countries, as a Shakespeare Garden, a Swiss Farm Garden, a Virginia Colonial Garden, etc., are not easy to make. They draw however, many visitors and often financial support from groups or individuals otherwise not interested in an arboretum. In this BALDWIN estate, e.g., it is planned to have the BALDWIN and REID houses skillfully restored by certain historical societies. Without doubt, they will be glad to contribute also to the restoration of the garden of Captain REID, difficult as this restoration may be. The scientific reconstruction of early gardens is an intriguing subject, its technique is difficult and needs further study (this also involves the study of the history of various cultivated plants and even the breeding of extinct varieties, as done already for pigeon, poultry, etc., varieties of the past). With a group of workers at Williamsburg I am trying to get out a small manual on the technique of restoring old gardens. This involves much study, ranging from old prints to the advertising columns of 18th century newspapers!

8) **Trade Demonstration Gardens**, such as a few arboretums have set aside for demonstration purposes by the trade. Such semi-permanent horticultural exhibits drawn many visitors, they should be kept well separate from the other exhibits. If organized on a strictly rotating basis I do not think that they are objectionable from any point of view.

9) A well-financed arboretum will often have certain **Branch Gardens**. In the case of the Los Angeles Arboretum perhaps a

desert garden, a Sierra Garden for plants of higher altitudes, and a downtown Los Angeles garden might be considered.

There are many other things which can be made and done in an arboretum. It is, however, time to consider an other facet of the modern arboretum, the Departments of Research, Education and Administration.

I already spoke about the need for a horticultural school in the framework of most arboretums. There are other well-known features, such as greenhouses, lathhouses, propagation houses, etc., a garden- and general herbarium, a hall for dioramas and other special exhibits which will often double as a large exhibition hall and an auditorium for larger groups than can be handled in the other buildings. After studying for years the programs of many large arboretums I should like to make a few suggestions:

1) Radio, press, and public relations are poorly and unscientifically handled in many arboretums, and as a result thousands of dollars of possible revenue and much good will are lost.

2) The relationships between plant science and plant form, on the one hand, and art on the other hand are often hardly considered. We cannot all be expected to become interested in WORDSWORTH's or SHELLEY's nature poetry, but yet we cannot be good botanists unless we appreciate beauty of plant form and colour and have some understanding about the principles underlying the aesthetics of plants, flowers, natural plant formations, gardens, and plant arrangements. Every arboretum, I think, should organize an annual exhibit of drawings, etchings and paintings of a botanical and horticultural interest and closer relations between those who make these and the staff should be encouraged.

Then I should like to refer again to the possibilities of the modern diorama; not only exotic or arctic vegetation types but also chapters in economic botany, ethnobotany, etc., can be illustrated exceedingly well with new techniques.

To be a center of regional botanical and horticultural synthesis the modern arboretum needs, in addition to its usual library of books and journals, several card files on the botanical and horticultural resources of the region for easy consultation by staff and visitors, these files to include data on plants which have been grown but which no longer are represented in the area. These card indices will form a useful horticultural center which will draw many visitors (often visitors who do not care much for the living collections!) to the garden and which will enable it to fill its mission of regional horticultural synthesis.

I should now like to consider with you the publications an arboretum will issue, such as the mimeographed newsletter, the regular journal and various books.

A mimeographed newsletter should be issued often and distributed widely.

The journal is needed not only for the publication of work by the staff, but also for exchanges; at least some 400 journals may be obtained today in exchange by any botanical-horticultural library.

Every arboretum will issue books from time to time, ranging from reports dealing with the work of the staff to botanical and horticultural monographs and hand- and reference books. Much material has remained unpublished in the past due to the high cost of producing technical botanical and horticultural monographs of limited interest. Now it seems possible that the new technique of typing such monographs in our own offices on a vari-typewriter and reproducing the results by offset will make it feasible to turn out nicely produced monographs at about one-third of the cost for a typeset and printed book, a really dramatic development!

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To conclude, I should like to deal in an entirely different way with a special set of problems that confront those responsible for the conduct of a new arboretum or a similar institution of systematic botany and horticulture, a set of problems which touch on all four facets we considered before, the men who make the staff of an arboretum, the plants with which they deal, the services they endeavour to render and the form in which they publish their material.

There are at present at least a hundred thousand workers in the pure and applied botanical and horticultural sciences in this small world, some hundred thousand workers with the training and background that enables them to contribute to the progress of their *scientia amata*, and perhaps even to that of the world at large, as research workers, as administrators of research, as extension workers, or as teachers. The influence of these hundred thousand learned men, however, is surprisingly small. Although the world at large has profited so much from advances based on the discoveries of workers in the plant, animal and medical sciences, its affairs are hardly conducted along lines conforming to the postulates of biology and related sciences.

There are many causes for this state of affairs, mostly easy to discuss and analyse but difficult to change. One of the reasons is the fact that these various groups of biologists do not form a unit, not even a conglomeration, but rather a heterogeneous group of centrifugal forces. A well conducted arboretum may, as we have seen be of considerable help in uniting the activities of certain of these forces. However, the problem remains that most of the workers concerned are now narrowly specialized.

Specialization is necessary, and it is easy but not correct to say that it is a necessary evil. Like all necessary things, however, it makes us forget about, and neglect other valuable, less urgent considerations.

To be a good all-round biologist is a desire more easily expressed than realized. In the first place one has to "keep up with progress," a not very difficult task as there are many journals which will gladly follow us to any corner of the world. Is it enough to keep up with the literature? Can one be a good biologist by keeping up with the literature in a general way and concentrating otherwise on one's own immediate problems?

One can hardly answer these questions without considering the greatest curse of modern biology and one of the major reasons for our ineffectiveness, as a group the now almost unbridgeable gap between taxonomy, on the one side, and general biology on the other side.

Very often, as a result of their special problems, the botanical and horticultural taxonomists have accustomed themselves to thinking in terms of species, subspecies or varieties. These units, natural or artificial, seem to them the only things which matter. The general biologist and the intelligent public (and even the worker in another field of taxonomy) cannot follow the specialized taxonomist, who seems to have forgotten that there is a higher level to which many a specialist in another field, the general biologist, the intelligent amateur, will in many a case follow him, namely the genera.

In works on the genera and principal subgenera of the flora and fauna of a certain region we can give, in little space, a review of the principal forms of organisms in that region with good notes on their ecology, biology, and other general data, to answer most of the questions with which the groups of colleagues referred to above are trying to cope. Such biological-ecological systematic generic floras and faunas, if done well, cannot fail to be a constant source of inspiration. I believe that a newly established arboretum, with a limited herbarium and library, as central clearing house for its region, will find it more useful and desirable to assume some leadership in the production of such generic floras than in becoming a second rate Kew, Dahlem or Harvard Herbarium.

The general biologist is interested, naturally interested in form; otherwise he would not be a biologist. Some are more interested than others; but for nearly all of them function is not abstract but something dependent upon a certain form. The general biologist differs from the taxonomist in not having the time, the interest, and above all, not the psychological bent to follow him in his endless rambles through the world of species, subspecies, and varieties, with the unavoidable, for him seemingly absurd problems of nomenclature. It is a shame indeed to realize that we taxonomists have not prepared, in the 200 years

which have elapsed since LINNAEUS's time, anything like a series of monographs, for the various temperate and tropical regions of the world, with which the biologists and other intelligent and interested people can identify the principal forms of plant and animal life, their names, structure, relationships, and all the interesting ecological and other general biological details which can be given in a few words about most forms of plant or animal life.

When considering, in former decennia, the activities of large central botanical or zoological institutions, as well as the possibilities of solving some of their problems by a coöperative approach, we, taxonomists, discussed the possibilities of coöperative collecting schemes, a well-organized exchange of specimens, coöperative revisions and floras. Let us not forget that all these useful things are internal problems. The taxonomist's weak position in the world of biology and the sad gap between taxonomic and general biology cannot be improved materially unless certain institutions make it their task to bridge the gaps between taxonomy and general biology. I feel certain that a good series of regional generic floras (and also faunas) where the two points of view will truly meet will be as useful, in the long run, and as stimulating to ourselves as our colleagues in many other fields, and therefore ultimately to the world at large.

It has been a pleasure to discuss the scope and some selected aims of the modern arboretum with you. Many of the thoughts referred to above came to the Trustees of this Arboretum and their advisors after a study of other arboretums. Other ideas come to us from the study of the history of the gardens of former times. There is perhaps no other field in biology where the knowledge of the history of biology yields such stimulating, practical results as in the planning and direction of large centralizing units as modern arboretums.

I hope that this projected Los Angeles County Arboretum will be established soon on a working basis and that you will all find here, under the leadership of Dr. WENT and the other Trustees, in years to come, much to unite you more closely. To do this well, they again will need the help of all of you in order that their efforts will not be of a synthetic, but of a synthesizing nature and will result in a living fellowship of all who grow plants, who study plants, and who play with plants in Southern California.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

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