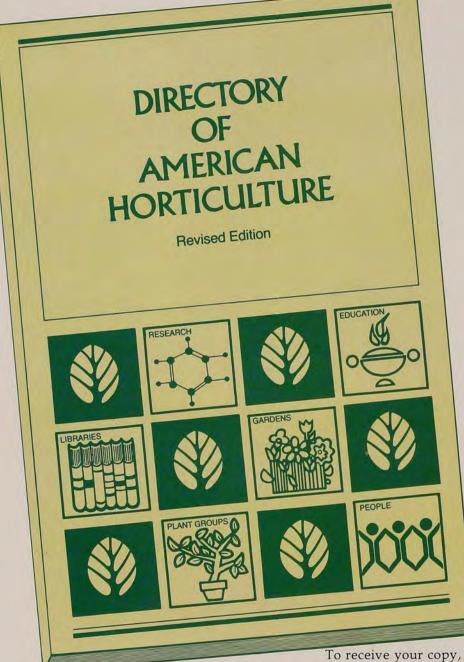
## American Horticulturist

Volume 53 Number 3 Late Summer 1974

### NEW DIRECTORY OF AMERICAN HORTICULTURE



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The 1974 Directory of American Horticulture published by the American Horticultural Society now is available. The 119-page publication is an encyclopedic reference work about organized horticulture presented by A.H.S. as part of its continuing effort to promote coordination and cooperation in this field. As the name implies, the purpose of the Directory is to tell anyone interested in any aspect of horticulture or gardening where to turn for information or assistance. The work lists professional, semiprofessional, trade organizations and plant societies, conservation organizations, garden club associations, special libraries, U.S. Government Programs in agriculture, educational programs-both degree and non-degree granting, programs in horticultural therapy and practical horticultural certification. The publication also includes state and province lists—United States and Canada; gardens, garden centers, National, state and regional organizations, and other institutions listed by States and Provinces. The Directory lists international registration authorities and useful reference publications for the serious gardener. The Directory of American Horticulture not only is a practical aid, but is a must for both amateur and professional.



## **"OUR HORTICULTURAL HERITAGE"**

29th Congress of the American Horticultural Society October 9 through October 12, 1974 Washington, D.C.

#### **HIGHLIGHTS OF TENTATIVE PROGRAM**

#### Wed., Oct. 9

Federal Period Home and Garden tours of Historic Georgetown, Washington, D.C., and Old Town, Alexandria, Virginia.

#### Thurs., Oct. 10

Tour of George Washington's River Farm, now the National Center for American Horticulture.

Potomac River boat ride tour and reception at Historic Mount Vernon.

#### Fri., Oct. 11

Horticultural tours to Dumbarton Oaks, Hillwood Gardens and the National Cathedral.

Day-long Educational Program at the U.S.D.A. Research Station, Beltsville, Maryland, and tours at the National Arboretum.

Annual A.H.S. Film Festival and Awards banquet.

#### Sat., Oct. 12

A report of the A.H.S. Environmental Horticulture Symposium Hort/U.S.: Living & Learning.

Organizational sessions and educational presentations.

Tours to Gunston Hall, Woodlawn Plantation and historic Pohick Church.

Rare plant auction and President's banquet. Speaker of international prominence to be announced.

#### Sun., Oct. 13 & Mon., Oct. 14

Post Congress tours to Williamsburg, Richmond, Charlottesville, the scenic James River area and colorful Skyline Drive.



## **Growing On**

Plantsmen know that all is well when their plants grow on. So it is with garden clubs, plant societies, and horticultural organizations. When growth stops there is a problem; status quo, horticulturally speaking, usually is symptomatic of some sort of blight. In recent years the American Horticultural Society has made phenomenal growth—more than a severalfold increase in membership—and expansion continues. Other changes accompany this exciting burst of growth.

Early May saw the dedication of the new A.H.S. headquarters at the beautiful River Farm at Mount Vernon, Virginia. During those impressive ceremonies a new term often was heard; people spoke of the National Center for Horticulture. Here is a wonderful concept; Plant Societies have the opportunity to use the River Farm as *their* national headquarters, taking advantage of secretarial pools, public relations and information production services and so on. The A.H.S. computer, with its vast load of horticulturally related information, is immediately available. Already several organizations are studying the advantages of participating in the National Center for Horticulture and some have moved in.

Concurrent with the dedication of the River Farm was the Environmental Symposium sponsored by A.H.S. and funded by an H.E.W. grant. Here is an important branch on our tree. Public services have not, to the present, been a strong program in American horticulture. But in recent years A.H.S. has been involved in nation-wide studies of urban environment tolerant plants, in plants and landscape designs for public buildings, and more. The Environmental Symposium produced a fine crop of new ideas to explore, ideas designed to bring more people face to face with plants. And, after all, isn't that what a National horticultural organization is all about? Isn't it a sort of dating bureau functioning to introduce people and plants to each other?

Our readers need to review the Summer, 1974 issue of American Horticulturist and then read the two special articles in this issue identified with the Hort U.S. symbol. Finally, read the summary of activities that took place during the Symposium. All of this is the groundwork for a continuing program which is developing; a program that will bring people and plants together in botanic gardens and arboreta, in public parks and gardens, in flower shows and garden club activities, and in everybody's house and garden.

We use our facilities to encourage members and friends of A.H.S. to grow new and exciting plants. Who can read an article on Japanese maples or on Lithops without developing a craving for these exciting plants? Who doesn't yearn to visit flower rich South Africa-or at least, to grow many of those beautiful species in the home garden? Our planet grows smaller daily, and we gardeners have learned how to move the whole world into our gardens. A.H.S., the Plant Introduction Bureau, and similar organizations make this possible. Out of the corner of our eye we watch our natural areas fade and die under the invasive onslaught of "civilization." Aspects of natural history are under the aegis of other organizations, but all horticulturists, amateur and professional, maintain an acute interest in the well-being of surviving natural habitats. Hence the articles by the Audubon Society's Charlie Callison and Oregon's governor Tom McCall in this issue. The Garden Club of America has dedicated much of its 1974 activity to a study of national conservation and environmental activities; we have borrowed these two fine articles from two of their programs

It is a wonderful thing to watch the membership of our American Horticultural Society zoom upwards. It is even better to watch new, meaningful programs burgeon and bloom while cherished traditional activities are maintained at a high level. By all means, come to the River Farm, A.H.S. headquarters, the National Center for Horticulture, for the Congress in October. You owe yourself a view of the National Center for Horticulture. You are a part of it!— J.P.B.

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For United Horticulture ... the particular objects and business of The American Horticultural Society are to promote and encourage national interest in scientific research and education in horticulture in all of its branches.

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#### American Horticulturist Volume 53 Number 3 Late Summer 1974

JOHN PHILIP BAUMGARDT, Editor

The American Horticultural Society, Publisher Mount Vernon, Virginia 22121 O. KEISTER EVANS, Executive Director

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**OUR COVER PHOTO**—*Lithops helmutii* by George Kalmbacher, Brooklyn Botanic Garden. Mr. Kalmbacher also authored the article *Lithops* on page sixteen.

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With great showmanship, Dr. Henry M. Cathey opens one of the sessions of the Hort U.S. Symposium in the ballroom of the River Farm. Spurred by Dr. Cathey's enthusiasm, delegates entered into new analyses of the people-plant relationship.

# HORT U.S./living and learning\*



\*A report on the recent A.H.S. Symposium by Dr. Henry M. Cathey, Cochairman of the Symposium and A.H.S. vice-president.

The symposium on "how horticulture can enhance environmental education" May 1-4, was sponsored by the American Horticultural Society under the auspices of a grant from the U.S. Department of Health, Education, and Welfare. The symposium was a major step in a program designed to bring all sectors of horticulture into closer contact with other disciplines now working on people-plant interactions. More than ninty participants drawn from many sectors of horticulture were involved in the four day session. Activities centered at the A.H.S. national headquarters, the River Farm, which serves as a National Center for American Horticulture.

The participants worked in two of twelve working parties; the format and direction were established in an opening plenary session. Later sessions provided for exchange of ideas between working parties, permitting comparison of working parties' recommendations, and examination of the major recommendation of all groups. Most of the four days were spent in the working sessions, developing concepts and relationships, evaluating their potentials, examining work now in progress or completed, and packaging these priorities in a written report. The goal of the symposium was to evaluate the state of environmental education programs in horticulture and to pinpoint information which is essential to effective development and functioning of quality people-plant programs now and in the future.

On May 3rd, the participants were received at Mount Vernon by Mr. Cecil Wall for a late afternoon tour of the mansion and gardens. The relationship between Mt. Vernon and the River Farm was discussed. After a Colonial Dinner, the participants held an open discussion with Mr. Maurice Sigler Chairman, U.S. Board of Parole, on scarred landscapes and scarred minds.

A result of four days of work was a gathering of creative ideas, new and reoriented, with specific recommendations, outlined in succinct statements. This product will be assembled in appropriate form as the symposium re-



Delegates from across the country assembled to participate in the Hort U.S. Symposium. Professional horticulturists, botanists, university professors, amateur gardeners and professional plantsmen joined forces to elucidate new ideas.



Signing the Declaration, Dr. David G. Leach, president of The American Horticultural Society leads off under the watchful eye of Co-chairman Cathey. Each delegate signed, in turn.

port. Synthesis of the report into a publication will require additional work over several months.

The symposium was a step in a continuing process and represented an opportunity to interact and combine the many disciplines necessary to understand and manage people-plant programs.

The following resolutions were made on May 4th:

**R**esolved that: The American Horticultural Society make every effort to both resolve and serve the changing environmental need for horticulture in the world of today and tomorrow. Further, that the American Horticultural Society expend its energies in enlisting the support of the many and varied sources capable of helping us to provide this service.

> —Mrs. Pendleton Miller, Symposium Co-chairman

**B**ecause of rapid social changes creating precipitous environmental changes adversely affecting the quality of plant growth and human lives, the American Horticultural Society resolves immediately to promote revegetation of small areas made barren by man, especially vacant gasoline service stations, converting them to Youthful Energy Service Stations, Y.E.S.S.!, redesigned and operated by local people as neighborhood sources of plant materials and inspiration, a new breath of life.

**B**ecause of rampant technology, commercialization, and urbanization and the resultant artificiality, the American Horticultural Society resolves to foster *naturalistic* gardening, wherein we are seeking ever greater sensitivity to *nature's* arrangements, humble about our human concepts of tidiness, admiring the unasked-for blessing of weeds in a pavement crack, and peering over the fence into the wildness of paradise, wondering, wishing to help humanity recreate on Earth the Garden of Eden.

-John W. Brainerd,

Garden Centers Group Leader



A working group assembled in an upper hallway at the River Farm. Miss Joan Faust, garden editor for the New York Times presents a point while Mrs. Lois Paul, Director of Education at Longwood Gardens keeps a record.



Symposium Co-chairman, Mrs. Pendleton Miller from Seattle, Washington, is one of the first signers of the Declaration.

**B**e it resolved that a cohesive horticulturally oriented environmental education program, based on the principles of this symposium be brought to the communities of America through regional representatives of A.H.S. at local symposia to which leaders of community organizations are invited to participate.

> —James M. Martin, Community Organization Group Leader

Whereas the American Horticultural Society is emerging as the National Center for Horticulture, with consequent unique potentials and responsibilities, therefore be it,

Resolved, that the American Horticultural Society be urged to assume national responsibility for and to devise productive ways to continue and greatly augment its functions as (1) national repository of all manner of horticultural information, (2) inventorying such information from whatever horticultural or other sources shall be deemed advisable, (3) catalyst for horticultural endeavors requiring its peculiar expertise, and (4) synergist with other organizations in horticultural endeavors which should utilize their joint resources and efforts toward extending indefinitely the dissemination and utilization of horticulture's many benefits.

> —Barbara H. Emerson, Collector Gardens Group Leader, and Plant Societies Coleader

Seek guidance from distinguished science educators to secure the most effective learning processes which may be integrated in the school curriculums in communicating the art and science of horticulture, not only to children, youth, teachers, and administrators of our American schools, but also similar opportunities made available for creative expression to millions in all walks of life.

Protect the countryside through a new process of learning, wherein the teacher and learner seek to discover the unity of the myriad of interrelationships in nature and gardens—through this involvement elevating the dignity of the human spirit.

> —Barbara Shalucah, Public and Private Schools Group Leader

**B**e it resolved that the National Center for American Horticulture serve as a catalyst in the establishment of horticultural research priorities, in the planning and articulation of research objectives and in the drafting of grantin-aid proposals for research to meet the educational needs of the gardening public.

> —Eliot C. Roberts, Research Facilities Group Leader

**A.H.S.** shall recognize and explore the life enhancing and life affirming qualities inherent in the human response to plants. To this end, they will initiate and implement throughout



One of the skull-rattling sessions, in which delegates to the Symposium divided into small working parties to tackle a particular proposition. Here, Mrs. Barbara Emerson chairs a session.

the country programs demonstrating this positive influence of horticulture. A.H.S. shall further pledge itself to continue this effort until all possible applications of People-Plant relationships are known and utilized.

> —Charles A. Lewis, The Disadvantaged Group Leader

**P**ublic gardens are to be a communicator of horticulture to the public at the public's level.

Public gardens are to work in the field of changing human behavior patterns in horticultural awareness.

Public gardens are to stress involvement education in setting the stage for self-discovery of horticultural experiences and to promote spaced repetition of successively advancing horticultural experiences.

Public gardens are to encourage plant appreciation in the total environment as well as in the garden setting.

> -Russell J. Seibert, Public Gardens Group Leader

The A.H.S. should develop the rational and the selling techniques that can be used and understood by laymen, skeptics, and the overextended in answering the question of why I or my organization should support the implementation of Hort U.S.

The A.H.S. should schedule periodic meetings at River Farm to which it invites various audiences that have been identified as key facilitators in achieving the goals of Hort U.S. and to develop agendas for such meetings that will result in activities being developed that will achieve the goals of Hort U.S.

—Wayne H. Schimpff, Youth and Adult Organization Group Leader

#### Declaration: May 4th

As a final act of the symposium, each of the participants signed his name to the following Declaration: Dr. David Leach, president, A.H.S. and Mrs. Pendleton Miller, Co-chairmen of the Environmental Horticulture Committee were the first to sign.

#### HORT U.S./LIVING AND LEARNING

#### AN ENVIRONMENTAL SYMPOSIUM SPONSORED BY THE AMERICAN HORTICULTURAL SOCIETY through a grant from the DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

We, the undersigned, gather at the River Farm to pose, debate and identify questions of person-plant symbiosis in the belief that our environmental quality standards may be raised, our social well-being improved and our educational vitality increased.

We believe the positive influences of horticulture need to be identified as a basic factor to insure the physical and psychological well-being of the American people now in the future.

We propose the creation of practical policies in building habitat and instructional programs to bring horticultural amenities to our educational systems.

> National Center for American Horticulture George Washington's River Farm Mount Vernon, Virginia May 4, 1974



A very limited number of examples are given from the gardens and arboreta supporting the American Association of Botanical Gardens and Arboreta. To all the public and private gardens we owe a great deal for their contributions to knowledge, beauty, and an improved environment.

# Gardens at the Interface

#### Fred B. Widmoyer\*

Today, the masses are raising their voices to dispute the type of progress that leads to environmental catastrophe. Everywhere we turn, the media is cautioning us that Doomsday cannot be far removed unless we reduce our daily requirements. But how many of us are willing to eliminate progress? Our forefathers didn't fish polluted streams or worry about air that wasn't fit to breathe. But neither did they have automobiles, televisions, washing machines, vacuum cleaners, or enough leisure to litter the countryside. With the inevitable movement of time and progress, change has come to our country that, not so very long ago, was untouched, virgin land.

Awareness of these environmental changes has been a characteristic of arboreta and botanical gardens throughout their recorded history. The early gardens, planted by the ancient Greeks and Romans, were primarily pharmaceutical in purpose. Later gardens, developed by the nobility and aristocracy, were mainly for display and personal edification. At that time, botanical gardens represented plant collections from many areas of the world. Only in recent years have some of these gardens become important contributors to our modern knowledge about plants. Still later gardens were developed at universities for research and educational purposes, primarily for their taxonomic and other botanical uses.

From these beginnings, arboreta and botanical gardens have undergone a metamorphosis from traditional, living museums where plants are labeled for educational research activities to gardens with people involvement.

In response to these changes, the American Association of Botanical Gardens

\* Professor and Head, Department of Horticulture, New Mexico State University, Las Cruces, New Mexico 88003

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and Arboreta, in 1940, launched itself as an independent organization representing gardens throughout the Western Hemisphere. The A.A.B.G.A. has served as a sounding board for its members whose various programs have led to the support and education of people interested in modern day problems. Garden administrators throughout the world are cognizant of their communities' environmental needs. Professional horticulturists have long recognized the contributions plants make to environmental well being. Within the past few years, the general public has awakened to some of these attributes.

The Arnold Arboretum, the oldest consecutively operated arboretum in the United States, has experienced considerable changes in educational activities. Horticulture, which was once about as popular as R.O.T.C., is now in demand. Requests for formal courses have come not only from students but also from staff and townspeople alike. Harvard students organized a "Green Committee" to improve their campus' appearance. One student prepared the first modern map survey of the campus plantings. Popular classes at the various arboreta have had a much heavier enrollment, nationwide, for their environmental, ecology-oriented presentations.

Many arboreta, in order to increase understanding of the value of trees, have involved people in the garden's activities. When citizens understand horticulture and botany, plants and trees, they join in promoting wider use of plants and trees as urbanization continues to expand at the expense of meadows, woodlands, and open spaces.

Arboreta and botanical gardens, through their educational endeavors, attempt

Botanic Gardens and Arboreta often contain special collections assembled at great cost by dedicated individuals. Shown is a small corner of the great Gotelli Dwarf Conifer Collection featured in the U.S. National Arboretum in Washington, D.C. to teach the value of plants. Some gardens have offered assistance by training teachers of all levels. Many teachers have also availed themselves of the consultant services offered by arboreta and botanical gardens. Some have enrolled in garden-sponsored, non-credit courses. Cooperation with universities and colleges has produced programs at the Morton Arboretum, Norfolk Botanical Garden, Callaway Gardens, Cornell Plantations, Los Angeles Arboretum, and many others which exemplify the close working relationship between people interested in modern, innovative plant uses.

In the past few years, gardens have been continually updating their educational, public service, horticultural, and research programs to make them of direct benefit to the greatest number of people. The A.A.B.G.A., in 1965, helped lay the foundations for a computerized Plant Record Center. Ten arboreta and botanical gardens financed the preliminary studies. After two years of data collecting and analyses, the program was judged successful and enlargement feasible. At that time Longwood Foundation awarded a multi-million dollar grant to the American Horticultural Society to expand and pursue this study. Today, the major garden records are computerized. This computer bank makes it possible to learn results of plant trials at these institutions. Not only are successes available, but also information on those plants that met their demise.

Much of the early horticultural therapy was begun by members of the A.A.B.G.A. The Menninger Foundation has long been recognized for its contributions in the field of occupational therapy as it relates to horticulture. Conferences along these lines are held on the Michigan State University campus. Today, there is a resurgency of interest in this approach to therapy and Kansas State University has initiated a degree program in horticultural therapy. Recognizing that arboreta and botanical gardens should be available to all, many institutions provide representative gardens for the blind and other handicapped individuals, such as gardens for touch and smell.

Most, if not all, arboretum and botanical gardens consider their primary function to be one of education. Whether it be for youths or adults, this education takes many forms which have evolved from experiences of the community in which the garden exists. Of late, considerable interest in the use and development of American native plants has been in evidence. Through educational endeavors, considerable botanical, horticultural, and even specialized training has been offered under the auspices of botanical gardens and arboreta.

It is up to the professionals to persuade the public that arboreta and botanical gardens play a vital role in environmental protection and conservation while serving as sources of specific information. Garden walks, nature trails, indoor and outdoor conferences, and special seminars have been methods of conveying this knowledge. Garden telephones have been even busier than usual with questions from the public.

More recently some of the gardens have been producing educational films concerning their gardens and emphasizing aspects of history, information, and "how-to-do-it."

As more people become urban apartment dwellers there is an increasing demand for information on utilization of plants in their particular environment. To meet this need, many gardens have added investigations of slow-growing, dwarf, herbaceous plant materials for urban agriculture to their research efforts.

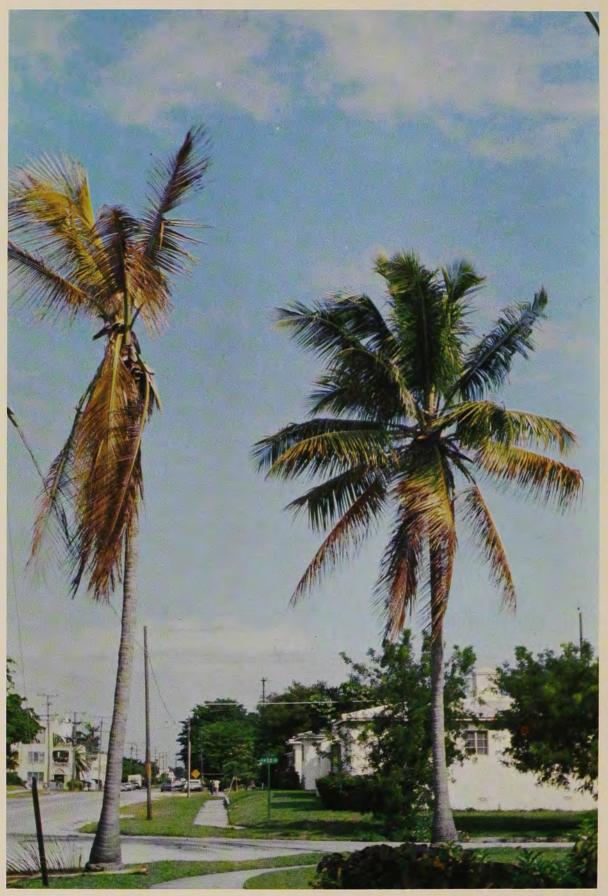
Botanical gardens have also attempted to overcome misleading and nearfraudulent advertising which takes advantage of novice gardeners. These gardens offer a reliable source of information about hardiness, growth rates and habits of plant materials. This can be vitally important to those seeking to maintain and upgrade their surroundings. Those gardens which currently include natural, ecological areas find themselves under pressure from all sides. It is not unthinkable that these gardens may one day have the only undeveloped land in their communities. It takes many years to recreate or redevelop lost areas. Ensuing generations may miss the great educational opportunity of open lands and mature plants. As gardens grow, personnel, operating funds, and land quickly become limiting factors. This could be compared to the garages of the 1920's and the 1974 automobiles.

Much of the initial evaluation of pollution effects on plants was done by arboretums and botanical gardens. Studies have been made on how plants can reduce the effects of air pollutants on humans and how plants can reduce the hazards of modern living such as highway safety, erosion, fire control, and the effects of solid waste utilization for horticultural product purposes.

Although there is some duplication of effort between gardens, many specialize in plant collections which are adapted to their geographic and climatic area. Some gardens, in conjunction with segments of state and federal governments, have sponsored explorations to other countries in a search for new plant materials that might be adaptable to urban planting. Domestic explorations have given us many suitable new plants, especially from areas of the Northwest and the Northeast. Outstanding native plant collections are maintained by many gardens. In general, many of the horticultural plants of any consequence, either for beauty or for food, have been introduced to this continent. Plant breeders have used the source of germplasm provided by these collections in improving good varieties with insect and disease resistance. Evaluations of disease resistance has been a primary objective for several gardens. These new plant types reduce the necessity for pesticide use. In some cases, plants more adapted to the environment have resulted. Some of the newer plant selections can tolerate air pollutants and actually improve the air for human beings.

The changing orientation and planting programs of botanical gardens and arboreta have been in process much longer than the current environmental crazes. Herbaria have been relegated to those gardens specializing in taxonomy and serve as a fountainhead of information to other gardens, wherever they may be. Some arboreta and botanical gardens engage in in-depth research, but the majority serve as cultural institutions representing the art and science of horticulture and gardening. Most of the gardens are developing programs and plantings that can be enjoyed by the visitors with varying backgrounds. Demonstration gardens, workshops, and lectures are nothing new. They have occupied a great deal of staff time and money for a number of years. Although we do not necessarily place an ecology label on the garden's programs, they certainly reflect a marked concern for understanding of the environment.

Arboretums and botanical gardens have now expanded their services to help solve urban, suburban, and intercity problems. Through education on the proper plant use, man, in a landscaped environment, can enjoy a better physical and mental health. People become more knowledgeable about plants and can select those which are more adaptable to their surroundings. The environment must include more than brick and stone. It must incorporate such important factors as diversity, provision for movement, pleasantness, and relationship with its components, including the people themselves. Our gardens play a significant role at the interface where the interests of the biologist, ecologist, conservationist, engineer, and landscape architect come together in land development.



Coconut palms with various stages of the lethal yellowing disease.



# Lethal Yellowing of Coconuts

John Popenoe and Jack B. Fisher\*

Back in the year 1955 reports came from the southernmost city in Florida, Key West, that coconut palms were dying from some unknown blight. Since the coconut was almost the trademark of this island community, labeling it as a truly tropical island, great alarm was spread and the State Department of Agriculture was called in to find out what was happening.

It was decided quickly that the blight killing the coconut palms was the same as, or similar to, the dreadful lethal yellowing disease of coconuts that had been reported from Jamaica around 1891. No cure had been found for the disease and in spite of attempts to control it some 15,000 coconut palms were killed in Key West during the succeeding ten years.

Fortunately, experience in Jamaica had shown that the Dwarf Malay varieties of coconut were highly resistant to the disease and consequently thousands of seed nuts of the resistant varieties were imported from Jamaica for replanting in Key West.

Meanwhile the disease seemed to have run its course in Key West. Some twenty-five per cent of the original plantings escaped and the Dwarf Malay coconuts began growing to replace the lost palms.

In 1969 a new outbreak of the disease occurred in the Keys, this

time on Key Largo, 100 miles from Key West and in 1971 dying palms were observed in Coral Gables on the Florida mainland. Since then the disease has spread unchecked in the Miami area and more than 15,000 palms on the mainland have died.

In Coral Gables a further ominous situation has occurred. Hundreds of palms of the species Veitchia merrillii, the Christmas palm or Manila palm, have died and many fine Fiji Island fan palms of the genus Pritchardia have also died under circumstances lending to the belief that they are being killed by the same disease.

Scientists in other countries have seen the same type of progression of this disease or one very similar to it. Many of the islands of the West Indies have the disease and a disease in Togoland, Ghana, and Nigeria in West Africa appears to be the same as lethal yellowing.

#### Signs of Disease

One of the first signs that this disease has infected a coconut palm is the premature dropping of young nuts from the palm. Most of the fallen nuts will have brown or black areas near the stem end.

A second and very important symptom is that the next inflorescence that breaks through the spathe will be blackened at its tip and no nuts will set on this inflorescence. (



Healthy and diseased specimens of the Christmas palm (Veitchia merrillii).

Further inflorescences, if they appear at all, will be all black.

The third major symptom is yellowing of the leaves which usually occurs after the darkened inflorescences appear. The older leaves turn yellow first, followed progressively by the younger leaves. Leaves that die prematurely will cling to the palm rather than fall off as normal leaves do. Usually the last leaf to die will be the spear leaf in the crown and it will die along with the vegetative bud at its base. Eventually the top of the palm will fall away leaving nothing but the trunk which may resemble a telephone pole.

#### Significance of Yellowing Disease

This is the story of the disease but no disease is of much importance unless it affects people in some way. The story of the people affected by lethal yellowing is both pathetic and exciting. This disease has devastated millions of coconut palms in areas where they are of major economic importance. Since the coconut is one of the major crop plants of the world with millions of people depending on it for food, shelter, and a livelihood, the continued spread of the disease could cause untold misery.

In Florida the spread of lethal yellowing of the coconut has aroused the public in a way that few other things could. During the first incidence of the disease in Key West there was a public outcry for something to be done. This resulted in the initiation of research by the State Department of Agriculture and the importation of thousands of resistant seed nuts.

When the disease struck in the Miami area where millions of people could see the devastation there was even more concern. The State Department of Agriculture and the University of Florida immediately stepped in to learn more about the disease and try to find a way to control it or at least stop its spread. Money was appropriated by the State, by the County and by the City of Coral Gables to help in removal of dead palms. A quarantine was set up so that no coconut palms would be moved from the areas where the disease occurred to areas without the disease.

In 1972, the University of Florida set up a research program at their Agricultural Research Center in Fort Lauderdale to study the disease. Dr. R. E. McCoy, plant pathologist, was named to start a research program.

Meanwhile a newcomer to South Florida, Mrs. Murray McOuaid, was dismayed to find the coconut palms dying all around her new home in Coral Gables which she moved into a little more than a year ago. She called together a group of citizens and formed them into the Save the Palms Committee. Many of the local members of the Palm Society worked with her and she made trips to state, county and city governmental meetings to educate our elected officials on the subject of lethal yellowing, the distress that it was causing the taxpayers, and the need to do something about it. Due to the efforts of Mrs. McOuaid and her committee additional funds were appropriated by the State of Florida for the University of Florida Agricultural Research Center in Fort Lauderdale to expand the research program on lethal yellowing.

Mrs. McQuaid's activities also resulted in a research symposium on lethal yellowing held at the Fairchild Tropical Garden in September, 1973. Funds were solicited from the Tourist Development Authority of Miami Beach with the result that it was possible to bring scientists together from many parts of the world who were working on this disease.

The list of participants to the symposium was impressive. Dr. L. Chiarrapa came from the United Nations Food and Agriculture Organization in Rome and reported on the work done on this disease in West Africa. Dr. R. F. Whitcomb from the U.S. Department of Agriculture in Beltsville, Maryland, discussed diseases closely related to lethal yellowing of coconut, what is known about them and what are the agents that spread these diseases. Dr. M. V. Parthasarathy of Cornell University showed pictures of the

organism that is presumed to cause the disease. These pictures were taken through an electron microscope at Cornell and showed a mycoplasma-like organism in three species of palm, the coconut, the Christmas palm, and the Fiji Island fan palm. All of the material had been collected in Miami from diseased palms. The organism was not found in healthy palms.

Dr. P. B. Tomlinson from Harvard University led a discussion on the basic structure of palms and Dr. M. H. Zimmermann from Harvard and Dr. J. A. Milburn from the University of Glasgow, U.K. discussed translocation in palms.

From Jamaica interesting talks were given by D. H. Romney, director of Research for the Coconut Industry Board, H. C. Harries from his staff, Dr. Peter Hunt from the University of the West Indies, Dr. M. Schuilding from F.A.O. (United Nations), and Dr. C. G. Johnson and Dr. S. Eden-Green from a British government team.

A group from the University of Florida including Drs. D. A. Roberts, J. A. Reinert and R. E. McCoy, presented reports of their work and George Gwin from the Florida State Department of Agriculture gave a talk on the history of lethal yellowing in Florida. Dr. Jack B. Fisher of the Fairchild Tropical Garden organized the symposium.

After the symposium representatives of the news media and interested groups wanted to know immediately if the problem was solved and, if not, how soon could they expect to have a good control for the disease. Unfortunately the problem is not so easily solved. A major contribution was the establishment of an International Council on Lethal Yellowing which will promote and coordinate collaborative efforts of researchers in various countries.

Like our American chestnut blight this disease appears to be one that will run its course through the coconut palms of south Florida. Fortunately there is more hope for coconuts than for the American chestnut. Studies in both Jamaica and Florida show that at least temporary remission of the symptoms can be obtained by treatment with the antibiotic. Terramycin. Although this treatment is expensive and not readily available at the present, it is hoped that a newly developed treatment using a pill pushed into a hole bored in the trunk of the palm will be both effective and economical. This would make it possible for the homeowner to treat his own palms at minimal cost. Treatment must be made before many leaves have yellowed on the coconut to be effective

Besides the "Dwarf Malay" varieties mentioned earlier others seem to have some resistance. Mr. Harries reported on tests of many varieties in Jamaica. In these Jamaica tests several varieties such as the "Panama Tall" have been about fifty percent resistant, that is about half the palms die while the others survive. Hopefully additional resistant varieties will also be found in Florida.

The most encouraging development has been the public awareness of lethal yellowing and the wide reception or even demand for the resistant varieties. More than 250,000 resistant seed nuts have been brought in from Jamaica. These are being widely distributed and planted and this number compares very favorably with the estimated total of some 500,000 coconut palms in south Florida. With all of the publicity for the coconut and the enthusiastic support of the general population, South Florida may end up with more coconut palms after the blight has run its course than it had before!

The extent to which this disease kills other species of palms will soon be put to a thorough test. So far only a few specimens of coconut have shown symptoms of the disease at the Fairchild Tropical Garden, but in this Garden is the world's largest collection of palms and they undoubtedly will all be exposed to the disease. Time will tell if additional species are susceptible.  $\infty$ 





Lithops karasmontana.



#### George Kalmbacher\*

For a great many people, acquaintance with the genus Lithops impels the imagination to high levels of wonderment and awe. For some, the fascination becomes fervent and lasting. Without question these tiny products of evolution which are found in the great Orange River Basin of South Africa present one of the most intriguing aspects of plant life.

They consist of two small very

fleshy leaves facing each other, but joined to make one apparent body with usually a shallow cleft between the two at the top. In nature these bodies are buried in the ground with only the ornamented surfaces showing. In times of increasing drought, shrinkage of body volume may cause them to be covered with blown soil. When the rains come they will fatten, push up and have flowers. The surfaces are in the na-

\*Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, New 16 York 11225 ture of an inch across, and the outline as viewed from above is more or less elliptical.

Lithops are to be found in a part of the world most inhospitable to plant life. Strong winds, intense heat, low humidity and low rainfall are the factors that form the physical environment of these plants, and it is the remarkable complex of adaptations to this environment that make them the unique plants that they are. Besides, they must possess characteristics that make them safe from animal appetites.

In structure they are basically, when flourishing, two water-gorged leaves forming a compact body, whose water-storing capacity approaches the maximum possible in proportion to a total surface that must face the heat of sun and soil. Another reduction is the telescoping of a stem, making a plant of only leaves and roots. And when dormant or inactive, the roots dry up!



L. marmorata.

Protection from sun is afforded by an epidermal layer that is thick, tough and waxy. The top is without stomata, and the whole surface serves to help conserve the water content of the plants. Protection from strong winds that are a natural feature of their environment is afforded by the placement of stomata on the buried walls. Since stomata are the exterior-interior passages for gasses and moisture, winds would wisk away the moisture that is involved in the phenomenon called transpiration, and thus cause drying.

Cells that contain bundles of microscopic very long needle-like objects called raphides occur near the top of the plants. It is likely that they cause the dispersal of light that strikes them into a sort of disorganisation, and thus greatly reduce the incident strength of what light reaches the plant. These crystals consist of calcium oxalate.

Not only are the *Lithops* submerged in the earth in intimate companionship, but also their appearance so resembles the coloration of the particular earth materials where they grow that they are extremely difficult to see, very often even when searching for them. The soils and rocks, according to location, may be granite, quartz or limestone. The design may involve two or more colors. *Lithops*, meaning



L. lesliei var. venteri.

"like stones" is a handsomely apt appellation. This camouflage preserves their continuity on the landscape. For animals they can supply food and water if discovery were easy, but *Lithops* are so well fortified with a "minus" appearance that outwits the hunting capacity of animals, they are safe from such depredation.

Since rocks and earth have no

"chlorophyll greens" the necessary chloroplasts containing necessary chlorophyll are aptly hidden inside the plant body. These cells are far back in the plant at the walls. A few species have transparent tops for the sun to pass through, but typically the tops are patterned into intricate complexes affording large and small areas for entry of sunlight into the plant. These complexities of form and color excite our sense of design and become the big interest of those who follow through with an attachment to this form of strange wonder.

The flowers which develop when the annual rains take place look like tiny daisies, but are single flowers, whereas in the daisy (Composite) family what looks like a single flower is a very compact cluster of usually many flowers, and is called a "head." Opening up in the afternoon, they are generally white or yellow, but sometimes orange. According to species they vary in width



L. vallis-mariae.

from a maximum of one and five eighth's inches to a minimum (rare) of one-third inch, but probably most are in the neighborhood of one inch. Width of petals varies—they are parallel sided and range from long and slender to somewhat broader. In the center is a column of numerous stamens. In proportion flowers are very large and may cover the single unit from which they arise.

17

The intricate dry capsule that holds the seeds is small, and like the rest of the capsules of the family is unique in the world of plants. It is divided into four to seven closed compartments, so constructed that when a raindrop hits a compartment its hygroscopic nature causes a lid to quickly lift up and to one side, and thus expose numerous very tiny seeds. When it dries the lid goes back into place and preserves the seeds still inside until the next rainfall, which might be a year or more later.

The first *Lithops* to be recorded was found by Burchell in 1811 and is now called *Lithops turbiniformis*. Burchell reports: "On picking up from the stoney ground what was supposed to be a curiously shaped pebble, it proved to be a plant." He drew a sketch from which Haworth described and named the plant botanically. It was not until 1908 that a



L. gesinae.

second species was found and named. Between 1920 and 1933 large numbers of species were discovered.

Little was done in anatomical research on *Lithops* until about 1966, when Professor Chester B. Dugdale, professor of Biological Science at Fairleigh-Dickinson University, Rutherford, New Jersey, went to South Africa and studied the genus in its various habitats. His findings and report were published in due time.

The illustration of a longitudinal cross-section shows the short stem uniting the club-shaped leaves of the figure. The dark upward lines in the leaves are part of the vascular system. Small roundish bodies are large cells of water storage. The figure of the top of Lithops insularis shows many dark spots that were found by Professor Dugdale to be tannin-bearing cells (idioblasts). In discussing these cells in a letter. Professor Dugdale writes "Lithops are characterized by large cells containing a solution of tannic acid. During most of the growth cycle this is a colorless fluid, but with the withering of the old leaves, the tannin solution solidifies into either a solid or a granular mahogany-colored mass." The function of these cells is still not definitely understood.



L. verruculosa.

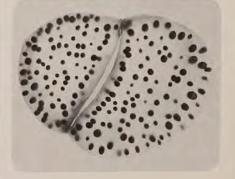
Foremost among the researchers in *Lithops* is Professor Desmond T. Cole, Professor of Bantu Languages at the University of Witwatersrand, Johannesburg, South Africa. Professor Cole with the able help of his wife, Naureen Cole, has made various excursions to study and collect and has established a "lithoparium" at his home for growing and studying his specimens. He methodically has brought back with him the soil and rock matter in which each of his specimens was growing, and has plants reestablished in trays as he found them. As exactly as he could, he has in effect, mounted a living museum of *Lithops*. I was his guest in 1967 and it was at that time that I took the slides of this article of plants not in flower, to record the patterns.

The vagaries inherent in the genus has produced some disagreements among the authorities over the past several decades in matters of taxonomy and nomenclature. At present, Professor Cole has the advantage of living in South Africa and thus being in the field. His astute comprehension, culminating in a recent revision of the genus, makes him the one to be considered the leader. He has reduced the number of species to thirty-seven, which represents a definite consolidation and reduction to synonomy from what



L. bromfieldii var. insularis.

Tannin cells of top of *L. bromfieldii* var. *insularis*. Photo by Chester Dugdale.





Shows water-storing cells; new leaves growing from stem; vascular bundles. L. helmutii. Photo by Chester Dugdale.



L. werneri.

has been thought to consist of more than twice as many species.

#### **Home Culture**

Growing *Lithops* from seed is not at all difficult, and since seedlings flower in three or four years, sometimes in two, growing them from seed can be a most pleasurable occupation. One part each of good garden soil and clean builders' sand or river sand is all that is needed. In the Brooklyn Botanic Garden we have germinated them in one part each of sand, peat and soil, and they came along "like weeds." The whole mixture should be put through a screen which can be fine or rather coarse.

Pots 2¼ to 2½ inch or larger can be used. First fill the pot three-quarters full of coarse drainage materials, and over this put the screened sifting. Seeds are very fine, so they should rest practically on the surface.

Two matters are here very important—for about a year seedlings must never become dry, and warmth and sunlight must be provided to get them up and on their way. A dried-out *Lithops* seedling cannot be revived. They need plenty of water. Pots may be placed in pans of water. This eliminates possible disturbance to germinating seedlings if watered from overhead.



L. localis.

Given enough light and moisture, seeds will germinate with high percentage any time of year and will do so very quickly. If the temperature is around 60° F. and pots are covered with glass, seedlings come up in one or two days, and under other conditions will be only a few days in coming up. Bottom heat should be avoided as this will slow up germination. Growing *Lithops* presents usually no difficulty. Stop watering mature plants from approximately December 1st to April 1st. This is the resting period. Start watering every two weeks from about the beginning of April; gradually increase water applications to about once a week, continuing from about the Middle of May through September. Then taper off. If your water supply is hard, see that more water runs out from the bottom of the pot than is retained, in order to leach out the insoluble salts.

In the cultivation of *Lithops* a very important necessity is ventilation. Set up a small fan to keep the air about the plants moving. In the summertime, when things should be going along smoothly, a period of muggy weather may come on or there may not be any sun for a week or ten days. When this happens hold back on the water. It is at such a time when the fan will be most valuable



L. pseudotruncatella.

by modifying the effect of dangerously high humidity. The use of dehumidifiers and air-conditioners makes for ideal conditions.

The planting mix should be very loose and when dry, flow from the hand. When put into a pot with a plant or plants water should start to come out from the bottom in a second or so. When rolled in the hand, the feel of it should be gritty. A 19



L. turbiniformis.

good mix looks good and feels good. A typical mixture is: 3 parts good garden topsoil, 2 parts builders' sand, 1 part pea-sized perlite or builders' <sup>3</sup>/<sub>8</sub> in. gravel, and a bit of leaf-mould or peat-moss. Bird gravel or pea-sized aquarium gravel can be used in place of builder's gravel. When mixing dry, the perlite should be soaked for a little while previously.

Another way to prepare a mix is to sprinkle with water while adding the various materials. Mix thoroughly and water until a batch can be taken in the hands and pressed into a ball that will cohere and not fall apart.

As strange as they are, and coming into a different environment not at all like the original habitat, Lithops surprisingly thrive in their



L. hallii.

new world of our northern homes and greenhouses. They adjust remarkably and are easily grown, if a few fundamental rules are observed.

Several years ago, Frank Bowman of our gardening staff was given some Lithops without any guidelines about their culture. In the beginning, had he asked local Lithops growers about the possibility of growing them outdoors in summer the response would have been "That's not the way to grow Lithops." Today Frank says "I put my Lithops outdoors in the sun and forget about them. Let the sun beat down, let the rain fall-they firm up, their color heightens, and they look great." That's having a Lithops collection with little summer effort. Frank places his pots on top of stumps and



L. meyeri.



L. fulleri.



L. lesliei var. mariae.

logs, so they drain well after heavy rains. His collection of more than thirty species has thrived, summering outdoors, for more than ten years.

Al Kuehn of the New Jersey Cactus and Succulent Society tells me that in the wintertime his plants indoors have been kept as low as 28 degrees F. and that that degree of cold when the plants are perfectly dry has done his Lithops no harm.

In certain areas of Mexico and our neighboring Southwest it is possible to grow *Lithops* outdoors all year.

In Sierra Vista, Arizona, near Bisbee, Mr. James Robin has an outdoor garden of *Lithops*. He started growing them there eighteen years ago and has found that his climate is ideal for them. �



L. julii.

The land use debate continues. How much virgin or relatively undisturbed land can be sacrificed for development? How much agricultural land can be given up for people to live on or to play on? Florida's unique sub-tropical swamps, swamps, forests, and grasslands with their highly specialized plant and animals have been especially beset. Natural areas have been converted to agricultural land and then developed for housing and for recreation. There have been major battles over an airport complex, a waterway, and other commercial developments. The dollarconscious Florida government pushes development with little regard for natural resources. Various Federal agencies, dependent on new projects to maintain their bureaucratic status, continue to push for further inroads in undeveloped wilderness areas of Florida.



Large, elevated planters throughout Magic Kingdom accomodate flowers and mature trees, including Magnolia grandiflora, Prunus caroliniana, Ligustrum japonicum and others. Planters can accomodate root system of trees as mature as twenty years. An irrigation system is built in and automatically provides water for fifteen minutes daily during early morning hours. A vertical drainage system utilizes a dry well. All such planters are located over compacted earth roughly equivalent to concrete from a drainage standpoint.

# Landscaping a New World

Not all developers are without conscience when it comes to developing virgin areas. The following story, told by the Walt Disney World landscape Architect, Mr. Morgan Evans, points up how this great development made special efforts to minimize its impact on the land it utilized as well as showing a degree of regard for surrounding natural areas. Debates will continue involving any appropriation of natural areas for any sort of development as well as the hazards of introducing potentially invasive exotic species. Horticulturists need to inform themselves of all aspects of this touchy subject of land use.

\*Landscape Architect Walt Disney World

#### Morgan (Bill) Evans\*

When announcement was made, in 1965, of the acquisition of 27,400 acres in central Florida for the creation of Walt Disney World, engineers, advance planners and Disney ecologists were already involved in preliminary surveys of the property, pertinent to commercial recreation, vacation camp sites, living developments, landscape architecture, experimental horticulture, water control, conservation and environmental protection.

Before his death in 1966, Walt Disney had tutored his artists and engineers in successive master plans for the entire forty-three square miles. His objective was to provide for developing recreational, vacation, entertainment and associated facilities plus later creation of two cities, while attempting to achieve some permanent protection for its natural beauty and wildlife. Existing but intermittent water courses were amended to provide constant water level and natural waterways were channeled to create interconnected lakes and lagoons of a natural aspect.

Under any large scale development on forested land, some removal of trees is inevitable. The Disney policy has been an appraisal of all existing vegetation and the locating of construction zones in those areas where the least harm to native growth results. The site for the Magic Kingdom theme park required the removal of only a scattering of scrub growth in a 100 acre area. The subsequently larger acreage required for public parking was fitted between stands of pine, avoiding a twenty acre cypress grove, somewhat to the puzzlement of construction men, since it still stands squarely in the middle of the parking lot. Where feasible, trees lying directly in the path of construction were salvaged by transplanting, so that several thousand trees were reestablished. Many more thousands of young trees were grown from seed or cuttings, for the first phase of the landscaping or set decorating process. Some 10,000 Australian eucalyptuses were planted as ornamentals and an additional 14,000 were recently set out for research purposes.

Generally, for every tree removed, at least one, or more, was planted. Nowhere has this conservation plan been more closely adhered to than in the 600 acre Fort Wilderness campgrounds. The primary purpose is to give the camper as natural an experience as possible, so that when he pulled his vehicle onto his site, he is surrounded on three sides by vegetation. Further, Fort Wilderness has clean white sand beaches, on a crystal clear lake bordered by stately pines and cypress. The interior is interlaced with horse trails and winding canals, with grassy slopes that invite canoeing. Vehicular as well as water routes there avoid the "shortest distance" premise. They rather wind and curve, contributing to the aesthetic sense of the area.

On the northeast corner of Bay Lake, a nature trail has been laid out in a swampy area which reflects not only historic Florida backwoods, but most of the world, in an evolutionary context, as it was a million years ago.

During the first operational stages for Walt Disney World a twenty-five acre plot was set aside in 1967, for an experimental tree farm. Its purpose was to subject a broad array of plant materials to the Florida soil and climate to test their potentials. Additionally, a forty acre plot was established as a storage unit, to grow and cultivate those plants which tested well and had been included in landscaping plans. In both areas, the exotic outnumbered the natives. In a short time, the horticultural collection maintained in liason with the Department of Ornamental Horticulture at the University of Florida and several botanic gardens, has gained enough repute to attract professional groups from around the state and nation.

Horticulture potential in Florida depends greatly on land elevation, and although the elevation in the Disney property varies only slightly even these minor differentials have great effect on plants and trees. There are four basic conditions. The highest contours may be only four or five feet above the ground water table and remain dry throughout the year; dropping only slightly, one or two feet, the next elevation may be dry in the winter but quite wet the other half year; another foot or two puts the land under water for most of the rainy season; and finally there are the cypress sinks which are never dry. Although there are no infallible rules to limit certain species to specific water tables, plant communities are reliable indicators of land character. Extreme changes in this character caused by droughts and floods, can produce tragic results.

The Reedy Creek Improvement District, a public authority empowered to carry out water control programs and provide utilities and other services for the Disney property, was established by act of the Florida legislatures and financed by assessments against the Disney property. The Improvement District has implemented a court-approved water control system, built around a forty-five mile canal system which provided a permanent means of controlling and maintaining the water table throughout the property, thereby assuring the best use of the land while at the same time protecting the cypress heads, pine, flatwood, swamp forest and other plant communities from extreme ground water fluctuations.

Of the 27,400 acres acquired, 7,500 in the southernmost region have been set aside as a permanent conservation reserve. This section contains an extensive array of flora and fauna providing a unique exhibit of Florida's natural plant and animal communities . . . At the present time, the area is not available to the public.

On a day-to-day level, Disney World established its own air and water pollution prevention program under the guidance and official approval of the Florida State Department of Pollution Control. Under the program, it is the responsibility of the control officer and his assistants to monitor and maintain appropriate water quality both at the point of entry to the Disney property and departure, some ten miles south.

Tertiary treated effluent water at a current rate of approximately one and one-half million gallons a day flows from a modern sewage plant and is at a suitable quality level to be reintroduced to the natural drainage system. Inasmuch as even this relatively clean water still carries traces of nutrients, however, the company has elected to divert this effluent into a holding reservoir from where it is boosted by high pressure pumps through underground distribution lines to overhead spray equipment. Walt Disney World has joined with the University of Florida in an experimental water reclamation program, the objective of which is to return to the natural storage system, water cleaned of all impurities and suitable for reuse for any purpose.

The process has been to plant more than 100 acres to varied forest, pasture and ornamental crops. By passing the waste water through hungry root systems, the remaining phosphates and nitrates are filtered out. The "misplaced resource" is thus converted to useful commodities in the form of hay, wood pulp or ornamental trees. Species selection is controlled to ensure high nutrient requirement as well as high water tolerance. Among hardwoods, select types of eucalyptus figure prominently with a potential for actually growing a wood crop, from seed, within a five year span. This will be sold for use as pulp in high-grade paper.

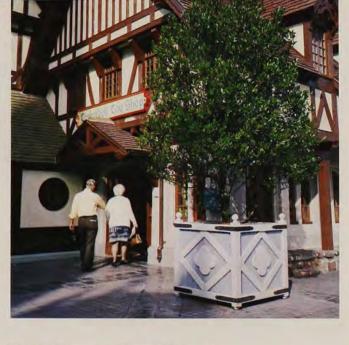
As in all other aspects of the master plan, design has been carefully considered in the plotting of the experimental farm. Tree lots and pasture areas are interlaced in free form rather than in grid pattern. Vistas have been contrived by which tall eucalyptus trees may play an esthetic as well as a functional role.

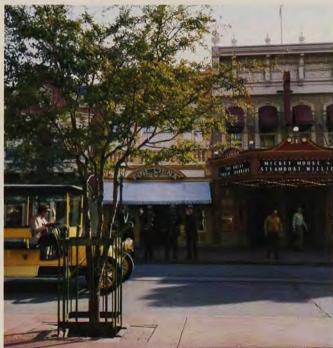
Walt Disney World will continue to grow, adhering to a carefully considered master plan which recognizes that an enlightened conservation policy is essential to a truly successful development. A limited number of resident trees and animals have been displaced but more than twenty-five per cent of the entire site will be preserved and protected, its ecosystem undisturbed by man or machine, and where construction does proceed, respect for the environment will be a guiding principle.  $\bigotimes$ 

Right above. Large decorative wooden planters are located throughout Magic Kingdom to display many species of shrubs and trees, including this mature cherry-laurel, *Prunus caroliniana*. Containers are fiberglass lined, with natural gravity drainage. Irrigation is by hand.

Right center. The Magic Kingdom's Main Street, U.S.A. is located over basement area, necessitating construction of large planting pots not visible from ground level. Pots of sufficient size to accomodate root growth of oak trees for ten more years were fabricated. Irrigation is natural, augmented manually only when necessary. Drainage is accomplished through plumbing system connected to storm drain. Trees used are select variety of live oaks, *Quercus virginiana*, imported from Corpus Christi, Texas. Trees shown are about seven years old. Protective grillwork is grounded for protection from Central Florida's frequent lightning storms.

Right below. A Main Street, U.S.A. planting pot as viewed from the basement workroom. Twelve such planting pots, each holding approximately two cubic yards of soil, are in use along this turn-of-the-century street. Drainage plumbing and the grounding wire connected to a protective street level grillwork are visible. Pots have slightly tapered sides to facilitate tree replacement when necessary.









The River Farm mansion, a portion of which dates to before 1750, now serves as offices for the American Horticultural Society and other horticultural organizations. Some rooms have been beautifully restored.

# Mrs. Richard Nixon joined with Mrs. Enid Haupt and other officials of the

Mrs. Richard Nixon joined with Mrs. End Haupt and other officials of the American Horticultural Society to dedicate the first National Center for Horticulture at the former Wellington Estate at Mount Vernon on May 1st.

The estate once belonged to George Washington and was known as his River Farm, the accent of the day, therefore, was colonial. Guests were brought onto the estate grounds by 18th century horse-drawn coaches, and the luncheon, served on the terrace, included Williamsburg specialities and a special spring desert in flower pots.

The 350 guests watched Mrs. Nixon arrive at the River Farm's Potomac River landing by boat, to be driven to the mansion in a colonial coach preceded by the thirty-nine member Mount Vernon Guard. During the dedication ceremony, the First Lady and Mrs. Haupt planted a flowering dogwood tree which will serve as a lasting reminder of the occasion.

A generous grant from Mrs. Enid Haupt, a member of the A.H.S. Board of Directors, allowed the Society to purchase the River Farm property to establish a national center for all scientific, professional and amateur horticultural organizations who wish to locate there. According to A.H.S. Director O. Keister Evans, the purchase of George Washington's River Farm is particularly significant in

The Potomac River viewed from the east balcony of the River Farm mansion. The twenty-five acre property abutts the river for about 1,000 feet.



The Mount Vernon Guard is composed of boys aged eight to fourteen years. Most live in the immediate neighborhood of Mount Vernon. The Guards' costumes are authentic reproductions and their music is of the Colonial period.



Mrs. Richard Nixon and Mrs. Enid A. Haupt walk through the home gardens of the River Farm during the dedication ceremonies.



## Home For Horticulture

that after almost 200 years, American horticulture finally has a national home, a center for its important activity. The River Farm is a twenty-five acre property located a short distance south of the Nation's capital, and was one of five farms owned by the first President.

Immediately following the dedication ceremonies, the A.H.S. opened a fourday symposium to study how horticulture can enhance environmental education. Partially financed by a grant from the Department of Health, Education and Welfare, the symposium, HORT U.S./Living and Learning, featured workshops with emphasis on the expansion of existing ideas of environmental education.

According to the Symposium Co-chairman and First Vice-president of A.H.S., Dr. Henry M. Cathey, We gape at environmental deterioration whenever we venture from our residences. We are embarrassed when our media communicate the mounting levels of pollution. We are disappointed when the rankings or priorities ignore the full potential of what plants and plantings can do for the landscape and our social well being.

Over 200 U.S. horticultural educators and leaders of the field were invited to participate in the symposium which Dr. Cathey hoped would initiate major changes in the development of horticulture in this country.

Mrs. Enid A. Haupt, donor of the River Farm, and Dr. David G. Leach, A.H.S. president, move to the entryway of the mansion to unveil the commemorative plaque.



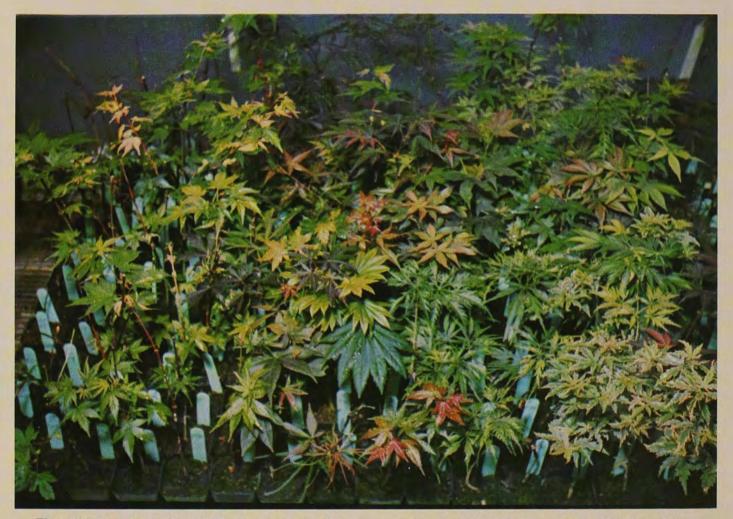
Mrs. Richard Nixon and escort driving in a period coach from the River Farm landing to the terrace where Mrs. Enid A. Haupt and A.H.S. President David G. Leach waited to greet her. The First Lady's coach departs from the National Center for Horticulture as the members of the Marine Band play a musical salute. Photos by Phil Gerazi.





# MAPLES

J. D. Vertrees\*



The grafting bench provides a thrill as the new leaves of the young grafts begin to develop. The variation of leaf types shows much contrast in this portion of the bed. Photos by Author.

\*Mr. J. D. Vertrees has spent most of his life in Oregon. After receiving his degree from Oregon State University, he was consulting entomologist in the agriculture chemical industry for several years. He then joined the staff of the Oregon State University Extension Service until retirement. Involved in educational duties, he dealt with insect, disease, and horticultural problems.

Besides horticultural hobbies in lily, rhododendron and dwarf conifer collections, he is an avid photographer of insects. For thirty-five years, he has concentrated on new methods of close-up action photos of insects.

For the last ten years he has collected cultivars of Acer palmatum and A. japonicum, as well as other rare Asiatic maples. He is making a study of the problems of synonyms in the A. palmatum. He uses old literature and descriptions, and grows many clones hoping to clarify misnomers.

Retired, Mr. Vertrees has a small private propagating nursery, The Maplewood Nursery, Rt. 2, Box 593, Roseburg, Oregon 97470.



Probably there are as many variations in the propagation methods of Japanese maples as there are nurserymen working with them. It is a little like a lady buying a hat—or a man buying a pipe. Each has personality variations, but still the hat or pipe gets purchased. Each nurseryman has found through experience some variation of the basic procedure which fits his needs, timing, or equipment which gives him the best results. I present here, not necessarily the "best," but rather methods carried out by various nurserymen in this and other countries.

The main methods of increasing Acer palmatum, A. *japonicum*, and their cultivars are with seedlings, grafting, cuttings, and layering. Each of these methods suits a specific purpose.

#### Seedlings

Seedling production is the easiest method of getting a lot of trees, but, of course, not of named varieties (cultivars). One reason for raising seedlings is to produce two-year understock for grafting. A second reason is a good select strain of seedlings to grow on for sale purposes. Seedlings usually are separated into the greenleaf and red-leaf types of *A. palmatum*. These make excellent garden and landscaping trees and are usually less expensive than the grafted varieties.

By collecting seed from given clones, and also by doing some hybridizing, horticulturists have found a fascinating variation in the colors and leaf shapes. Since A. palmatum has been in cultivation for over three hundred years, the variation potential in the crosses has been multiplied. Unusual leaf types quite often appear. More than 200 cultivars now exist, mainly from Japan, for this reason. One must keep in mind that any named cultivar of this maple was once a seedling someone selected (with the exception of a rare bud sport). Seedling production by nurserymen and amateur growers constantly gives rise to new varieties. A word of caution is that if one is a "namer," the market could be flooded with new cultivars that are not really outstanding enough to stand up in the trade. In the meantime, better-than-average trees are produced for landscaping.

In raising seedlings for understock, a uniform stand will produce pencil-size stems for grafting by the second year. Some nurserymen collect from certain seed plants which give a uniform color. Green or red leaf seedlings graft equally well. Of course, many producers buy seed from American or overseas sources.

Seeds collected from cultivars usually do not produce seedlings resembling the parent but largely revert back to the normal palmatum-type leaf. For instance, A. 'Dissectum' cultivars usually produce normal seedlings. Red leaf or variegated leaf trees will perhaps produce normal green seedlings. There are, of course, exceptions and some trees do produce a percentage of seed-(





lings similar to the parent. I have selfed (self-pollinated) some blossoms and produced seedlings apparently identical to some named clones. I also know of a red A. 'Dissectum' that throws almost all red dissected-leaf seedlings.

One cause of failure in seedling production is that seed has dried out too much before planting. Seed from Europe and Japan almost always is dry. I usually soak this seed prior to stratifying. Even so, sometimes the second or third year has passed before germination is complete. I have had seed come up in the seed flat each of the three years after planting. Locally collected seed may be planted in prepared beds immediately after collection. Other methods include stratifying seed in a peat-sand mix, refrigerated, for 120 days, then plant in beds or flats. Some nurserymen de-wing the seed; some do not. Seed which has been completely dried seems to respond to a warm-water soak for fortyeight hours prior to stratification.

In my area, the soil ranges from pH 5.5 to 7.0 and the seedlings respond to a little dolomite lime in the beds. After germination, ample nitrogen feedings, low level, repeated frequently, produce strong seedlings. The beds are supplied with phosphate and potassium prior to planting.

Some seedlings are large enough to pot up and graft as one-year olds. Most nurserymen pot up one-year plants and grow them in pots the second year for understock. Some propagators bed grow seedlings the second year, potting up in the fall and grafting the next spring.

#### Grafts

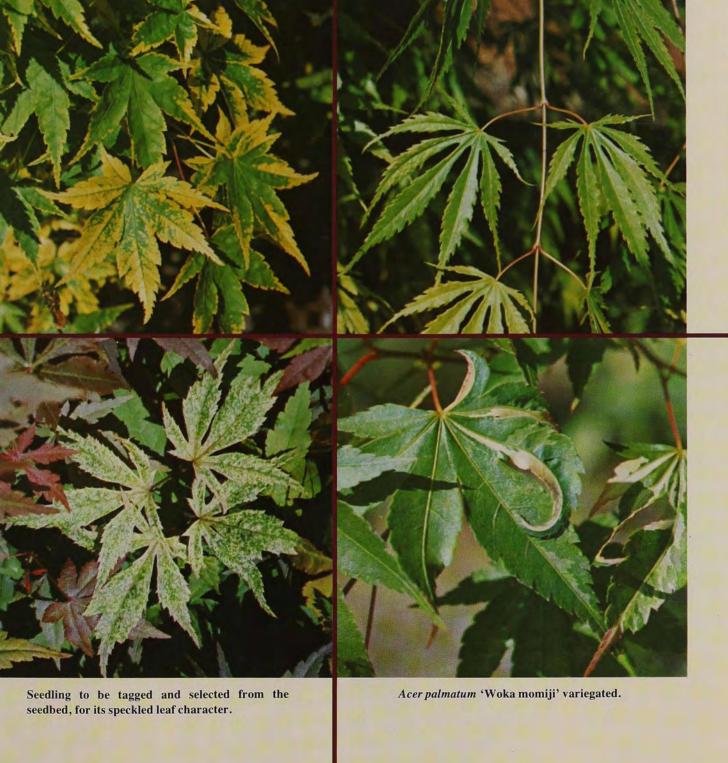
Grafting is the main method of increasing cultivars. Several techniques are used. There are more variations in grafting techniques than any other method of propagation. The basic method, however, is the side graft. The understock usually is brought out of dormancy during January, in the greenhouse. When new growth starts to appear in February, the cultivar scion is inserted by side graft, low in the stem. Scions are collected when fully dormant and refrigerated until used. The graft is wrapped and kept from drying, usually with a coating material. As the scion graft heals and begins to show growth, the top of the understock is removed, leaving the new variety to continue strong growth.

Variations of this method include grafting in March, April, July, August, November and December. This entails handling understock differently and preventing the drying of the graft. Some nurserymen dip scion and understock both in wax. Some do not wax at all, but bury potted, newly grafted plants above the graft point in deep, moist peat. Mists systems also are used by some. Another method includes grafting when both scion and understock are dormant; the entire plant then is layered in a cool house until growth starts.



The very beautiful leaf marking of *Acer palmatum* 'Sagara-nishiki' makes it a popular choice.

The cascading beauty of the deep cut leaves of *Acer palmatum* 'Omurayama.'



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#### Budding

Budding with a normal T-bud and with a bud-stick are two commonly used methods. As mentioned, each propagator has worked out a favorite procedure. In any method, complete success is rare, although experienced propagators approach a 100 per cent take in some years. Working with scions that sometimes are no larger than wooden matches, a good alignment of the cambium layer is quite difficult and exacting.

As spring advances, the tops of understock are cut off, the grafting rubber or string is cut or removed, and then the plants are potted up in larger containers or are planted out in field rows for growing on. The entire budding procedure is not an easy or low cost process.

#### Cuttings

Cuttings of Japanese maples are in the more-difficultto-root category. With modern methods, plastic cases, mist systems, hormone dips, bottom heat, and other modern aids, cuttings are more easily produced than they were years ago. Some commercially-grown cutting-produced trees have been on the market for years. Also, some propagators produce understock by rooting cuttings and then grafting to the desired cultivar. Current season growth is collected as it begins to harden in June or July. All precautions possible are taken to prevent wilting between collecting and placing in the rooting frames. Usually a fairly strong hormone dip is used and bottom heat of 72° to 75° F. is supplied. Either a double glass case, a plastic case, or a mist system is employed to prevent any drying during rooting. As roots appear mist gradually is reduced to prevent root rot. Often, a late season growth is produced on well-rooted cuttings.

Most propagators agree that rooting cuttings is not too difficult, but breaking dormancy is very difficult. Consequently, many do not let the plants go dormant but keep them in leaf the first winter, in heated houses, and plant them out in the spring for growing on. Longday light is maintained during the winter with minimum heat of 50° to 55° F.

#### Layering

Air layering and ground layering are both methods for producing a limited number of a desired cultivar. Air layering is successful in the Pacific Northwest when completed during May, with the rooted plant removed the following spring. Normal methods of layering described in most books work well. Layering of two, three, four-year, and older wood has proved successful.

#### **Growing Conditions**

It would seem impossible for me to define the best conditions for growing maples, considering all the variations of growing conditions in this country. Probably the ideal soil is a friable loam with good drainage and fairly high organic content. Partial shade is ideal, espe-





cially when supplying protection from hot afternoon sun. Wind protection, a neutral pH, ample water without waterlogged soil from poor drainage, all are desirable.

Few of us can have perfect conditions. I have seen fine maples growing under such adverse conditions that I believe almost anyone can enjoy these fine plants by taking a little extra trouble. Extreme acid or alkaline soils can be overcome for a specimen plant. Heavy clay soils would suggest the maple be planted on a mound, as would a very boggy situation, the roots will find their own drainage level. In general, maples will not tolerate wet feet but will tolerate fairly dry conditions, although will not grow as vigorously. While most cultivars are hardy to well below zero, some protection from strong freezing winds is desirable. Similar protection from hot drying winds in the southwest summers is suggested.

Sometimes overhead sprinkling during the hot periods of the day will result in leaf burn. Sunburn and tip burning often occur more frequently in the red leafed and dissected leaf varieties of *A. palmatum*. Delicate tones and cut-leaf varieties grow best in shade.

#### Problems

Insect and disease problems are few compared to some other garden plants. Occasionally aphids will attack the new spring growth. Various lepidopterous larvae will sometimes appear, but are not serious, unless trees are attacked by one of the epidemic species occuring in some parts of the country. Usually few insecticides are necessary.

The greatest threat perhaps is verticillium wilt which attacks all maples. Plants kept in vigorous growing condition seem to be able to tolerate or overcome the effects of this disease, although it sometimes results in twig die-back. A serious wilt attack on a weak tree will result in dead limbs, or sometimes the loss of the entire tree. Locally in America there may be other disease problems, but usually Japanese maples are not grouped with the weaker types of plants.

#### Unusual Uses

A. Palmatum and A. japonicum cultivars make excellent container plants for patios and other special places. They are, of course, favorites for bonsai culture. Clones which are more dwarf, or have brightly colored spring foliage, or that color well in the fall, all give an extra bonus to the bonsai fancier.

The more I observe cultivars of *A. palmatum* and *A. japonicum* growing under widely differing conditions, the more I am convinced that almost anyone can find a location that will enable him to grow some cultivar of these fine maples. They are among the most varied and fascinating small ornamental trees we have. Try some, you'll like them.  $\bigotimes$ 







Elizabeth Scholtz\*

In preparing a pictorial melange of South Africa's remarkable flora, it has been barely possible to scratch the surface. There are 18,000 species of plants in the country, and 2,600 of these are concentrated in an area known as the Cape Peninsula-an area of 182 square miles.

Many of the flowers shown here are found in the South Western Cape Province which has been termed South Africa's Floral Kingdom. Seeing this area for the first time prompted William Burchell to say in 1811, "At every step I recognized some well-known flower which I had seen nursed with great care in the greenhouses of England ... in one mile I collected 105 species even at this unfavourable season".

Others, and most particularly the succulents, are found in the drier inland areas, where summer rainfall, if any, prevails. The winter rains of the South Western Cape produce the floral splendor of August, September, and October; but there is always some wild flower in bloom in the Floral Kingdom.

The Proteas are probably the most spectacular of South Africa's indigenous flora, and one of them, Protea repens, is the national flower. There are some who contend that Aloe should have pride of place-they are almost as varied as the protean Protea!

Let us hope I have done justice to one of the richest floras of the world.

\*Director, Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, New York 11225.



*Moraea villosa*, the peacock flower, a mauve iris with an iridescent green "eye," flowers in spring in the Tulbagh area.



*Leucospermum nutans*, pin cushion protea, is a floriferous shrub which flowers from late winter until early summer and lasts well as a cut flower. It is consequently a favorite with both gardeners and florists. Castle Rock, part of Table Mountain, is seen in the background. Picture taken in Kirstenbosch.



*Protea compacta*, the Bot River protea, flowers throughout the winter and spring. *Protea*, named for Proteus, the sea-god who could assume many forms.

Protea cynaroides, the king protea, has flowers up to twelve inches across. It was named so by Linnaeus, who, when he was sent a specimen, thought it was a giant artichoke (Cynara is the botanical name for artichoke). The flowers grow on a dwarf shrub.





*Eucomis zambeziaca*, the pineapplelily, is a popular house plant in America. It grows wild in many parts of South Africa and flowers in summer.



Haemanthus katherinae, torch-lily or blood-lily, has flower heads up to six inches in diameter in summer.



Sparaxis tricolor, the velvet or harlequin flower, has become a popular subject in gardens all over the world.

Frithia pulchra, one of the many strange "windowed" plants which are known as "mesembryanthemums." The stubby, cylindrical, fleshy leaves are topped by lens-like structures which concentrate the sun's rays for purposes of more efficient photosynthesis.



Aloe ferox, one of the handsomest species of a large genus, has flower heads over a foot long.



*Gloriosa superba*, the flame-lily, is a vine with flowers that occur on the branch tips in summer.



Dimorphotheca pluvialis and Gazania pinnata growing in the veld. Dimorphotheca pluvialis, the White Rain Daisy, is seen in such profusion in late winter that it is often taken for snow. Gazania has become a popular annual in American gardens.

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*Herschelia charpenteriana*, old man with pipe in his mouth, a rare summer-flowering ground orchid.



Disa uniflora, red disa or pride of table mountain, is the best known and most attractive of South Africa's ground orchids. It is the floral symbol of the Mountain Club of South Africa and occurs near water on rock ledges. For many years it defied cultivation; but some of its secrets have been discovered, and several people have been successful in their attempts at growing this unusual plant.



Babiana villosa, the red babiana, grows in the Tulbagh area. Other babianas are cream, blue, and purple. They are so named because early settlers noticed baboons digging up the bulbs for food.

*Geissorhiza rochensis*, wine cups, grows in marshy areas and flowers in early spring.





*Ixia viridiflora*, the green wand flower, has a true green flower. Much cultivated in Europe, Australia, and New Zealand, it is still rare in South Africa. (The white, yellow, and purple ixias are much more common.)

Dimorphotheca aurantiaca, namaqualand daisy, covers miles of veld in Namaqualand and blooms in late winter.

Aloe marlothii, one of the most widely distributed aloes, blooms in winter on rocky hillsides in many parts of the interior of South Africa.



# Notes on Land, River, Plant and Wildlife Destruction\*

Charles H. Callison\*\*

\*From a talk given at a Garden Club of America Conservation Symposium, March 4, 1974, in Kansas City, Missouri

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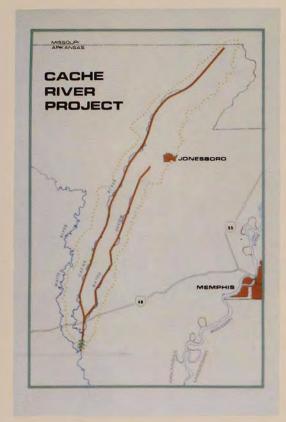
Wild ducks and geese in uncounted millions once darkened the skies, inspired the Indian to poetry, and awed the pioneer in Audubon's day. To the dismay of not only duck hunters and naturalists, but of all Americans who feel unease at the steady erosion of the natural environment, they no longer darken the skies. In too much of the United States it takes a real search to even find a duck. Biologists have estimated the total population of wild ducks has been declining at the rate of from ten to fifteen per cent per decade for the past forty years. What has caused the long and drastic decline? The ducks are down because the marshes where they breed have been drained, because streams and their flood-plain wetlands have been turned into ditches and reservoirs, and because swamps have become cornfields and soybean plantations.

Some of the destruction and decline was inevitable, of course, if America was to grow to more than 200 million people and feed them. But a great deal of it has been unnecessary and uneconomic and counter-productive—the result of a disease in our body politic known to political scientists by an inelegant term. They call it the "pork barrel." While drainage ditches and channelized streams are pox on the face of America, the syndrome has deeper causes.

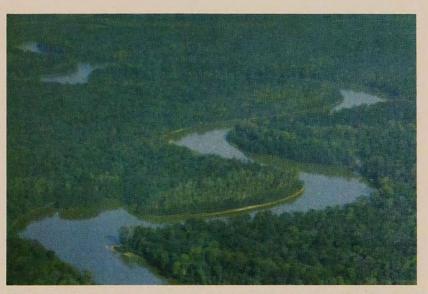
Part of the cause is the local Chamber of Commerce which, while resolutely deploring government extravagance everywhere else, sends delegations to Washington to lobby for an Army Engineer project or a Bureau of Reclamation scheme in their own back yard.

Part of the problem is the combined lobbying power of the contractors who build such projects all over the country, and of the makers and users of bulldozers and draglines and concrete mixers who fatten on the federal money.

And at the heart of the disease is a time-honored custom within the clubby atmosphere of the Congress of the United States. Long ago it was named "log-rolling" after the practice of the pioneers who helped each other



The Cache River Basin of Arkansas. The plan is to deepen and straighten meandered rivers, turning them into super-drainage ditches—shown on the map by the red lines. This is channelizing. It drops the water table, permitting the clearing of forests and their conversion to cropland.



The Cache River Basin. An aerial view shows the extensive hardwoods—most valuable of forests for wildlife because of the heavy annual crop of acorns and other tree seeds and fruit collectively called "mast." *Photo by Ron Klataske*.



And this is the desecrated lower Cache—where some six miles were channelized in the beginning of the \$72 million project.

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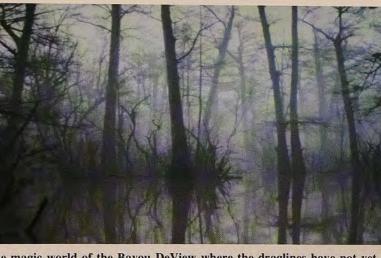
put up their log houses. The senator from one state says to the senator from another, "I will vote for your Reclamation project if you will vote for my Army Engineer project." And the senators who rank in the Appropriations Committee say to all the other senators: "You'd better vote for our projects or you'll never get any money for your projects."

In most cases the words probably are never spoken. They don't have to be. The system is too well understood.

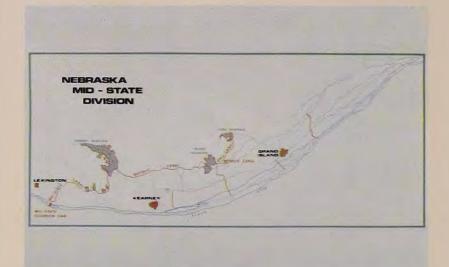
There is a cure. It has worked at times. It is for the citizens of every state to say to their Senators and Representatives: "As taxpayers we demand representation. We want you to vote against every boondoggle that destroys more wealth than it creates. We want you and the rest of government to quit faking those cost-benefit ratios."

Let me illustrate the problem with three examples-three classic products of the pork-barrel system that long has brought discredit to the Congress of the United States. They are three non-sensical, engineering schemes that will take enormous bites out of the remaining wetlands that produce and sustain our waterfowl. They do worse than that. They will destroy farmlands and forests and scenic beauty and other irreplaceable environmental values. Each would waste your money, because not one would show a favorable cost-benefit ratio if the true value of the resources to be destroyed were counted in the costs -and if a realistic interest rate, say seven or eight per cent, were charged for the money the taxpayers have to advance for the project.

One is the Cache River Project, a massive channelization program already started by the Corps of Army Engineers in eastern Arkansas. Started until a court order last spring stopped the draglines pending a satisfactory Environmental Impact Statement. At an estimated cost of \$72 million, this project would convert 231 miles of the Cache and its tributary Bayou De View into massive drainage ditches. In the process it would destroy the best wintering area for mallard ducks left in the Mississippi Flyway—an area where the wintering flocks number upwards of a



The magic world of the Bayou DeView where the draglines have not yet invaded. Photo courtesy Arkansas Game and Fish Commission.



The Nebraska Mid-State Project (Platte River). Mid-State would be built by the Bureau of Reclamation, a big-spending, engineering agency in the U.S. Department of the Interior which, ironically, is also supposed to protect wildlife and wilderness. The project design is to divert the flow of the river from the broad, shallow and braided channel into reservoirs to the North. It would take most of the water out of the Platte most of the time and in drought cycles, the river would be completely dry the year around.

Upwards of 200,000 sandhill cranes gather on the Big Bend of the Platte, arriving from wintering areas in the Southwest and Mexico. They feed in the wet meadows and farm fields—and roost nightly standing in shallow water on the broad sandbars in the channel. This is the great spring staging ground of the species. They sleep safely in the river, and disperse to the fields each day, performing courtship rituals, pairing off, feeding, gathering strength and generating hormones for the nesting season in the far north. Photo by Ron Klataske.



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Aerial view of the river showing how the cranes use the sandbars for sleeping. Photos by Ron Klataske.

half million birds. Some 100,000 acres of swamp hardwoods would be wiped out. "Mitigation" has been offered in the acquisition of 30,000 acres of swamp woodlands. This isn't real mitigation at all. Those 30,000 acres are already there. No new swamp will be created to take the place of the swamp to be drained and destroyed.

Furthermore, the project threatens severe damage to the White River National Wildlife Refuge downstream through flooding and siltation. Channelization never really controls floods. It only makes the floods worse and moves them downstream.

My second horrible example is the Nebraska Mid-State Project of the Bureau of Reclamation. This is a scheme to divert most of the water out of the Big Bend of the Platte River for the alleged purpose of supplying irrigation water to an area that already supports a prosperous agriculture, and where the farmers already use economical pump irrigation. It is supposed to recharge an aquifer that is already recharged naturally from the flow of the Platte and its tributaries. This is all silly enough, but what makes Mid-State an abomination is that it would dry up and destroy some sixty to eighty miles of riverbottom habitat that is essential-

• to three-fourths of the sandhill cranes in North America,

• to the remaining band of whooping cranes,



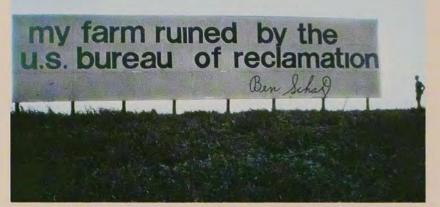
The Platte River. It is a river course providing diverse habitat rich in many kinds of wildlife.



The Garrison Diversion project would take water from the reservoir created by the Garrison Dam on the Missouri River and transport it through hundreds of miles of canals and channelized streams to irrigated areas (shown here in yellow) in northern, eastern and southern parts of North Dakota. The main canals and only some of the laterals are shown in red on this simplified map. This is only the "Initial Stage" of the project as conceived by the Reclamation engineers — and all the statistics I will quote are for the initial stage only — a \$433 million undertaking. The ultimate plan is even more fantastic, uneconomic, and destructive.



The main canal, the McCluskey, now partially completed, actually cuts through a continental divide, a divide separating the Missouri-Mississippi Basin from drainage to the North. The men at the bottom give you an idea of the dimensions of this great ditch. (The picture taken last December.) *Photo by Author.* 



One farmer bought a great billboard to register his protest.

Photos by Rich Madson



One of the scores of natural prairie marshes to be destroyed. This is some of 40 the best duck nesting habitat in North America.

• and to hundreds of thousands of wild ducks and geese.

Construction of the Nebraska Mid-State Project has not yet started, although since 1967 the Bureau of Reclamation has kept a staff at Grand Island spending from \$500,000 to \$800,000 annually to plan and promote it.

Thirdly, consider the madness of *Garrison Diversion*. Like Nebraska Mid-State, Garrison Diversion is the kind of project that gives the Bureau of Reclamation a bad name. This Bureau built some decent irrigation projects in the past. But having run out of good sites it is now scrambling on the margins trying to hang on to its jobs and its share of the pork.

Garrison Diversion would deface North Dakota. What would it do, at an estimated cost of \$443 million?

It will destroy or severely damage seven major National Wildlife Refuges through flooding or by pollution with agricultural chemicals and saline water run-off. They are the Audubon, Arrowwood, Sand Lake, J. Clark Salyer, Tewaukon, Dakota Lake, and Sheyenne Lake refuges,

It will wipe out other thousands of acres of prairie marshes including some of the finest remaining nesting grounds of the endangered canvasback duck.

It will pollute two rivers flowing into Canada, the Souris and the Red, in violation of the Boundary Waters Treaty of 1909. The Canadian government has filed a formal protest.

It will require an estimated 500 megawatts of scarce energy annually to power the pumping stations. Five hundred megawatts is enough electricity to supply a modern city of 250,000 people.

It will take some 70,000 acres of farm land out of production for construction of the canals, ditches, and reservoirs, chopping up thousands of family farms and making hundreds of them inoperative. For all project purposes it will require the taking of 218,500 acres.

All for the purpose of putting irrigation water on 250,000 acres that already support a prosperous agriculture. This is not "making a desert bloom." North Dakota is no desert. 🕸



## Excerpts from an Address by Oregon Governor Tom McCall\*

I would trade compliments, high office, occult powers and anything else I have for a promise by Americans that they'll stop muddying up their waters and ruining their land. Millions of Americans already have taken the pledge, though, and they expect nothing more from it personally than the peace and beauty their efforts are bringing.

I can't say exactly how many millions are disquieted by the indignities we've heaped on our natural world in the last few decades, but I know that they're spread all over the country. In recent weeks I've been from British Columbia to Boston to Santa Barbara to Philadelphia to Montgomery to Boise to San Francisco and now to Atlanta, talking to people—real people, concerned about America.

I suppose quite a few Americans still think of garden clubbers as people tending posies in immaculately-

\*Garden Club of America, Atlanta, Georgia, Tuesday, April 23, 1974 groomed front yards. That's one of the things some of you may do, but I find you in many arenas as you take aim on junkyards and billboards, join the struggle for land use planning, and plump for extension of Oregon's bottle bill to your own states.

An odd thing about our [Oregon] bottle bill: Its opponents keep on saying it's not the answer, that it won't work, but it keeps on working. Roadside litter from bottles and cans has been reduced ninety per cent, and visitors continue to marvel at our cleanliness.

There's no question in anybody's mind why Oregon's bottle bill has been so successfully resisted by all other states except one. It has been shot at by big beer and big money—industrialists who take the pocketbook position that they're not to blame, and that people like to be able to throw away beer cans and bottles. I'll grant that one-way bottles and cans are a great deal more convenient for bottlers, distributors, retailers and consumers. But one-way containers, inherently wasteful, also make a lot more money for can and bottle manufacturers, and that's their issue. They tell us that education will convince people not to litter, but we've tried that for years, everywhere in the country, and it doesn't work. What *does* work is putting a price on the head of beer and soft drink containers to encourage consumers to take them back to the store for re-use.

Elimination of litter along our roads, and on our beaches and in our waterway is not all, though, that Oregon's bottle bill accomplishes. What happens to all the *non*-returnable cans and bottles? Most of them go into sanitary landfills for burial, millions of cubic feet of unnecessary waste taking up space that's becoming more scarce all the time. Somebody better start figuring out what's to become of all the nonreturnable containers. In 1972, the country had to dispose of fifty-four billion nonreturnable beer and soft drink cans and bottles. By 1980—according to the Midwest Research Institute—we'll have almost eighty billion throwaway containers on our hands in a single year.

Perhaps a far worse indictment of the throwaway society is that by allowing nonreturnables to stay in the market we're literally throwing away energy. It takes four times as much energy to deliver beer or soft drinks in an aluminum can as in a refillable glass bottle. If we had a national bottle bill similar to Oregon's, the savings would equal two-thirds of the energy conserved by a national speed limit of sixty miles per hour. If we want to have enough energy to fuel our economy, we ought to be thinking first about conservation, eliminating wasteful practices like the one so archly defended by the can and bottle industry.

Let's not delude ourselves that the end of the Arab oil embargo signaled the end of gasoline shortages. The Federal Energy Office says we can have enough gasoline this summer for business and tourism—but in the same breath says that this will be true only if motorists continue conservation efforts. The situation may be even worse than it's being portrayed by the Administration. In each of the last two months [March, April] it has directed the oil companies to increase allocations to most of the states. Well, the spirit may be willing, but the flesh is weak. In February, three oil companies told



to deliver us [Oregon] more gasoline said they didn't have it and couldn't do it, and they didn't. And late last week the giant Exxon Company advised Oregon that it couldn't comply with a similar order. So maybe there will be enough gasoline this summer, and maybe there won't. But there will never be enough if we don't ease our demands on the supply of all forms of energy.

We're told that a bottle bill isn't the answer-and of course it isn't. But it's the key domino; having it in practice proves that we can have beautification, we can reduce solid waste, and we can save energy by simple and practical measures. The bottle bill is not the sole answer, but it is a pivotal antidote for the national disease of over-consumption. The Senate Commerce Committee has scheduled hearings May 6th and 7th on a proposal for a national container law. I hope that everyone of you, and every one of your organizations will make clear to your senators and representatives your support of the Act. Lobbyists for the status quo will be no shrinking violets in this battle, so don't be bashful. A national bottle bill makes sense; it's a fight you can't lose. So why aren't you winning? Maybe you're not winning because the politicians don't fully comprehend what people can do to them. I think that people have got to say very plainly to foot-dragging political leaders what the voters can do to them, and will do to them if they continue to ignore the common good.

An even more bitter campaign is being fought over the issue of land use planning. A National Land Use Planning Act has passed the Senate, and seemed headed for approval in the House. Now, all of a sudden, the measure is living by a thread. It isn't a liberal position to be in favor of land use planning. Land use planning isn't to keep people from doing things; it's a process of letting people decide what the best uses of this finite resource ought to be. It isn't a question of how not to use the land, but how to use it. And those decisions have to be made. We can't keep on using the land for any old purpose that comes to mind. It has finally dawned on us that all the land we're ever going to have lies before us. There is no more at the super-



market. People's lives will be affected by land use planning. But they're being affected already by the decisions of others, and in the absence of public participation in those decisions. If a school board decides to build a new school in the boondocks, it surely will attract residential development, and then commercial development. It will require new streets, sewers, water lines, telephone service, gas service, and electricity-all the things a community deems essential to its existence and comfort. Maybe the place selected was right for a school, but was it also right for residential and commercial developments? Who studied that question? Who decided? In the Willamette Valley of Oregon development comes so rapidly that we have built supermarkets on top of gravel beds-thereby covering up the gravel we need to build the supermarkets.

We've adopted a statewide land use planning law, and we're stopping to think about the questions. We're determined to have answers to that most persistent of questions: What's the best use of the land? My Statelike yours, I suspect-is dependent upon passage of Sentator Jackson's National Land Use Policy Act for the money we need to do a decent job of land use planning. The State itself is not broke, but we don't have the kind of money that local governments need to do this job. The Federal legislation would provide it. But neither the Federal nor the state government is going to shove anything down the throats of Oregonians. We'll set guidelines, but the planning will be done by the people who have the best knowledge of local conditions and aspirations. Even local governments-local politicians-don't have the final say. Our land use planning law requires public participation, and our Land Conservation and Development Commission is carrying out the directive with abandon. Interestinglyand some of you will find this hard to believe-the farmers helped spearhead Oregon's land use legislation. Many of our rural people want the land to farmnot to be piecemealed and cemented over by developers. In this they are more enlightened than officials of a mammoth Oregon-based corporation which in March, sent a telegram to all the Governors asking them to oppose Senator Jackson's land use bill. The sender said: "We believe field hearings are essential to provide input from areas such as Oregon where our successes and problems can be presented and evaluated to help shape a sensible Federal program."

What all that means is: Let's have more delay, let's not do anything now, let's not upset the status quo, let's not mess around with our company's opportunity to maximize already record profits. Senator Jackson's bill has been grinding through Congress for three years. It's been almost heard to death. But the House Interior and Insular Affairs Committee plans another hearing, today and Thursday, and so the Governor of Oregon will be there this very afternoon 'to help shape a sensible Federal program.'' Except that I'll ask that it be shaped now, not later.

With this and all the other crises that America manages to generate these days, it was inevitable that the growth addicts would start wagging their fingers at the environmentalists. But it wasn't the environmentalists who embargoed oil, and it wasn't us who impounded funds approved by Congress for hydroelectric projects. Yet the fingers wag, and it may be the environmentnot the environmentalists-that pays the price. The President has asked for weakening of the 1970 Clean Air Act, and in doing so falls prey to polluting industries that never have and never intended to clean up. They were fighting the act before there was an energy crisis, and they'll be fighting after it's over. They simply don't want to spend the money to allow the world to recover from their sins of emission. They'll have to. The air and the water belong to us all; they are not the private dumping ground of anyone, not industry's acids and not householders' raw sewage.

The environment simply must not be laid waste because of man's bad planning. No matter what crisis presents itself, our concern for the environment must remain strong ... for, if we kill the world, we'll kill ourselves.

There are no barriers to resolving our problems while maintaining a quality environment. But it does require thinking about the problems in new ways.  $\bigotimes$ 

## SPREADING AN APPRECIATION OF HORTICULTURE exploring horticultural information sources

Your membership in the American Horticultural Society means that you have acknowledged to yourself, and you represent to your friends, neighbors, and associates, your dedication to enhancing the aspects of life touched by things horticultural; to preserving and adding to the beauties of nature, to increasing your own knowledge and spreading an appreciation and understanding of the values added....

Through your membership in organizations in addition to A.H.S., for instance, Federated Garden Clubs, State Horticultural Society, teachers' groups, professional societies, you may have access to a variety of resources usable in your personal drive to enliven horticultural interest in the contacts you make routinely. Make use of the programs and facilities of institutions such as university arboreta, botanic gardens, garden centers, and large public gardens. Find out and spread the word about learning opportunities in your community. Some of these are:

- special public school programs offering horticultural training
- extension programs—county agent programs, 4-H and youth programs, radio and television specials
- garden center classes
- arboretum and botanic garden educational programs
- Audubon study programs

Through your volunteer or leisure-time activities, become active in assisting with programs such as these. Investigate the possibilities in your community for introducing horticulture as a therapeutic aid in correction of certain types of disability and as an aspect of career training for the handicapped.

We have assembled and are reproducing here lists of sources of guidance in a broad spectrum. We hope that these lists will stimulate not only your interest but your *action*—to promote pursuit of horticultural careers, introduction of horticulture as part of your community's improvement projects, and opening a new field of beauty and wonder to those who, for whatever reason, have lost contact with the natural world. Be evangelical!

Selection of material listed does not necessarily constitute endorsement by the American Horticultural Society to the exclusion of other material which may be available.

#### BOOKS

 It's Your Community-A Guide to Civic Development and Beautification, by Henry R. Raymore and H. Stuart Ortloff, M. Barrows & Co., 1965, \$3.95. A good starting point for an over-all view of what to do, how to do it, what you can do to make your town a better place to live in.' Recommended reading to inform yourself on how to judge what should and can be done, whom to go to for support, how to organize committees, how to work with various agencies, and specific projects to consider.

2. Yearbooks for Consumers:

Consumers All, 1965, \$2.75. Outdoors USA, 1967, \$2.75. Landscape for Living, 1972, \$3.50.

A popular handbook for everyone interested in improving the quality of life in urban and suburban America; shows how to improve our environment with plants; gives home gardeners background information and how-to-do-it advice.

Handbook for the Home, 1973, \$5.70.

The Yearbook of Agriculture, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

 Nature's Guide to Successful Gardening and Landscaping, by William Flemer III, Thomas Y. Crowell Co., 1972, \$8.95.

A professional nurseryman shows how to follow nature's blueprint for putting the right plant in the right spot in several widely different environments.

- 4. Air Pollution and How It Affects Plants—report of workshop for county extension agents and others who work at the community level, designed to provide information on the problems of air pollution and damage to vegetation. Continuing Education Publications, Oregon State University, Corvallis, OR 97331, 1973.
- 5. Environment-a challenge to modern society, by Lynton Keith Caldwell, Anchor Books, paperback, 1971, \$1.95.
- 6. Trees for a More Livable Environment, Ortho-Chevron Chemical Co., San Francisco, CA 91420, 1971.

Lists of trees by size, hardiness zones, rate of growth, and trees for special conditions.

7. Transit Planting-a manual-prepared by the American Horticultural Society for the Urban Mass Transportation Administration, U.S. Dept. of Transportation, 1973, \$3.50.

A manual for the horticultural development of public transportation environments.

8. Plants, people and environmental quality, G. O. Robinette, U.S. Dept. of the Interior, 1972, \$4.00.

Joint publication of American Society of Landscape Architects and National Park Service. Plants to improve environment through many functions.

9. Man's Impact on Environment, Thomas R. Detwyler, McGraw-Hill Book, Co., paperback, \$5.95.

Teaching guide, notes and references for information polluters or conservationists.  Responses of plants to environmental stresses, J. Levitt, Physiological Ecology Service, 1972.

Comprehensive synthesis of the injuries produced in plants by a variety of physico-chemical stresses.

11. Since Silent Spring, Frank Graham, Houghton Mifflin Co., 1970, \$6.95.

Struggles since the 1962 classic of Rachel Carson are reviewed—without much progress.

 Bioethics-Bridge to the Future, Van Rensselear Potter, Prentice-Hall, Inc., 1971, \$5.95.

Necessity of mankind to develop an ethic with regard to the landscape.

 The Wild Gardener in the Wild Landscape: The Art of Naturalistic Landscaping, Warren G. Kenfield, Hafner Press, 1972, \$7.50.

Every home owner with a tract of wild underdeveloped land can use this book as a guide to enhancing the naturalistic landscape.

14. Science In A Vacant Lot, Seymour Simon, The Viking Press, 1970, \$3.50.

Things to see and do during the different seasons in a vacant city lot.

15. A Modern Herbal, M. Grieve, Hafner Press reprint of 1931 volume, 1973, \$13.95.

An unabridged, one-volume edition of a classic book on herbs.

16. Plant Disease Handbook, Cynthia Westcott, Doubleday & Co., 1971, \$19.95.

Diagnosis and control of 2100 plant diseases affecting trees, grasses, shrubs, flowers, and vegetables.

- 17. The Gardener's Bug Book, Cynthia Westcott, Doubleday & Co., 1973, \$12.95.
- Manual for handy reference to fight the pesty trespassers.
- Greenhouse Management for Flower and Plant Production, Kennard S. Nelson, Interstate Printers & Publishers, Inc., 1973, \$9.65.

Realistic, practical and up-to-date guide for the greenhouse manager.

 Garden Terms Simplified, A. J. Huxley, Winchester Press, 1971, \$3.95.

Clarifies horticultural or technical terms in layman's language.

- 20. Kids Gardening-A first indoor gardening book for children, Aileen Paul, Doubleday & Co., 1972, \$4.50.
- 21. Gardening-A New World For Children, by Sally Wright, Macmillan Co., 1957.
- 22. Plants We Live On, Carroll Lane Fenton and Herminie B. Kitchen, The John Day Co., 1971, \$4.29.
- Story of grains and vegetables for young readers.
- 23. Understanding Ecology, Elizabeth T. Billington, Frederick Warne and Co., Inc., 1971, \$3.95.

For the young reader.

#### **TEACHING AIDS**

- 1. How to institute a children's home garden project in your school or system. four-page mimeo. free from American Horticultural Society, Mt. Vernon, VA 22121.
- 2. Teaching Organic Gardening: How to plan, start, and maintain an organic garden in your school.

Organic gardening films; purchase or rental.

Insects to help you and the environment; filmstrip with cassette sound track and teacher's guide.

Above from Rodale Press, Emmaus, PA 18049.

3. Exploring the World of Plants and Soils

Educational material prepared for 4-H use by Cooperative Extension Service, 4-H Service Committee and AMchem Products, Inc. Member's manuals and teacher's guides.

#### 4. McDonald's Ecology Action Pack

For school grades 4 to 6, a kit designed to develop environmental awareness. Obtainable from local McDonald's or from McDonald's Ecology Action Pack, Box 2344, Kettering, Ohio 45429.

5. Teachers Curriculum Guide to Conservation Education: Grades 1-12—Outdoor Lab; Grades 7-9—Science; Grades 4-6—General.

Available from J. G. Ferguson Publishing Co., 6 North Michigan Ave., Chicago 60602, attention Editor, Conservation Series.

6. A Child's Garden-A guide for Parents and Teachers, Chevron Chemical Co., Ortho Division, San Francisco, 91420, 1972.

A guide to teachers in the use of the film "Growing . . Growing". Designed for teachers and students learning together. "The Children's Adventure Garden" from which this book derives, is the subject of an article, "Mary, Mary, Quite Contrary, Where Does Your Garden Grow?", by Richard A. Beatty, AMERICAN HORTICULTURIST, vol. 52, no. 4, Winter 1973.

#### **FILMS/SLIDES**

The Effects of Air Pollution on Plant Life. Slide set A-58, with narrative guide. July 1972. Extension Service, U.S. Dept. of Agriculture, Washington, D.C. 20250.

Audubon slides, 35 mm. 2X2 color, with informative text.
For purchase or rental.
Catalog on request to Photo Film Dept., National Audubon Society, 950 Third Ave., New York 10022.
Subjects include flowers, trees, ecology.

Massachusetts Audubon Society slides, for sale or rent. List available, covering plants, air pollution, city parks and planning, gardening, flower growing.

Kingwood Center Film and Slide Programs Gardening subjects. For sale or rent to garden clubs, churches, and other organizations. Scheduling by reservation.

For information address Kingwood Center, Box 1186, Mansfield, OH 44903.

#### Perennial Education, Inc.

Garden method series, for sale or rent, suited for high school, college horticulture department, extension service, garden clubs, libraries, garden centers.

For descriptive brochure address Perennial Education, Inc., P.O. Box 236, 1825 Willow Road, Northfield, IL 60093.

A.H.S. Film Festival Entries and Awards, 1964-73

List of films and sponsors from whom purchase or rental terms may be ascertained. Prepared by American Horticultural Society, Mt. Vernon, VA 22121.

Memmler Educational Color Slides

For sale only, high-fidelity color slides sets of production, propagation, hybridizing techniques, flower and tree families. Also, individual slides of a wide selection of plant species.

For rent, a selection of "how to" slides prepared for presentation to groups. Inquiries about this service welcomed.

For descriptive list write Eugene Memmler, 3287 Dunsmere Rd., Glendale, CA 91206.

#### Organic Gardening

Films and filmstrips; purchase or rental from Rodale Press, Emmaus, PA 18049.

#### PARTICIPATION PROGRAMS

1. Audubon study programs

Programs which emphasize the discovery approach to learning and provide an excellent basis for studies in conservation.

Five programs planned as units of study to spark the natural curiosity of young people.

Write to Educational Services, National Audubon Society, 950 Third Avenue, New York 10022.

2. Mission '76 Program of Keep America Beautiful and the General Federation of Women's Clubs

Many groups can use and benefit from the materials prepared in connection with this program. Among the items available is a guide to using *Your Community as an Environmental Resource*. Write K.A.B. New York Office, 99 Park Avenue, New York 10016.

- 3. National Junior Horticultural Association Request program outlines from N.J.H.A., Mt. Vernon, VA 22121.
- 4. 4-H and Youth Development Programs Consult county agricultural agents or write the Cooperative Extension Service at your State land-grant university.

#### **BULLETINS, HANDBOOKS, LEAFLETS**

Booklets, handbooks, and leaflets on a limitless variety of subjects pertinent to horticulture and environmental improvement can be obtained free or at slight cost. Some sources are:

U.S. Department of Agriculture, Washington, D.C. 20250.

Request a list of Home and Garden Bulletins.

Cooperative Extension Service, every state

Refer your questions to your city or county horticulture/agriculture agent who can provide state publications free of charge.

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#### Books

BOTANICAL & HORTICULTURAL BOOKS, Rare, Out-of-print, New .- Latest Catalog \$1.00 S.J. Singer Co. 1133 Broadway, New York N.Y. 10010.

Editor's Note: An error was inadvertently made in this ad in the last issue of American Horticulturist. The address was printed 113 Broadway and it should read 1133 Broadway.

MODERN FRUIT SCIENCE, BEST COM-PLETE book on tree and small fruits, 1000 pp., 1973 5th ed., Hort. Publ., Nichol Ave., N. Brunswick, N.J. 08903. \$16.50 + 43c; Foreign, \$17.50 + 48c. Request our list of Publ.

#### **Books Wanted**

Collectors items wanted: Books, Catalogs or other publications of Peter Henderson Seed Co. Write R.V. Bray, Box 4205 Charlotte, N.C. 28204

#### **Carnivorous (Insect Eating) Plants**

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#### **Daffodil Bulbs**

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#### Horticulturists

Wanted: Full-time horticulturist to maintain and improve 30-acre city park. Virgin Cypress in rich flood plain. Natural landscaping, mostly native plants. Will have one fulltime laborer, plus part-time and volunteer help. Must be willing and able to do manual labor. Outstanding opportunity for ambitious man/woman. Salary open. Send resume or questions to Ben Williamson, Route 3, Darlington, S.C. 29532.



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#### Miscellaneous

Hand Coloured Lily Plates 22"x15" by Lilian Snelling from Elwes Monograph of the Genus Lilium, suitable for framing, \$10.00 each postpaid, three for \$25.00. LOTH LORIEN LIMITED, Wadhurst, Sussex, England.

Wildflower Postcards, in exquisite color from the series of books. "Wild Flowers of the United States." Each card has a description of the flower portrayed, its habitat, its season. Price \$3.00 per set of 32 cards. THE NEW YORK BOTANICAL GARDEN, Dept. AH, Bronx, New York 10458.

#### Primroses

Hardy Barnhaven Silver Dollar Primroses bring enchantment to shadier gardens. Plants and seed of this famous strain, plus rare Primula Species seed. Descriptive Catalog, 25c. FAR NORTH GARDENS, 15621 Auburndale Way, Livonia, Michigan 48154.

#### Publications

WAKE UP YOUR GARDENING. Gardening is going places-are you with it! THE AVANT GARDENER brings you all the "firsts"-new plants, products, techniques, with sourcesplus full features, special issues. A unique horticultural magazine-news service, 24 issues a year, over 500 articles. Curious? 3 sample copies \$1. Serious? \$8.50 for a full year. P.O. Box 489, New York, NY 10028.

#### Water Lilies.

Colored catalog listing hardy and tropical water lilies-day & night bloomers, misc. water plants supplies, pumps, filters, jetsweeps, fountain heads as well as building and planting instruction. Van Ness Water Gardens, 2460 N. Euclid Ave., Upland, Calif. 91786. 10c.

#### Wildflowers

WILDLINGS-Nursery Grown Wildflowers for Gardeners, Nature Lovers. Catalogue listing wildflowers (Eastern and Western kinds) unusual plants, stories, nature lore, growing tips, etc.-All for just \$1.00. Jamieson Valley Gardens, Rt. 3-D, Spokane, Wash. 99203.

# The American HORTICULTURAL Magazine

fall 1970



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