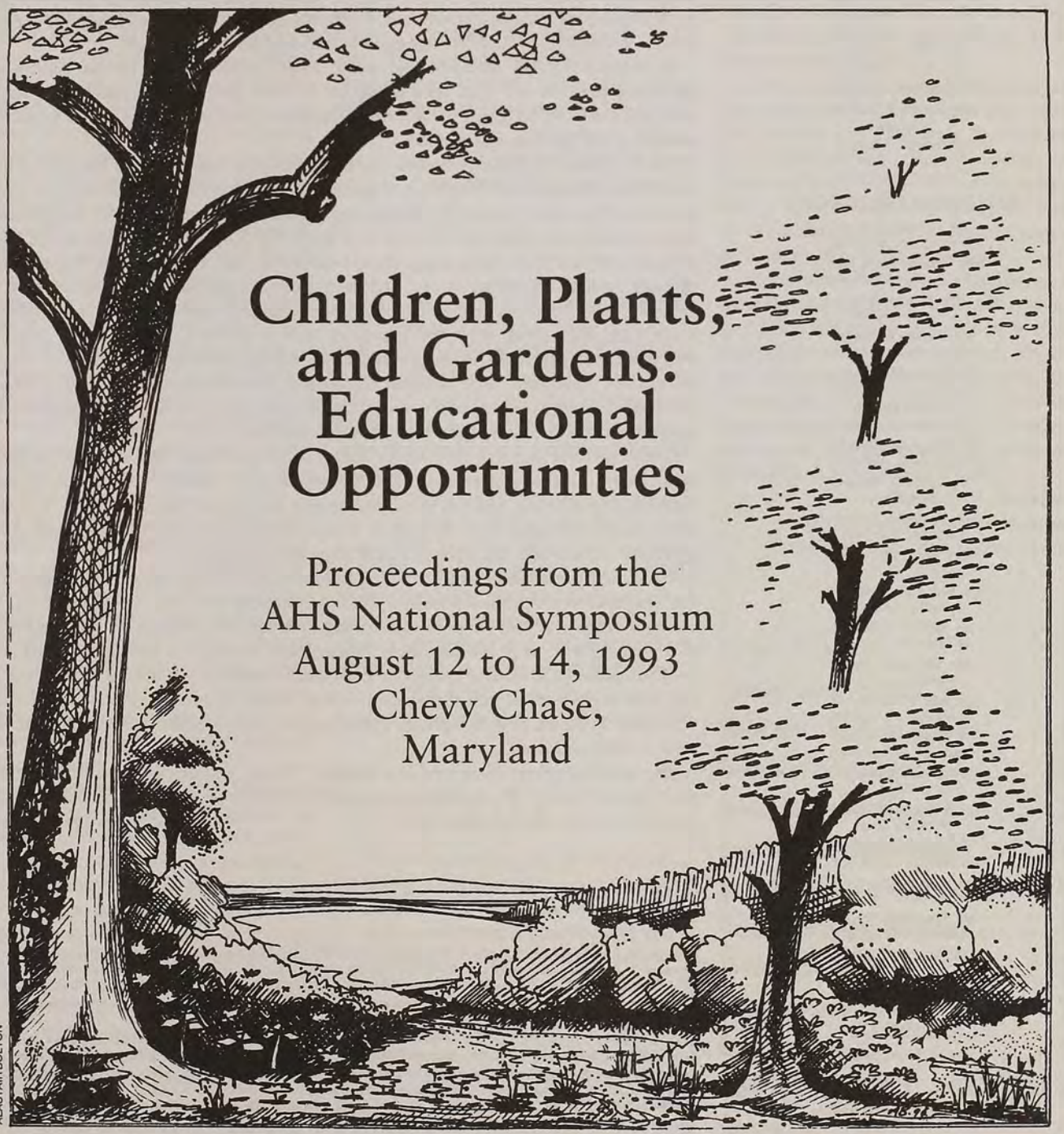
American Horticulturist

July 1994 A Publication of the American Horticultural Society $10.00



Children, Plants, and Gardens: Educational Opportunities

Proceedings from the
AHS National Symposium
August 12 to 14, 1993
Chevy Chase,
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COMMENTARY

The young voice of my granddaughter Emily was so excited as she ran back to her mother from the children's gardens here at George Washington's River Farm. "Mom, they have your plant growing in a garden with a house that you can hide in!" The plant turned out to be 14-foot tall sunflowers blooming in a garden designed by British author Penelope Hobhouse. Emily, then eight, had learned about the sunflower from a summer dress that our daughter Marcy had sewn for herself.

Meanwhile Emily's four-year-old sister, Ellen, appeared out of the vegetation to announce that she had just been flying on Princess Jasmine's Persian carpet and had returned safely. Ellen asked me if I would help her plant one at her house so she could pretend to fly anytime she wanted.

These kinds of early experiences—relating plants to someone you love or admire or using them to help create moments of fantasy—are at the heart of what makes a life-long gardener. The achievement of a beginning gardener may at first seem insignificant to someone older and more experienced. This is why I greatly admire gardeners and teachers who so enthusiastically encourage these beginnings, and are spreading this enthusiasm through national meetings, books, and participatory gardens all over the country.

As we welcome these new gardeners to our ranks, we have an added responsibility to make sure that along with the basics of how to grow a sunflower we also share well-examined principles of conservation and ecology. We can teach them to find ways for garden plants and wild animals to co-exist, how to recycle as many products as possible, how to use chemicals responsibly. We can use gardening as an opportunity to teach them about healthy food and fresh air and exercise.

Overprotective parents may worry about turning children loose in the outdoors of bees, rusty cans, and deer ticks. But of course, the "closed building syndrome" of recirculating solvents, dust particles, and gases is hardly any less dangerous. We can also teach them reasonable caution, such as how to dress so ticks can't invade their clothing, and how to recognize the signs of insect bites and allergies.

These first precious seeds start young people on a lifelong experience. August 5 to 7, the American Horticultural Society and the Montessori Foundation will join in co-sponsoring a symposium on children's gardening in Arlington, Virginia. In conjunction with that meeting AHS is publishing these Proceedings, based on a similar AHS symposium held last summer. It is being mailed to all of our members in the hope that they will share the concepts presented and the programs described with educators in their community, volunteer their own time to replicate a program in a nearby school, or try a special project with a child next door.

Our granddaughter Ellen told her mother: "Mom, you are a hero because you help other people learn." We need heroes everywhere. We hope that you will use this issue to venture in, learn, and become a hero. *—H. Marc Cathey, AHS President*

Replacement issues of this special issue of AMERICAN HORTICULTURIST are available at a cost of $10 per copy. The opinions expressed in the articles that appear in AMERICAN HORTICULTURIST are those of the authors and are not necessarily those of the Society. Botanical nomenclature in AMERICAN HORTICULTURIST is based on HORTUS THIRD. Manuscripts, art work, and photographs sent for possible publication will be returned if they are accompanied by a self-addressed, stamped envelope. We cannot guarantee the safe return of unsolicited material.

AMERICAN HORTICULTURIST, ISSN 0096-4417, is the official publication of the American Horticultural Society, 7931 East Boulevard Drive, Alexandria, VA 22308-1300, (703) 768-5700, and is issued 12 times a year. The American Horticultural Society is a nonprofit organization dedicated to excellence in horticulture. Membership in the Society includes a subscription to AMERICAN HORTICULTURIST. National membership dues are $45; two years are $80. Foreign dues are $60. $15 of dues are designated for AMERICAN HORTICULTURIST.

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Second-class postage paid at Alexandria, Virginia, and at additional mailing offices. **Postmaster:** Please send Form 3579 to AMERICAN HORTICULTURIST, 7931 East Boulevard Drive, Alexandria, VA 22308-1300. Produced in U.S.A.

Introduction

The fact that there are many children who haven't had exposure to gardening or even to a few small plants is a sorrowful and shameful one. Far too many children grow up in urban areas where their gardens consist of weeds poking through a mulch of broken bottles and cigarette butts. Other children in suburban and rural areas may receive occasional exposure to gardening, but rarely in a profound or lasting way.

As a nation, we are becoming aware of the great value of the natural world, and of our role within it. I grew up in gardens and on farms and, while the work was often very hard, it was always satisfying. The value of this intimate experience with plants increases with the passage of time, infusing other parts of my life with meaning. A business problem is mitigated when I contemplate an analogous horticultural truth. A great bonus is the sensitivity that one acquires to the beauty of plants.

Horticulture is not only an antidote to the poisons of the contemporary world, but also a positive force for the civilizing of mankind. Many children grow up knowing much about human nature but next to nothing about the horticultural wonders of nature. The education community, especially those involved in kindergarten through 8th grade, must lead children to plants and introduce them to the infinitely rewarding world of flora.

The philosopher Eric Hoffer said that maintenance was the principal feature of civilization. Learning to grow and maintain healthy plants is the key to gardening. In gardens, children learn to care, to be patient and to experience both success and failure. In time, children's maintenance of plants might give them insight into the care that they will require in their relationships with others. Our children will build a more beautiful world only if they know the beauty and mystery of life itself; they will realize it exists not only within them, but also beyond them—they need only to sow a seed to see this beauty and feel part of it.

"Children, Plants, and Gardens" is a horticultural "call to arms." At no other time have so many educators gathered together to share their knowledge and skill of teaching children about plants and gardens. This symposium will serve as a powerful seed to create the kinds of enriching environments children need and deserve.

George C. Ball Jr.
Immediate Past President
American Horticultural Society

In the past year, I have had the pleasure to learn from many of the participants in the 1993 AHS children's gardening symposium that, as a direct result, they have started new gardens and gardening programs for children in schools and community sites nationwide.

I don't think we have to convince anyone that children benefit from regular and meaningful contact with plants and gardens. Therefore, if we want more children to experience the joys and fascinations of gardening, we must take the initiative and make a committed and enthusiastic effort to provide those experiences to children.

Mahatma Gandhi said that if we want to change the world, we must become the change we would like to see in the world. Gatherings such as the symposium demonstrate that many hundreds of individuals are doing just that. We can all take inspiration and guidance from each other's thoughts and work.

It is our goal that these Proceedings will stir educators and other interested adults to consider the vital role horticulture should have in our education system. Indeed, as Mark Plotkin—one of the symposium's keynote speakers—said, we must bring horticulture back where it belongs—into the forefront of our culture.

The information and ideas contained in these Proceedings are also intended to inspire and guide individuals and groups to transform children's environments, especially lifeless and unimaginative schoolgrounds and community playground sites, into more deeply human and spiritual places—where children can live, learn, and play amid more natural beauty, grace, and health.

Maureen B. Heffernan
AHS Education and Symposium
Coordinator and Proceedings Editor

DEDICATION

These Proceedings are dedicated to George C. Ball Jr. and Vivian Elledge Ball. George Ball provided vision and leadership in promoting and organizing the children's symposium. Vivian Ball, along with the W. Atlee Burpee Company, generously helped provide the means for making the symposium and the Children's Garden Project at River Farm possible.

CONTENTS

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Fostering Earth Stewardship

By Roger Hart

Dr. Roger Hart, Director, Children's Environments Research Group, City University of New York, 33 West 42nd Street, New York, NY 10036, (212) 642-2970, Fax: (212) 642-2971. This keynote address was delivered at the August 1993 symposium.

It is a great irony of modern life that while technology has enabled us to perceive the complexities of environmental responses to human action, and the mass media has brought these close to our homes, children spend considerably more of their lives isolated from direct interaction with diverse natural environments than did their parents. The environmental education of children is promoted as essential to the establishment of a citizenry that is more caring toward the environment. But education will not be enough. I believe that a deep, lasting concern for the natural world must come from a genuine affection for it. How this affection is engendered is an important question for us all. Within this broader question I will consider the importance of gardening in fostering children's general caring for the environment, or "earth stewardship," as some have called it.

There is a notion that children are closer to nature. Poets try to capture the lack of self-consciousness of children and their fresh, full experience of the thing itself, as best known in the poem of Walt Whitman beginning "There was a child went forth..." While there is a greater immersion in sensory perception in childhood, there is no reason to believe that this necessarily means that a child has a closer, more caring relationship to nature. Anyone who has seen children stoning crabs on a beach or burning cigarettes into frogs knows that. Piaget, one of the great theorists of child development, summarizes it by explaining that children are both closer to and further from nature. They are closer perceptually because they are physically closer and less mediated in their response to things, but they are further from it conceptually because they think everything is made *for* people, even the clouds, lakes, and mountains. Interestingly, Piaget also describes a phenomenon that could form roots for children of a different kind of relationship to nature as adults. He describes a tendency of children to find intention and consciousness in things that are inanimate. The most famous of Piaget's accounts is of a child who collected pebbles together so they would not feel lonely. More generally, many seem to believe that goodness comes to children who simply have contact with nature. This is a kind of thinking that leads thousands of people to give money to the Fresh Air Fund in New York City, which sends children to live in nature camps and with families outside metropolitan New York. The contact with nature alone is not all that is required for a child to spontaneously develop understanding of and a caring relationship to the natural world. The role of adults is crucial.

I think the common reasons for having children in a gardening program are for them to learn the skill of gardening, to understand biology or more specifically botany (including the learning of plant names) to develop their aesthetic appreciation of the natural world, and to develop a caring concern for nature.

I grew up on a flower nursery in England and before lecturing to you today I gave a lot of thought to what it was I enjoyed as a child. From this reflection I would like to add a couple of additional reasons why we should do everything we can to make gardening experiences interesting and valuable to children.

First, if handled appropriately, gardening offers an opportunity for children to discover the joy of working—of defining a task and carrying it out to completion and hence to satisfaction at a sense of competence. Secondly, gardening can offer the special joy of "participation" with natural forces in the creation of something beautiful and more magical than could be created alone. This latter reason, this feeling of participation, I feel is at the core of the fostering of earth stewardship in children.

I think one of the most difficult problems for gardening programs is the question of how to establish a program that recognizes that children learn best when they are inspired to initiate change themselves and at a time when they feel ready to initiate such change. As you all know, providing garden pots for a class of children will inevitably work for only a few. The discipline of gardening can only come after a desire has been kindled in children. Gertrude Jekyll in her well-known book on children and gardens faced this issue and concluded that children should be given an already finished beautiful garden. This might have worked for highly privileged Victorian girls, but I think that for the majority of us working with children a diversity of opportunities is the key. Some combination of allowing children to be observers and apprentices of others while also having a free space to experiment with gardening if they wish is probably ideal. The notion that young children only learn from direct manipulation of the environment comes from an overworking of the theory of Piaget. Observation and imitation is also important to children. For this reason, simply making greenhouses visually accessible on a daily basis for young children to see seedlings developing into beautiful plants (which may be managed by older children) might be just as valuable an opportunity as the chance to handle seedlings themselves.

I feel another difficult issue for those working in gardening education is the issue of wildness. If you reflect back on some of the best memories of your own childhood, you're likely to say that many of them are of relatively wild spaces, not gardens. Certainly this is what a number of studies on the subject have shown. The areas of our flower nursery that my father was most ashamed of and hid from everyone else were the areas my friends and I wanted to be in: the garbage area behind the greenhouses, under the plant benches, in the toolshed, and in the toolshed

and boiler rooms.

Similarly, the garden on our street that was so badly tended that the local government that owned the houses threatened to throw the tenants out, was the garden the children on our block most wanted to use—it was wild! Why then do we expose children to gardening in rectangular plots, planting in straight lines, and with an emphasis on classification and scientific knowledge? I would like to suggest that the profession of gardening education has not only uncritically accepted the importance of children being actively involved in planting as the key strategy for gardening, but by doing so may actually be contributing to an old-fashioned notion of what should be a responsible mode for human intervention in nature. Maybe children should be allowed to more fully experience the plant world and learn to look at it closely before being taught to erase all existing vegetation to create a billiard-table surface of soil in order to engage in monoculture. The sustainable development of the environment implies a different kind of gardening. Children need to learn how to modify habitats so that food resources and beauty are created while also at least maintaining, if not improving, these habitats for other living things.

Recognition of the value of wild areas to children's spontaneous learning about the plant world, in contrast to their education about it, should lead us to look critically at the changing nature of our landscape in this country. Wild common lands should be made available to children in all residential areas at a very local level. Here is an opportunity for the formation of local alliances between urban wildlife conservationists, gardeners, recreation professionals, and educators to manage them with children in local land trusts. To me, this is the kind of new institutional structure that makes sense if society is serious about fostering earth stewardship as a crucial issue as we enter the 21st century.

Gardening as an Initiation Into Environmental Action

By Louise Chawla

Louise Chawla, Associate Professor, Whitney Young College, Kentucky State University, Frankfort, KY 40601, (502) 227-6721, Fax: (502) 227-6405. August 1994 Keynote Address.

One of the primary questions in environmental education research is: What are the antecedents of responsible environmental behavior? What motivates some people to take action to protect environmental quality? Numerous polls show that the majority of U.S. citizens identify themselves as "environmentalists," but when they are asked what actions they are willing to take and what sacrifices they are willing to make, the percentage who are willing to take action goes down as the effort involved goes up.

When people are willing to go out of their way to carpool, to recycle, to turn their back yards into wildlife sanctuaries, or even to choose careers in environmental protection, how do they explain their commitment? In particular, what childhood experiences are important?

Harold Hungerford and Trudi Volk, researchers at Southern Illinois University, have synthesized several reviews of surveys of conservationists and environmental educators and studies of the conditions under which young people show responsible environmental behavior. None of this research has focused specifically on the contribution of gardening; and considering that there is gardening and *gardening*, the contribution is probably mixed. When gardening consists of putting out a few store-bought annuals, gassing moles, and spraying everything that flies, it isn't likely to foster an ecological consciousness. Nevertheless, there are good reasons to expect that gardening at its best can be an important formative experience.

According to Hungerford and Volk, people are most likely to act responsibly toward the environment when they have all four of the following characteristics:

- ✦ Environmental sensitivity or empathy;
- ✦ In-depth knowledge of specific issues;
- ✦ Personal investment in change;
- ✦ Self-confidence regarding action skills.

Childhood experiences of gardens and gardening can contribute to each of these characteristics.

Environmental sensitivity, or an empathetic connection with the natural world, correlates strongly with responsible environmental behavior; and surveys of environmental educators and conservationists suggest that it is acquired through extended positive experiences in childhood in wild or semi-wild places, either during solitary play or activities with friends and family. Some people speak of it as "bonding" with nature, when children immerse themselves in nature's sensuous variety, absorbing their place and its elements in an often unthinking process of identification.

When adults seek to express this childhood experience, they associate it with free hours spent in forests or fields, along beaches or creek beds, or in family gardens. It is *not* associated with hoeing and weeding, but with enthralling exploration and play: feeling sun and shade, outstaring insects, wondering at leaf shapes, chasing minnows and tadpoles.

Carol Olwell, compiler of *Gardening From the Heart,* a collection of first-person

accounts about why people garden, has dedicated herself to the promotion of gardening that is a caretaking of the earth, in harmony with a region's soils and climate. Like many of the people she interviewed, she traces her motivation back to childhood. While her grandfather worked in his alfalfa field and her grandmother worked in her flower beds, Carol and her sister played in the nearby creek. Although she wasn't learning actual skills or knowledge about gardening at this time, "what I did absorb," she recalled, "as leaves absorb sunlight, was the sense that the earth was a truly beautiful and vibrant place, and that it deserved to be loved." This sense of the earth forms a foundation for environmental sensitivity.

This sense of the earth appears, however, in the memories of painters, poets, and novelists as well as gardeners, naturalists, conservationists, and environmental educators. As global citizens of the earth, regardless of our work as adults, how can we draw upon these early experiences to act responsibly? To take action, research suggests, we need to combine environmental sensitivity with personal investment in an issue, knowledge about it, and self-assurance that we have the necessary skills. Gardeners who serve as role models for children can contribute here.

When environmental activists and educators have reflected on the sources of their commitment, they repeatedly identify role models who showed them that the natural world deserves attention, respect, and care: a parent, grandparent, teacher, or friendly neighbor. Time outdoors in natural settings, by itself, does not seem to be enough to foster an environmental consciousness. Children also need a guide who translates their spontaneous fascination with the natural world into an understanding that nature is at once a collection of intricate details and a precious whole.

Because gardening involves the imposition of human designs on the natural world, it is destructive as well as constructive; therefore it is critical to evaluate what kind of relationship to nature we model to children. If our efforts are spent in eradicating native species and clearing away wildlife habitats in order to impose borders of exotic imports and the monoculture of lawns, we may be teaching children to enjoy gardens, but not to know and respect ecosystems. On the other hand, if we teach them what the land and its rainfall are naturally suited to support, and how to work with the land to maintain a diversity of plant species and animal life, we are teaching them their part in nature's interdependencies.

At their best, gardens provide accessible opportunities for children to learn about plant and animal adaptation, soils and topography, climates and microclimates. By being actively involved in gardening, children can gather the knowledge about issues that is a necessary background for responsible environmental behavior. Without having to travel to a distant wilderness, they can enter into the life of flourishing ecosystems in a back yard, on school grounds, on the land of a public park or nonprofit organization, or in a city lot. The very existence of gardens that restore the soil and preserve plant and animal diversity stands as a testimony to individuals' investment in caring for the earth. When these gardens flourish, they stand not only as a testimony to personal engagement, but also to skill in taking action.

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Grounds for Change: Learning Through Landscapes in Britain

By Bill Lucas

Bill Lucas, Director, Learning Through Landscapes, Third Floor, Southside Offices, The Law Courts, Winchester, SO23 9DL England, 0962-846258, Fax: 0962-869099. He will lecture at the 1994 symposium.

There are more than 30,000 schools in Britain. Some have wonderful buildings, carefully designed to create an ideal learning environment. Many, sadly, make do with crumbling, inadequate classrooms that contribute little or nothing to those who use them. Whatever the state of their buildings, all 30,000 schools own a certain amount of land—what we in Britain call their "grounds" and what you may think of as their "yard." It is this environment that I will explore in this article, because, as I hope I will demonstrate, it is a vitally important one for children.

In Britain, far too many school grounds are gray, tarmac deserts surrounded by forbidding chain-link fencing. They are frequently flat and featureless, with all the monotony of the prison yard. They seldom have adequate seating, shelter, or trees—indeed, there is very little evidence of anything growing in them at all. It is hard to imagine a more inappropriate environment for children to pass any time at all, let alone the hour or so per day that most of them spend outside during the school day. For a significant number of children, some 25 percent who do not have a garden, it is a terrifying possibility that they pass through childhood without any experience growing plants or seeing wildlife firsthand. Worse still, if their own home environment is in any way impoverished, then their school experiences will be doing nothing towards redressing this. They will simply be trading one unsatisfactory environment for another one, as they move from home to school.

It was to tackle these issues that Learning Through Landscapes was created. Back in 1986, an imaginative and forward-looking group of educators, landscape architects, and designers began a research project, the purpose of which was to investigate the design, use, management, and development of school grounds in Britain. Their findings have since been published in two forms, as a research report by Eileen Adams and as an advisory document by our national education ministry.

As a result of this research, an independent, national body—Learning Through Landscapes (LTL)—was established, and in 1990, I became its first director. In the four years since, LTL has set about bringing to the top of the educational agenda a range of issues relating to school grounds.

To begin with, it was important to establish some baseline facts. These included the extent of the problem—30,000 schools own more than 150,000 acres of land and children spend at least a quarter of their time at school on the grounds. They also included the enormous influence exerted on young people by places. Hard tarmac tends to lead to negative behavior, accidents, and poor motivation while attractive child-centered ones provide an exciting resource for formal and informal development. It was also essential to establish a more holistic view of educational land, not to assume that a school's grounds were the "property" of either its physical education department or of its budding horticulturists. Key to this was LTL's insistence that successful landscape projects had to involve children in all stages of the process if they were to achieve their social and educational aims as well as improving the design of the place.

In 1990, we set ourselves a primary objective—to persuade the teaching profession that school grounds are a valuable teaching resource, an outdoor classroom. To do this, we established a program of publishing and advocacy. We produced videos, books dealing with species and habitat relationships, and a range of practical guides suggesting how to teach the curriculum outside, such as *Bright Ideas in the Outdoor Classroom.* We also set up a national telephone information service to answer any questions from teachers working in the field. All of this was complimented by a fairly aggressive campaign in the educational press.

In three years, we largely achieved this objective. We dealt with 10,000 schools—a third of all schools in the United Kingdom—and attracted hundreds of individual and corporate members. Our staff has grown so that we now boast a small multi-professional team of 12! Most important, our name, Learning through Landscapes, has become synonymous with a movement that has reasserted the value of experiential learning outdoors, the power of landscape, and the need to reconnect a generation of young people to the soil, to share with them the value of growing things. In 1990 there were a few hundred schools involved in revitalizing their grounds; in 1994 there are many thousands.

So what, then, does a school that adopts LTL's philosophy look like? Not surprisingly there is no standard answer to this. Indeed, it is a feature of our approach to be utterly nonprescriptive and to celebrate local distinctiveness. An LTL school might have any one or more of these features in its grounds: an arboretum, a butterfly garden, a checkerboard garden, a corn field, a distinctively designed fence, a formal garden, a hen house, large numbers of attractive seats, a math trail, a maze, an orchard, a pond, a recycling center, a sculpture, a sensory garden, a sheep paddock, a vegetable garden, a weather station, a wildflower meadow, a windmill.

More significantly, an LTL school will

not just have embarked on a kind of horticultural shopping expedition, ticking off items from an imaginary list. It will have asked its pupils and staff what they would like to do outside and how they would like to feel and, using this data, will have evolved landscape plans that will meet these needs.

In terms of the formal curriculum—our National Curriculum—aspects of almost every subject can easily be taught outside and some elements of science, geography, physical education, and art can really not be taught effectively inside. Scientists can investigate pond life and watch hot-air balloons rise. Mathematicians can discover patterns and shapes in nature and measure, calculate, or estimate to their hearts' content. English specialists can be reminded that drama began outdoors and can savor the opportunities for poetic and factual writing stimulated by experiences on their grounds. Geographers can map and chart and investigate, historians can uncover the past memories locked up in the people and places that make up their school's immediate environment. Artists can create and technologists can experiment in the school's outdoor classroom.

But this is not all. There are huge social benefits to developing a school's grounds. It is often forgotten, for example, that we have evidence of major, positive shifts in behavior and attitude when the outside environment is developed. Conversely, there is a reduction in the number of accidents, especially those caused by collisions on the tarmac, and a strong likelihood that there will be less vandalism. The quality of play improves and children become increasingly positive about their school as they see tangible evidence of caring. The informal curriculum of the school is, thereby, enhanced.

However, benefits can be seen not just at a formal or even informal level. LTL has been exploring the hidden benefits that accrue in such projects. We have coined the phrase "the hidden curriculum of school grounds" to describe the much deeper emotional levels of response to the environment experienced by children. There has been some research into this area involving buildings and outside public spaces, but almost none in schools. We have recently published the results of two years of research, carried out for us by Wendy Titman, into this subject. As part of this, hundreds of children were interviewed using a technique drawn from the field of semiotics, to find out what they think and feel about all aspects of school grounds.

From this, we conclude that children "read" school grounds as they read any external environment. They see a set of "symbols" from which they deduce what it is they are supposed to be doing or feeling. So a well-tended pond may be read as an indicator that the school cares, while a total absence of seating or shelter is likely to suggest that a school places little value on its pupils. Pupils deduce a cultural context in which their activities take place. It is this that goes to make up the hidden curriculum. Not surprisingly, the hidden curriculum of school grounds both causes and affects children's behavior and attitude and has considerable influence on the overall management of the school.

Armed with the results of this and other research projects being run by LTL, we are now in a much stronger position to move our work into a new phase. I stated earlier that it had been LTL's initial objective to persuade educators of the value of the outdoor classroom and I genuinely believe that we, and other organizations active in this area, have largely achieved this. I now want to take our work in a new direction. My sights are set not on our education ministry but on the Department of the Environment, the National Heritage Department, and the Home Office. For, in truth, I am convinced that we are dealing with much broader issues than can be contained in the concept of formal education. We are looking at the operation of democracy at a local level, how children can participate in the process of designing and developing their environment. We are exploring subtle connections between art and science—the different ways of "knowing" the world. We are dealing with issues of inequality— the relationships between behavior and the quality of the environment.

If we continue to provide children with tawdry and second-rate grounds during their formative years, we must not, as a society, be surprised if those same young people construe this as an indication of the way we value them. It is a harsh and painful truth that, if we, as educators, provide inaccessible educational environments in our schools, then, wittingly or not, we demonstrate an uncaring attitude to the very children on whom the survival of the planet depends. It is Learning Through Landscapes' fervent hope that, by stopping the rot in schools, we can help to ensure that we learn to value each other and care for the wider environment.

Workshops

Practical Resources for Garden-Based Education: The New York City Experience

Dr. Stuart Lowrie, Deputy Director, Operation GreenThumb, 49 Chambers Street, Room 1020, New York, NY 10007, (212) 233-2926, (212) 689-4115.

Since 1989 Operation GreenThumb, in cooperation with the New York City Board of Education, has provided support to teachers through its outreach program, Education in the Gardens. The program helps interested professionals and members of the community build a garden on part of the playground or school yard for use as an outdoor classroom. These sites provide an educational resource for students and instructors alike. By 1993, 45 innercity public school participants had established gardens on or near the school yard.

Operation Green Thumb can provide copies of their resource manual, curriculum materials, Education in the Gardens resource listings, and conference supplements.

Topiaries, Totems, and Tales in the Garden

Pat Hammer, Owner, Samia Rose Topiary, P.O. Box 231208, 466 North Highway 101, Encinitas, CA 92023, (619) 436-0460, Fax: (619) 436-6869. Bob Hyland, Director of Education, Strybing Arboretum and Botanical Garden, San Fransisco, CA 94122, (415) 661-1316, Fax: (415) 661-7427. Beatrice Bowles, Storyteller, Harmony Hill, Inc., 1629 Taylor Street, San Francisco, CA 94133, (415) 776-3010.

This session presented innovative methods to introduce children to the joy of plants and gardening through the use of topiaries, totem poles, and other garden sculpture, as well as stories, myths, and music. The presenters see the garden as the most natural of settings for whimsical topiary animals, storytellers, and mythologists to open children's eyes, hearts, and minds to plants, gardens, and the environment.

Art + Garden + Families = Wave Hill's Family Art Project

Noah Baen, Artist/Naturalist, Wave Hill, 32 Tiffany Place, Brooklyn, NY 11231, (718) 549-3200.

Throughout the year, a team of artists show children and their families ways to give creative form to their experiences at Wave Hill. The richness of colors, textures, shapes, and fragrances; the vital energy of growing plants; the buzzing and fluttering of insects; and the constant change of seasons provide inspiration for colorful paintings, prints, and collages, or constructions in paper, clay, wire, and plaster. Natural materials are transformed into dyes, paper, jewelry, and wreaths.

This presentation highlighted popular, fun projects that build art skills and aesthetic appreciation while incorporating concepts in botany, horticulture, natural sciences, and landscape design.

G.A.R.D.N.: Gardeners and Readers Develop Naturally

Nancy E. Jurenka (with Rosanne Blass and Anne Polkingharn), Associate Professor. Central Washington University, Book Nook Farm, Route 1, Box 1038, Ellensburg, WA 98926, (509) 963-1479.

Integrating children's literature and writing activities with gardening ensures that growth will occur in all three areas. A Master Gardener, an educator/author, and a children's librarian involved the audience in classroom gardening activities associated with children's trade books, journal keeping, and creative writing activities associated with gardening, and discussed additional children's books to inspire gardening activities. A research project describing the benefits of garden journal keeping was included. The reciprocal nature of experience-based reading/language arts was emphasized. An extensive bibliography and other hand-outs were distributed and are available by writing to Dr. Nancy Jurenka.

Plants, Gardening and Gardens in Children's Comics—An Educational Opportunity

Joachim Wolschke-Bulmahn, Director, Studies in Landscape Architecture, Dumbarton Oaks, Washington DC 20007, (202) 342-3280; Gert Gröening, Professor, Fachbereich Architektur, University of Fine Arts, Berlin, Hardenbergstr. 33, 1000 Berlin 12.

Comics tend to represent virtually all aspects of life. Many comics have dealt with plant, park, and garden-related stories. Professional journals in horticulture and landscape architecture tend to present plant and garden topics in a way that makes only limited use of pictures. Their attempts may be considered relatively insignificant as far as nonprofessional members of society are concerned. The number of journal copies sold represents only about one-half of one percent of comics sold. Views on plants and gardens in comics may therefore, be more influential in shaping attitudes than those published in professional journals.

The presenters discussed how plant and garden issues are treated in comics for children and how they have the power and potential to teach and get children interested in those subjects.

Indoor Herb Gardening With Children

Mary Dunn, Teacher, 142 Western Avenue, Waterville, ME 04901, (207) 873-3773.

This presentation focused on indoor herb gardening projects for young children. This curriculum is intended to increase appreciation of all aspects of herbs, environmental awareness, and self-esteem. Curriculum projects included growing and propagating herbs, herb lore, and using herbs for crafts, cooking, and holiday celebrations. Methods of incorporating these into traditional content areas of teaching and ways to expand this "in classroom" curriculum into a summer outdoor camp-type environment were also presented.

Critical Elements of Effective Field Trips As Defined by Research in Museum Education

A. Jenkins Farmer III, Riverbanks Botanical Garden, P.O. Box 1060, Columbia, SC 29201-1060, (803) 779-8730.

Key elements for successful field trips to botanical gardens were identified through original research by the presenter. These elements include prior planning with an emphasis on the qualities that differentiate the garden from the classroom; advanced student preparation to include site orientation, concept orientation, and an agenda; hands-on, on-site activities tied to learning concepts and themes; follow-up activities, such as relating on-going educational themes to what was learned during the field trip; and evaluation of the trip by the students to gauge what was learned and whether it was enjoyable.

Common Roots

Joseph Keifer, Executive Director, Food Works, Inc., 64 Main Street, Montpelier, VT 05602, (802) 223-1515.

The Common Roots program of Food Works was presented as a practical community-based process that uses K-6 Historic Theme Gardens to create a seven-year student journey exploring the agricultural roots of the community. Slides from different school sites described the students' journey from Indigenous Gardens (grades K to 2) to Heritage Gardens (grades 3 to 4), and finally to Sustainable Gardens of the Future (grades 5 to 6).

This cross-curriculum, social studies approach ties science investigations and problem-solving, language arts and creative writing, math and critical-thinking skills, and the creative arts into a continuum of fall, winter, and spring units of hands-on stewardship activities that teach children to care for the self, the community, and the local environment.

Components of the gardens include raised bed gardens, mapped nature trails, indoor Grow Labs, and indoor and outdoor ecology stations consisting of bird blinds, compost bins, a water study station, a worm farm, living teepees, an outdoor classroom shelter, and a market garden.

Kindergarten Gardens or Outdoors Can Mean Cheap and Enduring

Marion Lardner, Kindergarten Teacher, Board of Education District, Earl Hanson School, 4000 9th Street, Rock Island, IL 61201, (309) 793-5930.

This presentation proposed using the outdoors in general, and gardens in particular, as the source for year-long learning in a developmentally appropriate kindergarten. This teacher believes that some of the best learning, for her classes, takes place in the garden. Specific activities for each season suggested how to dynamically integrate gardens into the entire school curriculum and recreational activities. For example, social studies questions and answers involve discussing what was native before new people came and what new plants or seeds those people might have brought with them. Language arts skills are nourished as children draw, design, discuss, and write about gardens and the creatures that enjoy them.

Children's Gardens Through the Ages

Catherine Meehan, Horticultural Archives Director, Smithsonian Institution, Arts and Industries Building, 1100 Jefferson Drive S.W., Washington, DC 20560, (202) 357-1926.

The Smithsonian Institution produced a slide show depicting the history of children's gardens in America, from late 19th-century school, community, and back-yard gardens for youth up to current gardening programs. At one time, school gardening programs were considered essential for teaching real-life skills and the overall full development of the child.

Gardens in Japanese Schooling

Lorisa Mock, Graduate Student, Longwood Gardens, 229 Dogwood Road, Media, PA 19063.

This presentation illustrated the Japanese child's introduction to horticulture by showing examples of elementary school gardens and discussing the role of horticulture and related field trips in the curriculum. These were considered within the context of a Japanese culture and led to an understanding of their significance in producing a very horticulturally aware population. The research and insights reflected in this presentation were carried out during a two-year residency in Japan.

Flower Arranging With Children

Hardie Newton, Educator, Flower Designer, and Owner, Hardie Blossoms, HCR 6, Box 127H, Madison, VA 22727, (703) 923-4492.

This presentation instructed participants on the basics of good flower-arranging principles and techniques and how to teach these ideas and skills to children. Flower arranging is a marvelous opportunity for children to be creative while carefully observing and considering the variations of color, texture, shape, size, and fragrance of flowers and foliage. Flower/plant arranging ideas for all four seasons were given.

A Living Library as a Garden of Diversity

Bonnie Sherk, Founder and Director, A Living Library, 93 Mirabel Street, San Francisco, CA 94110, (415) 206-9710.

This presentation described a plan to use gardens to resynergize communities and schools through the creation of "living libraries" incorporating many types of community resources: human, ecological, historic, technological, aesthetic, and economic.

The Living Library plan is site- and situation-specific in design in order to teach about the local cultural and ecological diversity of a community. It accomplishes this through the creative use of plants, animals, built and natural ecological environments, the arts, educational lecture programs, hands-on demonstrations, workshops, and state-of-the-art communications technologies.

Kids, Horticulture, and the Career Decision-Making Process

Lois Berg Stack, Professor, Landscape Horticulture, University of Maine, 5722 Deering Hall, Orono, ME 04469-5722, (207) 581-2949.

In the spring of 1992, 397 fifth and 10th students were surveyed to determine what influences them in their career decision-making process, what experiences they have had in horticulture, and whether they might consider horticulture as a career. The presentation discussed the findings and how educators can make children more aware of horticulture as a career option.

Traditional African-American Gardens: Learning From Our Grands

Richard Westmacott, Professor, School of Environmental Design, University of Georgia, Athens, GA 30602, (706) 542-4712.

This presentation was based on Westmacott's book, *African-American Gardens and Yards in the Rural South*. The gardens play diverse roles in the lives of children, from feeding the family to serving as places for entertainment or aesthetic expression, and most importantly, as a place where pleasure is derived from working and observing. In the rural South, many black children live with their grandparents and are exposed to traditional agrarian values and to an extraordinary emphasis on the values of self-reliance, often through the process of gardening.

A travelling exhibit of photographs of the gardens, funded by the National Endowment for the Arts, was on display at the symposium.

Wildflower Customs, Crafts, and Games

Margaret Wetterer, Writer, Educator, and Folklorist, 58 Conklin Lane, Huntington, NY 11743.

This presentation reviewed children's traditional wildflower games, crafts, and uses. The presenter explained such things as how to dry and press flowers, make flower chains, gather bitter herbs for the paschal meal, and how to make paint for art projects with plants such as pokeberry.

Garden Storytelling and Music

Larry Johnson, Storyteller and Teacher, Box 27314, Minneapolis, MN 55427-0314, (612) 546-1074.

The garden can be used as a compelling background or subject for storytelling. This presenter gave two original storytelling performances as well as an entertaining and humorous demonstration of how to use common garden equipment—like a hose and hoe—as musical instruments to entertain children and adults.

The presenter has information on the garden video exchange he has initiated to link U.S. schools with foreign schools, primarily in the former Soviet Union.

Tales From the Plant Kingdom

Candace Miller, Professional Storyteller and Educator, 439 South Cole Street, Lima, OH 45805, (419) 227-2516.

This outdoor storytelling presentation told how various plants acquired their common and latinate names. Several of the stories were written by children during the presenter's visits to their schools. General storytelling tips and attention-keeping techniques were also presented.

Science Education Through Enthnobotany or Tales of a Shaman's Apprentice

By Mark Plotkin

Dr. Mark Plotkin, Vice President for Plant Conservation,Conservation International, 1015 18th Street N.W., Suite 1000, Washington, DC 20036, (202) 429-5660, Fax: (202) 887-5188. Plotkin delivered this keynote address at the 1993 symposium.

Too many conservation groups, says ethnobotanist Mark Plotkin, try to raise children's concern about the environment with pictures of huge, bizarre, or cute, fuzzy animals. "The extinction of corn or wheat," he told the children's symposium audience, "would have a lot greater impact on our culture than the extinction of the elephant or the panda. It's time we were placing plants where they belong, as the centerpieces of civilization that make our culture, industry, medicine, and agriculture possible."

When Plotkin lectures to children, he points out that they probably ate some of the tropics for breakfast. "Did you have cornflakes? Corn comes from Central America. Rice Krispies? Rice comes from tropical Asia. Sugar on your cereal? New Guinea. Bananas? Tropical Asia. Chocolate? The Amazon. Hash brown potatoes? Potatoes come from the Andes. Ketchup on your potatoes? Tomatoes come from Mexico."

And we are still going back to these places, he noted, for wild or semi-domesticated plants to help give these crops more pest and disease-resistance. For instance, scientists in Bolivia recently found a potato with hairs that exude a poisonous paste that traps insects. Clearly, crossing this strain with domestic crops has fascinating implications. Children may not be thrilled by discussions of interbreeding two potato species, he admitted, but their attention is easily captured with a picture of "the killer potato in action."

Medicinal plants are especially useful for teaching kids—"and politicians, who are much slower learners than children"—about the importance of plants to human welfare, he's found. Many people are familiar with the rosy periwinkle, now a weapon against leukemia and Hodgkin's disease, first used by tropical Indians to treat blood problems. "But not many people know that one of its closest relatives is on the verge of extinction. If we can't save all the species, I want to make sure that the first cousins of our anti-cancer superstars end up in gardens, instead of going into the abyss."

When Plotkin isn't on the road lecturing on behalf of Conservation International, where he is vice president for plant conservation, he is living with the Indian tribes of the tropical rain forest, recording everything they will share with him about the power of plants.

"You can usually impress children by telling them that the difference between medicine and poison is just a matter of dosage." For example, the curare liana, which yields a poison the Indians apply to the tips of blowgun darts, provides American doctors with a muscle relaxant for abdominal surgery. It can't be synthesized in the laboratory. The Indians often make these substances more powerful with admixtures: substances that scientists once dismissed as inert, but now recognize as catalysts of complex chemical reactions. "These men running around the jungle in penis strings and red breech cloths," said Plotkin, "are a lot better chemists than we are."

It has been estimated that we know nothing about the chemical composition of over 98 percent of the flora in Brazil, which has more species than any other country. A single rain forest tribe, he says, may use at least 300 plants for medicinal purposes. But many have ceased passing their secrets along to succeeding generations. "When our missionaries come to their countries, the first people they try to discredit are the medicine men and women." As a result, thousands of years of accumulated wisdom is about to disappear.

Not only the tribes' knowledge, but their cultures, are evaporating. When Plotkin first began his work in the late 1970s, the Indians were living much as they had for centuries. Children's first toys were bows and arrows for hunting and fishing. They knew how to quench their thirst with the water vine, which fruits were edible, how to carve their own toys, how to make musical instruments from bamboos.

But Indians who 10 years ago greeted him in scarlet macaw feathers and blue body paint are now wearing blue jeans and athletic shoes. The Macushi tribe, whose use of curare led to its use as a medicine, were given shotguns by missionaries and traders and forgot how to make blowguns or prepare curare. When their economy fell apart, they could no longer afford shotgun shells. "The last time I was there, they were hunting with machetes," said Plotkin. "We have curare, but they do not."

Plotkin described a number of projects intended to return rain forest profits to its indigenous peoples. Conservation International's Shaman's Apprentice Program encourages medicine men of Amazonian tribes to formally train members of younger generations. One result of that project is the *Tirió Plant Medicine Handbook,* which records the knowledge of that tribe's shaman in their language. The Bible, said Plotkin, is the only other

book they have in the Tirió tongue.

Plotkin said he is sometimes asked why he lectures to lay audiences, rather than publishing his findings in scientific journals. "When you publish in a journal, seven people may read it. Four already hate your guts, and three say 'It's okay, but I could have done a better job.'" By lecturing to nonscientists, including children, he hopes to reach thousands with his message that plants are much more "than something that goes in one end of a panda and out the other."

Reproduced from the November 1993 American Horticulturist.

Burpee Goes to School

By George C. Ball Jr.

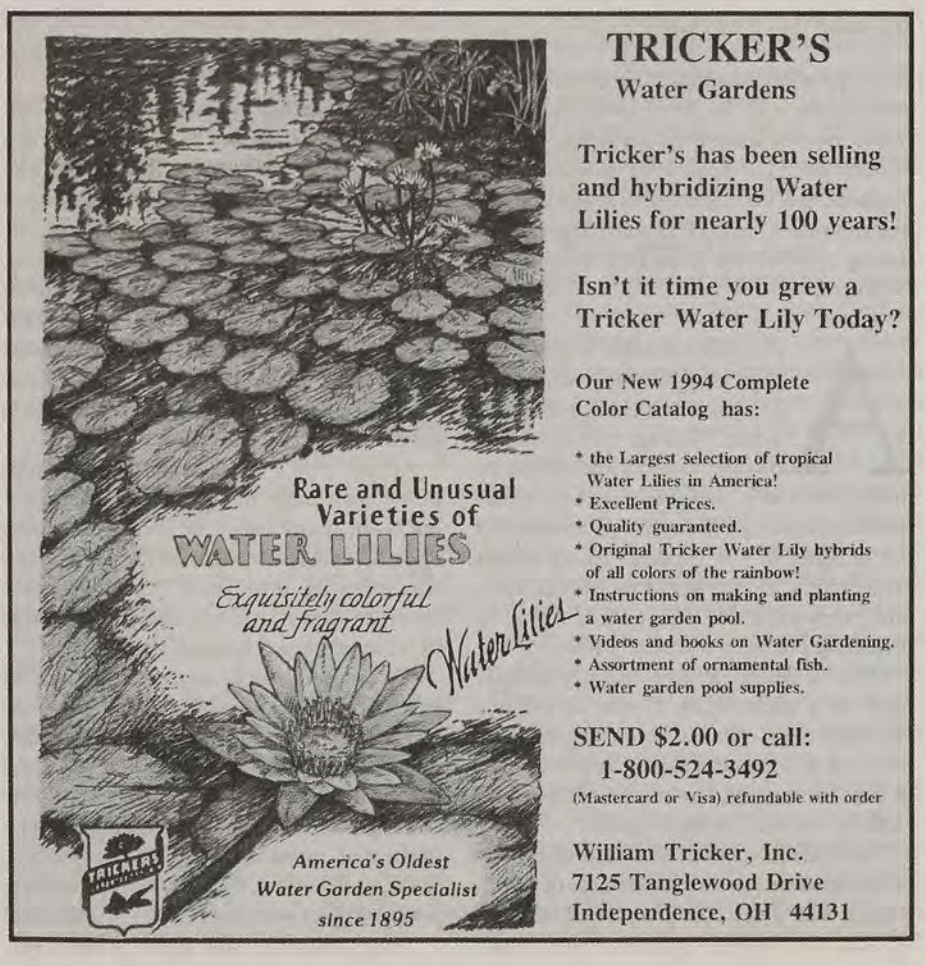
George C. Ball Jr., President and CEO, W. Atlee Burpee & Company, 300 Park Avenue, Warminster, PA 18974, (800) 888-1447, Fax: (215) 441-0647. *Ball will deliver this address on August 6 at the 1994 AHS-Montessori Foundation International Youth Gardening Symposium.*

In 1875 an 18-year-old Philadelphia man decided to share the results of his fancy poultry-breeding hobby with fellow fowl enthusiasts across the nation. Bear in mind that in these days poultry was fundamental to the American economy, especially to the home economy, which played a substantially greater role in the lives of people than it does today. Well over half the population lived and worked on farms, versus 1.8 percent today, and domesticated birds provided not only eggs and meat, but lessons in biology and social behavior. They also provided children with amusement. Many homeowners depended on breeders to produce diverse varieties of vigorous, disease-resistant and attractive fowl.

W. Atlee Burpee had already made his mark at the precocious age of 15, publishing articles in British journals. When American farmers requested him to supply vegetable seeds for their kitchen gardens, he turned his skills to the task of transforming old, European varieties into American vegetables and flowers for the unique soils, climates, and pests of our continent. To do this he applied the then little known laws of genetics formulated by Gregor Mendel, an Austrian monk. In 15 years the Burpee Seed Company was the largest in the world. America no longer needed to depend on European vegetables. This feat was as significant in the early 1900s as the discovery of oil was in the southwest United States in the 1930s.

W. Atlee Burpee was a surgeon's son. His innate curiosity was fostered by his family's love of science. However, it was his courage that enabled him to found the nation's first modern seed company, and thereby to increase its farming and gardening possibilities. The potential for such courage exists in every child. It is the job of a responsible family and community to create an atmosphere in which children can realize this vast potential. It is a responsibility that is shouldered increasingly by teachers in our present society.

Today, W. Atlee Burpee reaches the American child through three channels, in addition to sending our annual Burpee Gardens seed and plant catalog to their



parents. First, every winter we distribute our catalog directly to schools across the United States, where many teachers use it to supplement their teaching of biology. Second, we offer children's seedling kits, complete with trays, seeds, instructions, coloring sheets, and markers. These "Funseed" kits complement a line of "Funseed" packets that use playful images to help children remember the flowers' and vegetables' variety names—such as the Statue of Liberty for *Tithonia* 'Torch' and a rocket ship for 'Orange Rocket' carrot. Another unique teaching tool is Burpee's line of Spanish language packets, the only one in the United States. Each packet has translations that are sensitive to the dialects of Mexico, Puerto Rico, and Cuba.

For the older child we developed our new Burpee Gene Garden, which will be available for the winter of 1995. This is a kit with a tray, soil, and a packet of 300 seeds from a "mother" coleus plant, illustrated on the packet and in related literature. This mother plant, or seed parent, has been selected to produce seed that, when sown in the classroom, produces plants that display eight combinations of three distinct traits (color, color pattern, and leaf shape) in the precise Mendelian ratios of dominance and recessiveness. In this way the difficult subject of plant genetics can be taught and learned through a vivid, "hands-on" demonstration. After germinating and growing the plants to early maturity, the students sort them, record information about them, and analyze the results. After the classroom lesson, students take the plants home to their gardens.

This is an effective way to familiarize students with Mendel's laws of inheritance. Instead of listening to abstract discussion about hair and eye color, the student is engaged in a workshop observing clearly visible genetic traits.

All this from a packet of Burpee seed. Teachers need to add only a little water and a lot of encouragement.

Benefits Beyond Botany

By Julia W. Rappaport

Dr. Rappaport participated as a moderator and organizer of the 1993 symposium and serves on the Board of Directors of the American Horticultural Society. Dr. Rappaport is also serving as a key advisor and organizer for a 1995 AHS Youth Gardening Symposium to be held in southern California.

As children mature into adults, their relationship with plants and the earth changes in character. Young children are drawn to plants and insects by innate curiosity. Adolescents find excitment in learning the secrets of nature and the delights of the garden. Young adults find careers in the world of horticulture, and everyone finds beauty and value in including plants in their daily lives.

What a delight it was recently to look back at a time when I was teaching a one-year course in botany and gardening for sixth graders and to realize today that, in many instances, the course achieved results far beyond its stated goals.

The students spent the first semester doing lab experiments to learn the secrets of germination, water, air, soil, photosynthesis, etc. Because we were in California, they began their gardening in January by planting and tending an individual six by nine-foot garden just outside the classroom.

In May the highlight of the Annual Science Fair was the more than 60 garden plots, producing a colorful display of flowers, fruits, and vegetables. At the last open house before the end of the school year, the students organized a Garden Harvest Booth to sell their fresh produce. The project enabled the students to raise funds for science and sports equipment. The Harvest Booth also "produced" glowing smiles and a sense of pride on the faces of the young gardeners and their parents.

At the year's end, each student went home with bags and bags of garden produce—in many cases, entire plants, roots and all, were removed from the garden and transplanted into their home gardens. Summer school students enjoyed the fruits of what remained behind.

We learned much about the science of gardening. But the students also learned some things not in the planned curriculum. For instance, they learned about healthful nutrition and how really delicious is the taste of fresh fruit and vegetables. At the beginning of the year, recess snacks were mainly candy, cakes, and cookies. As the gardens matured, young veggies were harvested . . . and voila! . . . they actually tasted great! What a surprise! Soon the candy became scarce and we found the students on their hands and knees in the gardens "snacking" on their handgrown treats. Imagine that! A benefit beyond botany.

We talked about fertilizers and the needs of plants to grow sturdy and produce abundantly. We saw the results of adequate and inadequate fertilization in our own gardens. One day I overheard a conversation as these young minds began putting together plant needs and human nutrient needs and vowing to take proper care of their own bodies. Wow! What chapter in a health textbook could have inspired such scientific insight? The beginnings of longevity! A benefit beyond botany!

We learned the joys of growing living things and the disappointment when plants died or the rabbits got there first. One young student had a disastrous failure in much of her garden and evaluted herself harshly (students graded their own garden achievements) and many tears were shed. In midsummer, I answered a knock at my door to find her standing there with a zucchini about two feet long, fat as a watermelon, and the smile on her face and the sparkle in her eyes were brighter than the sun behind her. As she handed me the zucchini, I looked at her and her mother beside her, and we all burst into laugh-

ter...and tears. Did she just learn to grow a zucchini? No, she learned much more than that. Definitely a benefit beyond botany!

Many of these students were destined to have their own home gardens as they grew into adults. Several were destined to pursue careers in horticulture and obtain master's degrees. One was destined to become a graphic artist specializing in plant motifs. Many who would go on to careers in medicine, music, teaching, and other areas would continue to include plants and gardens as an important value in their lives.

How do I know this? Because today, many of our paths cross and we meet and reminisce. They talk of their remembrances and I recall their antics. It doesn't seem so long ago, but they are so grown up. With several is a young child or two who I am told has a little garden at home—something their parents remember as having been a very special experience for them in the sixth grade. For student and teacher, too. A benefit beyond botany!

GrowLab: Helping Young Minds Grow

By Tim Parsons

Tim Parsons, Director of Education and Eve Pranis, Associate Director of Education, National Gardening Association, 180 Flynn Avenue, Burlington, VT 05401, (802) 863-1308, Fax: (802) 863-5962.

Imagine growing vegetables and flowers through complete life cycles in the classroom, inspiring hands-on science investigations, environmental responsibility, and theme projects across the curriculum. GrowLab, which is run by the National Gardening Association (NGA) and funded by the National Science Foundation, is an indoor garden-based science program for elementary and middle school classrooms. This presentation at the 1993 symposium introduced participants to the GrowLab program and the resources that are available to help educators start one in their own schools.

The projects on this page and the next are excerpted from *Growing Ideas,* a bimonthly NGA publication for educators. *Growing Ideas* is filled with practical ideas and book, product, curricula, and information resources (including many for free or at minimal cost) for educators to use to implement plant and gardening projects in the classroom. *Growing Ideas* is available at no charge to any interested educator. To begin a subscription, contact the NGA.

Bulbs Across the Curriculum

Science Investigations/Questions:

✦ Experiment with different methods for chilling bulbs for forcing. Explore whether and how the length of "winter" affects the bulbs' growth and flowering. Discuss why some bulbs require this treatment. What does this tell us about their climatic adaptations? How do you think this adaptation promotes their survival?

✦ Compare growing bulbs in potting mix with and without bonemeal or bulb fertilizer.

✦ Discover the differences between bulbs (e.g., tulips) and corms (e.g., crocuses) by dissecting one of each.

✦ Dig up bulbs at different stages of being "chilled." Predict, then examine them to discover what occurs at different stages.

✦ Slice one bulb vertically and another one horizontally to compare their structure.

✦ Compare the growth and development of different size bulbs.

✦ Try raising amaryllis from both seeds and bulbs. Have students consider why bulblike structures are useful adaptations for reproduction.

Math Activities:

✦ Measure bulb plants' height and chart growth over time.

✦ Calculate growth rate in inches or centimeters per day.

✦ Compare the growth rates of different types or sizes of bulbs.

✦ Determine when to plant different types of bulbs if you want to have flowers on a certain date.

✦ Design and conduct a survey for parents, neighbors, and other teachers to learn about bulb-growing habits and preferences.

History/Geography Activities:

✦ Find out about the history of bulbs and trace their movement across the globe.

✦ Learn about the cultural, economic, and aesthetic roles bulbs play in Holland.

✦ Find out which bulblike plants are used as foods in different countries, then have a classroom bulb-tasting party.

Amaryllis: Tropical Treasures

Amaryllis, natives of the tropics, are dramatic, fast-growing bulbs with brilliant blooms bound to captivate your classes. Unlike bulbs from cool climates that require chilling, the amaryllis will bloom four to six weeks after planting with little care.

Plant amaryllis in moist potting mix with one-half to two-thirds of the bulb protruding above the soil. Since amaryllis thrive in cramped quarters, leave not more than one-half to one-inch of space between the bulb and container. Leave the pot in a warm, well-lit spot, and don't water it again until the first leaf or flower bud starts to grow. Then keep the soil moist. Since timing varies, this should provide some suspense for sharp-eyed classroom observers.

Flowers will usually appear in five or six weeks. When they appear, move the plant to a cooler, less lighted spot to lengthen the life of the flowers. The big amaryllis flower invites close exploration of its parts and of pollination, seed, and fruit produc-

tion. Like other lily family members, the flowers have six petals and six stamens surrounding a pistil. Have students observe the parts carefully to discover signs of the flower's readiness for pollination. (The three prongs of the pistil actually open upward when the flower can accept pollen.) Invite your class to "play the bees," using a cotton swab or paintbrush to transfer pollen from one flower to another. Following successful pollination, a swelling containing ovaries and then seeds will emerge at the base of the flower. It would take two to three years to grow a flowering plant from these seeds.

To make amaryllis bloom another year, cut off the withered flowers but leave the stalk and leaves. Leave the plant in a sunny window or GrowLab, and treat it as you would any house plant, watering and fertilizing regularly. Leaves require light, nutrients, and water to photosynthesize and produce food for another year of growth and flowering. The leaves will turn yellow and die in late summer or fall, signaling dormancy. Remove the leaves, stop watering and fertilizing, and store the pot in a cool basement until signs of new growth appear in the winter.

Corn Capers

During a unit on rainforests, Pat Murray's second graders in Westerville, Ohio, wondered about what happens when forests are cut for farming and the same food crops are grown on poor soil year after year. Their questions inspired an activity idea for their classroom GrowLab.

Using three-by-eight-inch containers with drainage holes, students planted 10 corn seeds in poor soil with only a thin layer of topsoil. They brainstormed how they would observe the plants' growth: by measuring how long it took the seeds to germinate and how long it took them to grow to five inches, by observing the quality of the leaves, and by recording how many actually germinated and grew.

Once the seedlings reached five inches, they were plucked from the ground and new corn seeds planted immediately. They made five successive plantings. "Just as the students had predicted, based on our readings," said Murray, "the number and quality of seeds that grew significantly diminished each time we replanted them.

"Although this was a loose simulation," she added, "the impact of doing and seeing it firsthand helped the kids understand the significance of 'overfarming' an area. It sparked a class discussion about how our simulation differed from real life, and about the lack of choices people in those areas may have."

Discover Life Lab Science: A Growing Adventure

By Kim Knorr

Kim Knorr, Life Lab Consultant, Life Lab Science Program, 1156 High Street, Santa Cruz, CA, (408) 459-2001, Fax: (408) 459-3483.

This presentation gave participants an overview of the Life Lab Science Program. At a Life Lab school you may find the following activities in progress: fourth graders proudly graphing the growth of their seedlings; fifth graders attentively observing and recording the temperatures of their compost pile; girls and boys preparing nutritious snacks from their garden beds; and much more.

In spring 1979, the first Life Lab project emerged when children planted the seeds that transformed a school's dirt parking lot in Santa Cruz, California, into a thriving garden laboratory. This school, like many elementary schools at that time, had little science instruction. However, more than flowers and vegetables grew there. Soon both students and teachers were asking questions and discovering the world of science around them. Since then, Life Lab has blossomed in more than 700 schools around the country. From Alaska to Florida, in urban to rural settings, more than 2,000 creative teachers teach science using Life Lab curricula and staff development opportunities.

Here is an example of a fun educational activity from Life Lab's curriculum guidebook, *The Growing Classroom:*

Zip Code Seeds

Description: Students will choose a variety of seeds to order from catalogs based on climate, food, and aesthetic preferences.

Objective: To learn to apply knowledge of climate, plant varieties, consumer preferences, and the ability to estimate quantities in compiling seed orders.

Teacher Background: It is less expensive to purchase seeds directly from seed companies and it is fun for students to look through beautiful seed catalogs. Order a variety of catalogs to include popular varieties as well as specialty seeds that grow well in your particular climate. Order catalogs from companies that sell both hybrid seeds and open-pollinated seeds.

Materials Needed: A variety of seed catalogs for groups of three; one Seed Ordering Chart and Companion Planting Guide (both included in the back of the guidebook); and a list of recommended vegetables and flowers for your area (contact your county's Agricultural Extension Service for help in compiling this list).

Preparation: Order and obtain catalogs at least six weeks in advance. (The Life Lab guidebook includes names and addresses of various seed companies.)

Class Discussion: How shall we choose

what to grow in our garden? What flowers and vegetables grow best here? (Consult the list from Agricultural Extension or develop your own list by comparing annual rainfall, average temperatures, type of soil, number of frost-free days, and amount of direct sun exposure with the needs recommended in seed catalogs and seed packets.) What vegetables do you like to eat? Which plants are companions to those we have listed? Why are there so many varieties of one vegetable or flower? Should we grow and save some seeds for next year's garden? If so, which seeds shall we grow? The ones we choose must be open-pollinated seeds. Why? What do you think will be the easiest to grow? Fun? Challenging? Do we want to try a variety of edible root/stem/leaf/flower/fruit/seed plants?

Action: 1) Divide the class into groups of three students.

2) Give each group a copy of the Seed Ordering Chart. Instruct them to fill in the specific characteristics with the answers from the class discussion. Using these characteristics, ask each group to go through their catalog and compile their own list of seeds to grow. Encourage each group to use different criteria, such as variety, cost, hybrid and nonhybrid.

3) As a class, compile one master list of seeds to be ordered and indicate the particular catalog to be used.

4) Ask the students in their small groups to fill out an order blank for their seed company. Obtain a check or money order and mail to the company. Allow sufficient time for the seeds to arrive.

More: 1) Have students make a class collage by cutting pictures out of seed catalogs. Divide the collage by plant parts that you can eat.

2) See the activity on plant varieties, "What's in a Name?"

3) Have students keep a record of planting dates and days to maturity of plants in the garden and compare this information to that listed in the catalogs and seed packages.

4) Have a speaker who knows about seeds, such as someone from a seed company or a gardener who grows his or her own seeds, come and talk to the class.

5) Visit a nearby seed company's greenhouses, garden plots, or trial grounds.

Let Your Students Know: Horticulture is a Great Career Choice

By Lois Berg Stack

Dr. Lois Berg Stack, Associate Professor, Landscape Horticulture, Department of Plant, Soil, and Environmental Sciences, University of Maine, 5722 Deering Hall, Orona, ME 04469-5722, (207) 581-2949, Fax: (207) 581-2999. *Lecture delivered at the 1993 symposium.*

Horticulture is familiar to everyone, yet difficult to define. A dictionary definition such as "the science and art of growing fruits, vegetables and ornamental plants" sells horticulture short. Yet a longer and more descriptive definition becomes academic, dry, and confusing.

What is horticulture? Look around your school. Horticulture is:

✦ A process. The horticultural process surrounds your school, where the lawns, trees and shrubs, and athletic fields are planted and maintained.

✦ A product. Horticultural products are offered each day in the school cafeteria: apple cider, green beans, grapes, orange juice, broccoli, cherry pie, potatoes, herbal tea, parsley, onions, peanut butter and jelly, and many other foods.

✦ A discipline to be studied. You may have studied some horticulture to learn how to grow seedlings for students' classroom experiments, develop the school's community garden, and take care of the plants that make the classroom a productive learning environment.

✦ A tool to be used in studying other disciplines. More and more teachers use horticulture as a tool to teach reading, cooperation, group skills, dexterity, mathematics, chemistry, and botany.

Horticulture is one more thing for many people. It is an avocation. Gardening is second only to television viewing as the most popular leisure activity in the United States. Nearly everyone plants a vegetable garden, mows a lawn, cares for a fruit tree, or has a house plant. Because students see horticulture as a hobby that their families practice on weekends, they may not realize that it can be a very rewarding career, too.

Students begin to explore career directions in middle school. They are often inspired by conversations with parents and siblings, and by observations of teachers and other adults, either in person or through television and movies. They begin to identify with careers like "doctor," "teacher," "professional athlete," and "newscaster." As time passes, they fine-tune their career goals through input from friends, personal thoughts, and more observations. By late high school, they try to connect their career goals with the training

required to achieve those goals. They may discard a career goal for lack of information. As a teacher, you can play an important role in helping your students investigate career choices realistically.

For some of your students, horticulture may be a good career choice. Professional horticulturists vary greatly in their training and day-to-day activities, but they all have one thing in common: a love of plants. When you use horticulture in the classroom, watch students' enthusiasm. Those who enjoy working with plants may be able to combine their love of plants with other interests and skills. They can work toward a rewarding career, whether they plan to enter the work force immediately after high school, or pursue training at a technical college or university.

Here are some of the many horticultural careers available to students:

✦ Directly out of high school, young people may work in production facilities like nurseries, orchards, and greenhouses. With some experience, they may become crew managers, or choose to start their own businesses. Many find that a few years of experience in the industry makes them want to study horticulture formally, in order to move into more skilled positions.

✦ Technical college provides basic training in production and management. Graduates often enter positions like assistant golf course superintendent, landscape crew manager, and greenhouse grower. After a few years of experience, they begin to move into managerial positions. The combination of good technical training plus experience plus a desire to succeed have produced some of our most successful horticultural professionals.

✦ A four-year university program trains students in the theories behind horticulture and provides a broader view of the world. Many university-trained horticulturists specialize in a certain area of plant production, such as high-technology orchard production or large nursery management. Others combine horticulture with business management and eventually own very large businesses. (Consider the business opportunities in a country where 80 percent of all households garden!) Still others combine horticulture with another discipline such as entomology or plant pathology, and help producers solve pest problems through an environmentally conscious approach. And others prepare for graduate work by studying more basic sciences like microbiology, plant physiology, and genetics.

✦ Students who pursue advanced degrees often find creative and exciting positions researching new ideas, solving problems, and teaching new ideas to others. These people might combine horticulture with genetics and plant breeding, and work toward improving the food value of a particular crop. Or they might combine horticulture with entomology, and work toward a solution of problems like gypsy moth or Mediterranean fruit fly. They might combine their knowledge of horticulture with computing skills and engineering, and create software programs and robotics to automatically manage greenhouse environments. Or they might investigate how to reduce the need for fertilizers by combining their knowledge of horticulture with an understanding of plant nutrition and soil chemistry.

✦ At all levels of training, horticulture can be combined with almost any other discipline. Horticulturists with special skills write books, design historic landscapes, grow and sell cut flowers, work in botanic gardens and arboreta, teach in high schools and colleges, consult with growers, breed new plants, and produce hydroponic vegetables.

All of these careers are rewarding, but the satisfaction level is highest when the challenge is greatest. Horticultural researchers develop crops that control erosion and require less synthetic fertilizers and other chemicals, breed food crops with higher yields to feed the world's people, find methods to extract chemicals from plants to cure diseases, develop crops that can be grown profitably on existing farmlands without threatening natural ecosystems, and work toward a greater understanding of life, natural history, and the relationships between plants and animals. These challenges require bright, dedicated, well-trained scientists.

As a high school teacher, you can help students explore horticulture as a career option. There are more resources available to you today than ever before. Many companies supply excellent classroom materials, suggestions for experiments, and technical assistance. The American Horticultural Society can help you get started through national meetings about using

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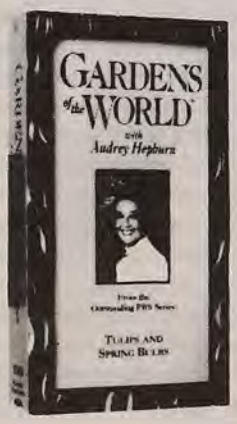

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horticulture in the classroom and lists of resources. The American Society for Horticultural Science (113 South West Street, Alexandria, VA 22314-2824, [703] 836-4606, Fax: [703] 836-2024) can provide a video about careers in horticulture, and connections to researchers at your land grant university. Local botanic gardens, arboreta, and County Extension offices teach courses and provide technical assistance. Garden centers, greenhouses, nurseries, and other horticultural businesses are very generous in providing classroom assistance and are generally happy to host tours of students.

Horticulture is a very effective tool for teaching other skills and disciplines. It should be put to use in every classroom. But remember that horticulture has an identity beyond its usefulness as a teaching tool. Help your students discover that gardening is a wonderful hobby, but horticulture is a great career.

Workshops

The Discovery School: An Environment in Which Children, Plants and Animals Grow

Janice Hanscom, 4-H Leader, and Felicia Leipzig, Teacher, Denali Elementary School, P.O. Box 72832, Fairbanks, AK 99797, (907) 474-5222.

Denali Elementary, a science and math magnet school in Fairbanks, Alaska, has implemented a broad-based environmental education program in which a school-yard garden serves as the cornerstone. Denali's efforts have been supported by the LifeLab and the RJR Nabisco Next Century Schools programs as well as by other grants.

This session described gardening activities and methods developed to cope with a short-season climate. Since students are only able to garden four to five weeks of the school year, the growing season was extended by integrating a summer 4-H program into the school curriculum.

The session also focused on how to get funding or donations to support indoor and outdoor gardening programs.

From Seed to Sprout! Developing Hands-on Curriculum Materials in the Plant Sciences

Sally Isaacson, Assistant Director of Education, Santa Barbara Botanic Garden, 1212 Mission Canyon Road, Santa Barbara, CA 93105, (805) 682-4726, Fax: (805) 563-0352.

In the last three years, the Santa Barbara Botanic Garden staff developed four teachers' resource guides with hands-on activities for children, a discovery guide for use on the garden grounds, and four new outreach programs. Presenters described the nuts and bolts of how to implement the guide book programs, as well as how to learn from the successes and failures of such a program.

Tree-mendous Programs for Schools and Beyond

Mindy Maslin, Tree Education Specialist, Pennsylvania Horticultural Society, 325 Walnut Street, Philadelphia, PA 19106, (215) 625-8280.

This session described three educational tree programs: Educational Games, the Youth Tree Corps, and Tree Farms. Educational Games include "Environmental Jeopardy" and "Tree-mendous Feats." Both games involve getting students to interact and teach each other about the importance of trees in the environment. Game instructions were distributed.

The Youth Tree Corps program teaches children the value of trees, how to care for them, and how to teach others to care for them. Through the Tree Farms program, small nurseries are set up on school property. Students plant the trees and maintain them during the school year and community members care for them during the summer. The nurseries serve as a teaching tool and source of trees for the school and community. Comprehensive materials detailing how to replicate these programs were provided.

Developing Plant Awareness Curriculum

Janice Morrison, Education Department Manager, Massachusetts Horticultural Society, 300 Massachusetts Avenue, Boston, MA 02115, (617) 536-9280.

This presentation introduced the programming tactics and curriculum innovations that the Massachusetts Horticultural Society has developed to increase plant science awareness. Generally, a contemporary horticultural education theme/issue is introduced at the New England Spring Flower Show each year and further explored through various outreach programs that focus on plant science. MHS curricula was designed to travel to classrooms and reach students who may not have gardens, parks, or forested areas surrounding them.

The Garden Earth Program

Maureen O'Brien, Program Specialist, State Botanical Garden of Georgia, 2450 South Milledge Avenue, Athens, GA 30605-1624, (706) 542-6156.

O'Brien described the pilot school in Garden Earth, a new K-5 environmental education program focusing on exploration of the school site. In this comprehensive program, students, teachers, and community members help plan and build a landscape appropriate to their own school site, transforming it into a thriving outdoor learning environment.

The Aquatic Environment—Using A Water Feature For Teaching

Philip Swindells, Principal, Philip Swindells Associates, 28 Albert Street, Harrogate, North Yorkshire, United Kingdom, HG1 1JT, 0423-568081, Fax: 0423-568080.

The aquatic environment, whether natural or man-made, provides a great opportunity for teaching natural history. Ideas

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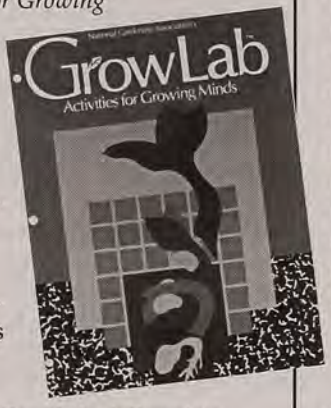

For free information on this and other resources including: *GrowLab: A Complete Guide to Gardening in the Classroom, Growing Ideas* newsletter, classroom posters and videos, contact:

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for such educational applications were based on a project of the design firm of Philip Swindells Associates, in collaboration with a panel of educators and funded by the British Government's Countryside Commission. The project used the resources of an old water feature on the grounds of Wentworth Castle, which is now a school. The panel produced a cross-curriculum program and teaching materials that, while being of specific value to the site, could be used at other schools having access to natural or man-made bodies of water.

School Learning Habitats: A View From the National Wildlife Federation

Craig Tufts, Chief Naturalist and Manager, Backyard Wildlife Habitat Programs, 1400 16th Street N.W., Washington, DC 20036, (703) 790-4438.

Tufts presented an overview of how schools are implementing learning habitat projects in a variety of educational formats throughout the United States. He described the National Wildlife Federation's (NWF) school habitat certification program as well as other national and regional efforts supporting this rapidly growing use of the school landscape.

For over 20 years, the NWF has encouraged schools to set aside part of their campus for use as a school habitat area. Generally patterned after NWF's Backyard Wildlife Habitats—small, primarily residential properties landscaped to attract wildlife—school habitats come in many types and sizes. They can range from small, urban gardens for birds to much larger natural or restored areas. Most important, the schools that have developed and maintained these alternative landscapes provide a significant additional learning area for students, teachers, and other members of the community.

Urban Reforestation and Environmental Education with Children

Mary K. White, Lisa Muentener, and Jean Shadow, Children's Education Coordinators, Isles, Inc., 126 North Montgomery Street, Trenton, NJ 08608, (609) 393-7153.

This session described Isles' urban environmental education efforts over the last 12 years, including its latest initiative, the Trenton Neighborhood Tree Project at Thomas Jefferson Elementary School. The presenters described how the goals of this reforestation program have been achieved and how it can be replicated in other urban areas throughout the United States.

A Landscaper's Plea for Less Design

Mark Francis, Professor of Landscape Architecture, University of California-Davis, Department of Environmental Design, Davis, CA 95616-8585, (916) 752-6031. Francis delivered this keynote address at the 1993 symposium.

Mark Francis knows the world has changed a lot since he was a child. A landscape architecture professor at the University of California-Davis, he recalls the response of a nine- or 10-year-old girl asked to describe the ideal outdoor environment. "She described a curly slide that would come off a very high hill, come down through a waterfall, and finally arrive in a pond. It was wonderful image of a place. I was ready to start drawing. But then I asked, 'What would you do if you fell off?' And she said without hesitation, 'I would sue you.'"

Our society is not only litigious, but crime ridden, and today's parents have some very realistic fears for their children, Francis concedes. But he believes that the way they have responded—he admits that his own children are on the day care-soccer game-violin lesson-Nintendo game merry-go-round—may have some very real costs. "We are denying children their basic right to childhood—overdesigning, overcontrolling, and overstructuring their lives." If you look out the window of the nearest school building, he said, "you will see something not that different from a prison yard."

Francis repeatedly urged the children's symposium audience to extend their concern beyond the home and school garden and into the larger community and to consider ways children can be given unstructured experiences with nature as part of their daily lives. He often uses a process he calls an environmental biography—asking people to recall feelings, smells, and sounds connected with a favorite childhood haunt—to begin his university classes, and he urged other teachers to do the same with their students. "Most people remember a mucky pond, a patch of woods, or an undeveloped lot." But lately, he has been alarmed to notice natural places disappearing from these memories. He quoted the assertion of author Richard Love that natural places are important for creating a world separate from that of parents. "Unlike television, nature does not steal time, but augments and enriches time," Love wrote in his book *Childhood's Future.*

Francis said his own profession adds to the problem by overdesigning spaces. "We're careful to rush in to fill up all the available space. Disneyland—and I've taken my own children there—is such a structured experience, because nature is completely controlled." Even "nature walks" sometimes put nature on the other side of a fence—"something to look at but not touch, especially for children."

Francis is concerned with the gap between what children seem to know about the global environment and their own firsthand experiences with nature. They don't grieve personally for the things they might have found in the mucky ponds they have been denied by our squeaky-clean suburbs. "If we put our children in boring and insignificant places, they're not going to be advocates for natural spaces when they grow up."

There are scattered exceptions to the bleak picture Francis painted. He offered a wide range of examples, from throughout the world, of natural spaces and "adventure playgrounds" that offer children privacy, empowerment, fantasy, and restorative experiences.

In a five-acre housing project near Seattle, the area outside the front door is designed not as an adornment to the building, but as a "kid habitat." About an acre of the grounds has been left as a woodland play area.

In Denmark, where you can receive formal education as a playground leader, an area is set aside for children to build houses out of scrap lumber.

In inner-city London, Gillespie Park has been left wild, except for a mowed interior for impromptu sports. "The youngsters I followed into the park joined a soccer game. That lasted all of 10 minutes, and then they went to an adjacent pond."

In Boulder, Colorado, a park consists of only sand and rocks. One big rock is used as a slide "in about eight different ways, instead of only one."

In the Village Homes development in Davis, foot and bike paths were created before the roads, so it's easier to walk or pedal than to drive. Children's favorite places there included a clover patch, a willow pond, and a scrap-lumber fort.

Landscape architects, Francis said, are always asked to include play structures in developments, "not for the children, but for the parents. Get out your catalog and order them, and then put your energy into the natural environment." Francis said it is only a theory he hopes will never be tested, but he believes there is less liability for builders in a natural play environment than an artificial one. "There is a sense that climbing a tree involves a certain amount of risk."

A round of applause showed that Francis had clearly struck a sympathetic chord with his audience when he quoted Lady Allen of Hertwood, an advocate of adventure playgrounds in London. Asked if she wasn't worried about children injuring themselves, she responded: "Better a broken arm than a broken spirit."

Reproduced from the November 1993 American Horticulturist.

A Miracle Place

By Sharon Lovejoy

Sharon Lovejoy, Heart's Ease Herb Shop and Gardens, Cambria, California, (800) 266-4372. Lovejoy was a keynote speaker at the 1993 AHS children's symposium and will also be a keynote speaker at the 1994 AHS-Montessori Youth Gardening Symposium August 6. She is author and illustrator of two gardening books for children, Sunflower Houses *and* Hollyhock Days *(Interweave Press).*

I asked the group of grammar school children, "What kind of a garden shall I plant in the parking lot next door?" Dozens of hands went up, voices yelled ideas, and as I scanned the group, one little boy smiled and said, "A miracle place."

That was the simple answer. Take one 22 by 90-foot parking lot and make a "miracle place." Believe it or not, the task didn't seem insurmountable. After all, every garden, no matter how small, is a miracle of astounding proportions.

The first priority for my husband and me was to create a special haven for garden critters. Water for frogs, hide-outs for toads, bat houses and bird houses, bird baths, butterfly shelter houses, butterfly feeders, pheromone dispensers to attract beneficial insects, baskets of nesting materials for the birds.

We decided to make our garden totally handicapped accessible. Wide, decomposed granite paths give wheelchairs and walkers easy maneuvering. We raised the beds a bit so plants could be easily touched and to further facilitate sensory participation, we planned a series of minigardens in large terra cotta planters.

Inspired by Susan Betz, an herbalist in Michigan, and Anna Sonmore of the Children's Museum in Minneapolis, I planted five pots, labeled "touch," "taste," "smell," "sight," and "sound." The "touch" pot contains aloe vera, fringed wormwood, woolly lamb's-ear, and a variety of textured sedums. "Taste" features chocolate mint, salad burnet, sorrel, and other piquant plants. "Smell" hosts peppermint, prostrate rue, lemon verbena, and fragrant herbs. The "sight" pot constantly changes as flowers flaunt their colors in quick succession. "Sound" is always amusing. Adults just don't seem to get it . . . I often see them shaking stalks of salvia or agastache expecting to hear bells or whistles. Kids seem to know that if they just sit quietly, eyes closed, they will hear the comings and goings of rumbling bumblebees, hummingbird's wings, the papery rustling of butterflies, or the snap of a jumping grasshopper.

Other large pots or barrels feature curiosities such as the much loved Harry Lauder's walking stick tree, broom corn, pumpkins, bayberry, mini-sunflowers, gourds, walking stick cabbage, a rainbow of potatoes, mini-Seneca Indian corn, a giant saucer of thymes for a sundial garden, and chicken-wire animal topiaries covered with polyanthum jasmine. Containers are versatile and just the right height for wheelchair touching.

Hide-outs and secret places are a necessity for kids. Just like us, they need a place where they can go and just be themselves without anyone looking over their shoulders. I use various methods to form hide-outs. The tried and true tepee is a sure winner. The tepee can be planted with gourds, scarlet runner beans, and mini-pumpkins. One that recently trialed in my friend Agatha Youngblood's garden was a magical moon teepee, draped in moon vines, carpeted in chamomile and banked with white nicotiana and petunias—a perfect place to spend an evening watching bats and giant nectar-feeding moths.

The caterpillar cave is an environmental concept I designed for my new book *Hollyhock Days.* I wanted kids to be totally surrounded by butterflies, caterpillars, and chrysalises. My husband and I constructed a tunnel out of posts, used a beam across the top, and lashed it all together. I then planted larval host plants and butterfly plants all around the shelter, leaving room for an entry door. It is possible to sit or lie in the cave and become a part of some of nature's most magical mysteries.

Water is a must in a children's garden. I wanted a pond, but couldn't afford the construction and worried about safety.

So I opted for an over-sized half wine barrel. I filled it with mosquito fish and fascinating plants, everything from floating four-leaf clovers to dwarf papyrus, water iris, cannas, striped rush, fairy moss, and grasses. The incredible thing is that my water barrel pond is totally self-sufficient and maintains a healthy water ecosystem.

My raised beds play host to a seasonal procession of plants for kids. Last year the bounty included spaghetti squash, giant pumpkins, strawberry popcorn, Indian corn, artichokes, and 'Pink Panda' strawberries. This year my beds are devoted to the garden's winged visitors. One bed is full of beneficial bug host plants. Another is a mix of perennials to entice and feed butterflies. Hummingbirds are the star of the third, with a thick minifield of their favorite floriferous foods. I couldn't bear to uproot the artichokes in the fourth bed. Their huge thistle blooms are a favorite of the butterflies and bumblebees and their unopened blooms are one of my favorite foods. And now under their leafy umbrellas nestle 'Pink Panda' strawberries so tasty that they seldom make it to maturity—the kids head right for the *fraises des bois,* 'Pink Panda', and blackberries.

The circular bed in the center of the garden sports a giant birdhouse and a chicken-wire topiary of my son Noah wearing one of his favorite caps. Surrounding Noah are small rosemary topiaries of chickens, ducks, and geese. Noah loves cosmos, as do the butterflies and later the goldfinches, so I always seed out different varieties around his green feet.

There are no boring, long, straight rows, and you won't find a "Do Not Touch" sign anywhere. Instead, there is a feeling of playfulness and joy and a welcome invitation to partake in all of the pleasures the garden offers.

Workshops

A Garden Play Area for the Students and Neighbors of an Independent School in Harlem

Josephine Bush, Landscape Designer, 2 Sutton Place South, New York, NY 10022, (212) 751-1191, Fax: (212) 751-8564.

A slide show illustrated how the landscape design process solved a serious drainage problem in the back yard of an independent school in Harlem and created a lush green/play area for small children. The design process also revealed the needs of the entire block for recreational green space, and attempted to meet those needs.

Contributing to the success and affordability of this project were a small grant from the State Council for the Arts for design; advice and permissions from city agencies; cooperation from the neighbors and the Catholic Church; help from school students, parents, faculty and friends; and a generous, capable contractor.

Schoolyard Ecosystems: A Guide for Planning, Installing, Maintaining, and Using

Dan Donelin, Professor of Landscape Architecture, University of Florida, Department of Landscape Architecture, 334 ARCH, Gainesville, FL 32611-2004, (904) 392-6098, Fax: (904) 392-7266.

This presentation showed teachers and students creating a Florida elementary school landscape to be used to teach environmental science and math concepts. Designing and building the garden let students and teachers learn about management of natural resources, land use, drawing site plans to reflect the design intent, and installation of a planting design. A workbook, "Schoolyard Ecosystems, A Guide to Planning, Installing, Maintaining, and Using" is available.

Professional Design for Children's Learning Gardens

Stephen R. Drown, Associate Professor of Landscape Architecture, Ohio State University, 190 West 17th Avenue, Brown Hall, Columbus, OH 43210, (614) 292-8322.

Drown presented design ideas for a garden based on the theories of how children best learn. He suggested designs to change children's awareness about themselves. He suggested ways to use learning gardens to enhance children's sense of personal worth; to improve their relationships with other human beings; and to bond their relationship to environmental cycles and systems. He explored:

- ✦ Learning as a directed experience—developing the gardening space to facilitate the teacher/student relationship.
- ✦ Learning as a physical activity—the garden space must have a high tactile quality and consideration must be given to skill, development, and age levels in an effort to maximize self-generated interaction.
- ✦ Learning as a passive experience—the space itself has the ability to teach.
- ✦ Learning as orientation—the need to create "place."
- ✦ The specifics of learning style—knowing more about how children learn will create stronger design criteria for the learning garden. Research at Harvard University conducted primarily by Howard Gardner suggests that there are several intelligences used in the learning process: spatial, kinesthetic, musical, interpersonal, intrapersonal, linguistic, and logical-mathematical.

Drown demonstrated how these ideas can be put into practice by reviewing plans for the new Learning Garden at the Cleveland Garden Center and a children's learning garden at the Ohio State University's Chadwick Arboretum.

Designing for Learning Outdoors

Lynn Morton, Partner and Landscape Designer, Eryl Morton Gardens, 1883 Hillcrest Avenue, Victoria, BC V8N 2R7 Canada, (604) 477-0133.

This session focused on the importance of landscape design for school grounds and how it can support and enrich the academic curriculum and the personal development of children. It emphasized the relevance of nature and plant life as a critical element and resource for learning, and presented practical examples of landscape designs that can be successfully replicated at most school sites.

Storybook Models and Other Ideas for Designing Children's Gardens

Herbert R. Schaal, Principal and FASLA, EDAW Inc., 240 East Mountain Avenue, Fort Collins, CO 80524, (303) 484-6073.

This presentation covered fundamentals of successful garden designs for children. These fundamentals include scaling down the spaces and elements; lowering focal points to children's eye level; creating learning environments that use all five senses and allow the use of the "multiple intelligences" (See Stephen Drown, this page); providing for universal accessibility; creating spaces and features that stimulate curiosity, imagination, discovery, adventure, and play and provide symbols and caricatures that children identify as their own; and using bright colors, fine textures, and light.

Other key design considerations include spaces to celebrate holidays and special events like Earth Day and Arbor Day; mazes and game parterres; topiary and storybook topiary characters; and horticultural contest and experimental plots.

School Wildlife Habitat Gardens for Teaching

H. Kibbe Turner, President, Wildlife Habitats, 420 East Diamond Avenue, Gaithersburg, MD 20877, (301) 670-1366, Fax: (301) 258-9544.

A 10-minute video showed seventh-grade students planning and building the Discovery Pond Garden at River Farm under Turner's direction. The students, of Carl Sandburg Elementary School in Alexandria, Virginia, produced the video.

Turner used slides to describe the value of school gardens for young people, and how they can best be used for community outreach programs, especially for intergenerational communication between students, teachers, parents, and senior citizens.

In a Child's Garden . . . Imagination Grows

By Jane Taylor

Jane Taylor, Curator, Michigan 4-H Children's Garden, Michigan 4-H Foundation, 4700 South Hagadorn Road, Suite 220, East Lansing, MI 48823, (517) 353-6692. Taylor, adjunct faculty in the Department of Horticulture at Michigan State University, delivered this keynote lecture at the August 1993 symposium.

Can we go now?" "More trees again?" How many times have you heard these comments and more, as children tagging along with their families tour a public garden? How would you like to hear, "This is *my* garden," "No, I'm not ready to go yet!" "Can we come back tomorrow?" "I just *love* this place!" This is what we hear every day, and what you too can hear if you construct a garden just for children.

One thing I do when I visit a public garden is to take a random count of the visitors I see to determine the number bringing children and those visiting without children. From my observations (unscientific as they may be), about 50 percent of visitors to public gardens (at least the ones I visit) visit with tag-along kids. They may come with parents, grandparents, or a group. But they are there in the adults' garden. The features are not to their scale, the labels are not for them—so plants must not be important in their daily lives. It is once again little kids in an adult place. The child feels no ownership.

When the new seven-and-a-half-acre Horticultural Demonstration Gardens on the Michigan State University (MSU) campus was being designed, we requested a piece of land to build a special garden for our young visitors. Our mission is: To promote an understanding of plants and the role they play in our environment and our daily lives; to nurture the wonder in a child's imagination and curiosity; and to provide a place for the enrichment and delight of children.

Our half-acre-plus garden was designed with the wants and needs of children in mind. In fact, kids had a say in what they wanted to see in the garden. Children enrolled in the MSU Laboratory School at two locations were asked what plants and features they wished to see when they came to visit. The results of the research were fascinating. They suggested plants from Peter Rabbit stories, flowers in a rainbow of colors, a tree house, a beanstalk for Jack to climb, lots of vegetables, dinosaurs, and a place to watch butterflies. Their wishes are granted and their suggestions make up the nearly 60 theme gardens within the 4-H Children's Garden.

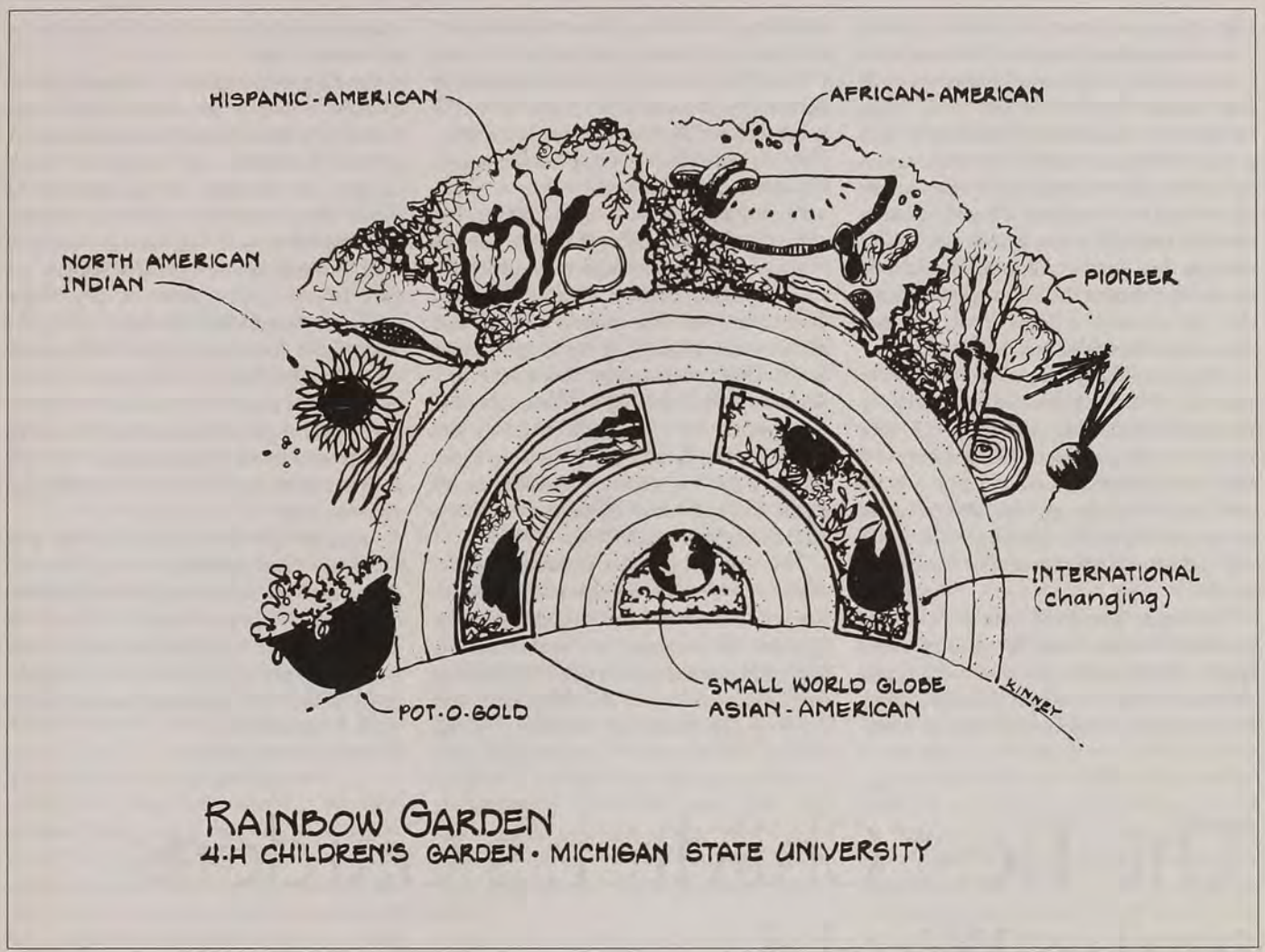
The themes include an ABC kindergarten where children learn the alphabet from aster to zinnia, a crayon color garden featuring colorful plants with crayon names, a sunburst-sunflower entrance with topiary bears and plants with animal names. The popular dinosaur garden includes a topiary stegosaurus surrounded by ferns and scouring rushes. Kids may crawl in a dino rib-cage covered with dinosaur gourd vines and can do a plant fossil dig in the sand pit. The rock garden features rocks indigenous to Michigan. Here the rocks are the focus and the plants the background.

An amphitheater and demonstration plaza holds 88 children for special activities. This also includes a compost display area. Adjacent to the house is a kitchen garden display complete with sink and counter-top for demonstrations. This faces the creation station—a place with tables and seating for 24, for small group hands-on demonstrations. Bordering this area is the Health for Better Living garden, Health representing the fourth H of the 4-H's. (The others are Head, Heart, and Hands.) The vegetables on display are those listed by the Department of Agriculture as the top 10 most nutritious and best for you to eat.

A giant rainbow painted on the sidewalk sets the stage for the six rainbow gardens that represent the cultural groups that introduced so many wonderful foods to America. These include an African-American garden, an Hispanic-American Garden, a North American Indian Garden, A Pioneer American Garden, and an International Garden. This last is a display that changes themes annually. (An Italian vegetable theme is featured for 1994.) A giant pot-of-gold sits at the end of the rainbow. While the concrete was wet, iron pyrite nuggets were set in place around the pot, and in the sunlight they glitter like a real pot-of-gold. (A design for the rainbow garden is on page 25.)

The children requested no "NO" signs in the garden. There are none. The signs say "please gently touch." The "sense-ational" herb garden, the cloth and color garden, the enchanted garden, the perfume garden, the performing plants garden, the pharmacy garden, the pizza garden, the Peter Rabbit garden, and the butterfly garden—all are to touch and sniff. The science discovery garden showcases new plant cultivars released by MSU faculty scientists or some plants that are being grown for use in experiments. These plants demonstrate what scientists on the campus do!

Water is a popular feature and the water garden is spanned by a replica of Monet's bridge. Two jumping jet rainbow fountains provide giant spurts of water. The magic bubble fountains are low enough so young children may touch them. The merry-go-round spitting frog fountains are a favorite. Children hang on to a swinging gate and as it rotates, it operates the pump that causes two bronze frogs in the pond to spit water. A floating *Continued on page 26*



MSU RAINBOW GARDEN

The Rainbow Garden, part of the Michigan State University 4-H Children's Gardens, consists of a series of six theme areas all related to the cultural diversity of our food crops. The center bed of the rainbow features a large metal sculptured globe. The raised continents make it easy to point out to children "Where in the world our food comes from." This raised bed is planted with 'Small World' zinnias. The huge cast iron Pot of Gold at the end of the rainbow is filled with 'Gold Nugget' marigolds. Iron pyrite nuggets, impressed in the cement while it was wet, glitter in the sunlight.

Some of the plants growing in the sections of the Rainbow Garden include plants either native to the country or introduced to North America by immigrants.

African-American

Geraniums (along the border), cucumber-gherkin, peanuts, sesame, okra, black-eyed peas, collards, watermelon.

Asian-American

Pac choi (Chinese cabbage), yard-long beans, red mustard, chrysanthemums.

Hispanic-American

Petunias (around the border), Mexican black beans, corn, tomatillos, peppers, cilantro, tithonia, blue potatoes, tomatoes.

International Garden

The International Garden changes annually. In 1994 it has an Italian theme and includes Italian basil, broccoli di rapa, Florence fennel, eggplant 'Violetta di Firenze', tomato 'Roma', cucuzzi, red chicory.

North American Indian

Pumpkin 'Connecticut Field', beans, corn, popcorn, Jerusalem artichokes, tobacco, sweet grass, sunflowers.

Pioneer Garden

Beans—'Scarlet Runner' and several pole beans for the bean-pole tepee—cabbage, beets, lettuce, onions, old-fashioned flowers.

bog box in the water is home to several insect-eating plants found in Michigan bogs.

Plants found in our morning cereal bowl and plants that provide our milk, meat, and wool are on display. Time may be told at the walk-in sundial. As the child raises his or her right arm, the shadow cast on the hour block tells the time. Flowers demonstrating biorhythm are grown here. Kids can get lost in the Alice-in-Wonderland maze that leads to the secret garden. After they exit through a floral arbor, they can play a tune on the dance chimes.

One side of the garden is bordered by the railroad. When a train comes roaring by the noise is deafening. However, kids love to wave at the engineers. We incorporated trains at each end of the garden. A train with two G-gauge garden trains winds around an alpine landscape. At the other end there is a large play engine for kids to climb.

The entire garden is accessible to the disabled. The tree house has a ramp and a special child's garden demonstrates raised bed gardening for those in wheelchairs. Our labels are simple and we use no scientific names. We soon discovered we are not educating just young children, but "young at heart" adults too. We who are trained in plant sciences assume too much about the general public's knowledge of plants. They crave to learn more about plants in a non-threatening and fun way.

Color plays a vital role in the garden. The entrance arbor as well as the "sails" on top of the amphitheater, the seats and benches, and the garden house are all painted in plum, fuschia, and teal. The rainbow and sunburst entrance are all brightly colored. Children love it. They asked for color! During the three seasons of construction, whenever concrete was poured for a sidewalk, children and families were invited to place their handprints in the wet concrete. Families return repeatedly with their children to see how their hands have grown.

The 4-H Children's Garden was designed by Jeffrey Kacos and Deborah Kinney, both landscape architects in the Division of Campus Park and Planning. Dennis Hansen served as superintendent of site construction. All are MSU staff. The garden is maintained by the HDG staff and student summer interns in the Department of Horticulture.

Funding for the garden is all from private donations. Nearly one million dollars has been raised including endowment funds. A popular and successful method of fund-raising was through the sponsorship of paver bricks inscribed with family names.

The gardens were dedicated in August of 1993. During the first garden season we experienced 1,000 visitors a day, many more on weekends. We hosted 150,000 visitors our first year. In the 1994 season, we will add two new theme areas, a scarecrow garden and a bird feeding blind. Formal programming begins as we design educational curriculum materials for children in school and other youth groups who come to visit.

Imagination does grow in the 4-H Children's Garden. The sheer joy that children express while learning about plants on their visits clearly demonstrates the need for a special garden for children—one all their own. When one young child was asked why he liked the 4-H Children's Garden, he replied, "'cause it's mine!"

The Best Children's Gardens in the World

By Nanine Bilski

Nanine Bilski, National Projects Director, America the Beautiful Fund, 219 Shoreham Building, Washington, D.C. 20005, (202) 638-1649. Presented at the 1993 symposium and the dedication ceremony of the Children's Gardens at River Farm on June 16, 1993.

Gardening for food, for wonder, for discovery, for joy, is largely underestimated solution to many of society's ills. As the National Projects Director of the America the Beautiful Fund, I have had the happy experience of being able to spread the joy of gardening to over 50,000 volunteer groups over the past 12 years through our Operation Green Plant program. With donations of surplus seed from the major American seed companies, we have been able to "seed" this movement throughout all 50 states and 22 overseas locations.

This Free Seed Program has now sent over 100 tons of free seeds to volunteer gardeners who have grown billions of dollars worth of food for the hungry, restored and beautified thousands of parks and blighted neighborhoods, and started thousands of new environmental education programs. I would like to share with you some of the most exciting and delightful children's garden projects that we have helped to develop all over the world.

You may wonder how it is possible to decide what are the best children's gardens in the world. Well, one way is that when the projects report back to us on how they used their grant, I always tell them, don't tell me how your plants grew, tell me how the people grew, and it is those projects where the people grew as much as the plants that we give our National Recognition Awards to. Many of the projects I am going to tell you about are such winners and others look like they will be award winners in the near future.

You may also wonder how America the Beautiful can have projects all around the

world. Well, they are all started by Americans living in American overseas territories, by Peace Corps volunteers, ministers, teachers, businessman, agricultural advisors, friends and relatives visiting people abroad or responding to some disaster. We see this "people to people" effort as one simple, practical, and dramatic way to spread the American ideals of freedom and democracy.

I will start in our own country, with one of the most miraculous stories I know. We all remember the terrible tragedy that Hurricane Andrew produced in South Florida. There were over 100 America the Beautiful projects hit by the storm in both Florida and Louisiana, and as soon as the phone lines were working, we talked to them and told them they could count on our help.

One of the projects, Palmetto Elementary School in South Miami, had applied for one of our national recognition awards just before the hurricane, and told us practically everything they had described to us had been wiped out by the storm. Before the storm, they had built a raised bed garden at the school with a beautiful hand painted mural as a backdrop, and a Seminole "Chickee"—an indigenous thatched palm shelter—as a gathering place.

But the kids had vowed, "We Will Rebean" the garden, adapting Miami's slogan, "We Will Rebuild." We rushed them a supply of seeds and educational materials and by the time I visited them three months later, lunch was served with the vegetables the kids had grown in their restored garden. They had also repaired the Chickee, built a new scarecrow, restored the mural, and had started a Farmer's Market where they were selling their produce to raise funds to help restore the Miami Zoo. They were also donating vegetables to the Camilus Homeless Shelter for hurricane victims.

They got their National Recognition Award after all, and the parents and teachers we spoke to were thrilled with the way the children had restored the garden as a symbol of regeneration for the whole community. At least going to and from homes that had mounds of rubble around them, people could see a true "island of beauty and hope" for this beautiful piece of America that had been so cruelly destroyed.

Farther north, in Villa Rica, Georgia, the Winston Elementary School is creating a model wildlife garden above an underground ATT cable that crosses a 45-acre woodland area belonging to the school. The land had been cleared to a 10-foot width, approximately 1500 feet in length, and ATT gave their permission for it to be used as a nature trail. Last fall, the students began placing markers on indigenous plants and trees and other natural points of interest along the trail. They made markers out of recycled cedar boards into which they burned the names of the plants. During the winter, they also built birdhouses, bat houses, nesting boxes, bird and squirrel feeders, constructed observation tables, trash receptacles, and recycling bins. This spring, they began planting America the Beautiful wildflower seed along the nature trail and created a new wildflower meadow between the school and the nature trail. They planted food plants for wildlife: millet, sorghum, sunflower, berry bushes, vines, and butterfly bushes, and identified other natural food plants like dogwood, pines, maples, and oaks.

During the summer they continue to provide cover for wildlife with brush piles, rocks, and vines and to study different plants that they can add to attract more birds, butterflies, and other wildlife. With the devastating loss of so many monarch butterflies in recent years, the kids feel they are finally able to do something real for the environment. This is just one of the hundreds of bird and butterfly gardens that we have helped schools and youth groups to plant all along the Northeast flyway corridor.

Up in the Cradle of Liberty, Philadelphia, an inner-city school received a National Recognition Award for creating an ingenious garden that would make Ben Franklin proud. The Smedley Elementary School is in an old neighborhood with precious little greenery, but the students transformed a vacant lot at the corner of Pratt and Charles Street into a fabulous Horn of Plenty, a garden planted, tended, and harvested by the students. From the 32,000 square feet of this property have come enough crops for each child to take home an estimated $100 worth of beans, tomatoes, eggplant, broccoli, zucchini, rhubarb, strawberries, raspberries, pumpkins, and gourds.

What used to be a trash-filled eyesore now has a neat fence built by parents and children, a solar greenhouse built by the children, a brick path leading to the greenhouse, a hand-painted mural, a fish pond, a compost heap, a tool box, a resting area with picnic benches, and a scarecrow. By experimenting with cloches and the solar greenhouse, they learned about year-round growing. They also started a newsletter for their garden club. Each fourth, fifth, and sixth grader in the "garden club" was given a 10 by 10-foot plot where they not only grew their vegetables, but also flowers that they sold to raise funds for gardening tools and materials. They were one of the five projects selected by *Reader's Digest* to be featured in a story about Operation Green Plant several years ago, and have now received worldwide fame for what they have done.

On the West Side of Manhattan, adjacent to the cooperative apartment project built by the International Ladies Garment Workers Union for their members, is another ABF award-winning garden, the Penn South Children's Garden. In a community where most parents work all day, 25 children paired off with 25 retired residents as their "garden grandparents." This pairing was the idea of a high school science teacher who lived in the project, and remembered planting a vegetable garden outside Wichita, Kansas, when he was six years old. He wanted his own daughter, born in New York City, to have a similar experience, so he and several other parents approached the cooperative's board with a plan for a plot of land that was once a parking lot. Once it was approved, they put together the partnerships between the children and the elderly, many of whom are of Spanish, Italian, and Greek descent and are able to pass along European gardening traditions to the youngsters. In the center of the 20 plots being worked by the partners, they created an arbored shelter where harvest fetes and storytelling take place.

Homelessness is a problem found not only in urban centers like New York and Washington, but all across America. Several years ago, we did a special project to help homeless children in 15 sites across the country. One of the most exciting was deep in the woods of Maine, a farm appropriately known by the acronym, HOME. Here a group of nuns and lay religious volunteers provided homesteading opportunities for homeless families.

While the adults worked on building houses and work sheds, the children were given the responsibility of growing vegetables for the communal meals. From being frightened and unhappy, they turned into happy, self-confident kids who could take credit for tomatoes, beans, corn, cucumbers, beets, and carrots they grew for the entire community. The children also decorated all the tables and the living areas with

the flowers from the cutting garden they planted. Social workers and parents alike were amazed and delighted with the transformation of these children, who had found the true feeling of "home" in their garden.

Farther west is the Future Farmers of America farm in Houston. Every year, they plant over 150 pounds of vegetable seeds on a 14-acre model farm. If you know how much your average seed packet weighs, you can imagine how many seeds there are in 150 pounds! With these seeds, low-income students from the Stephen Austin School learn sound agricultural skills and grow enough fresh produce to feed their families all year. By growing fresh flowers as well, they plan to grow enough to open a Fresh Fields roadside stand where they can learn marketing, bookkeeping, advertising, and public relations, as well as showing off the bounty of their harvest.

Now we leave the United States and and go to Hogar Infantil in the state of Chiapas, Mexico. In a broad valley in the ruggedly beautiful region where pre-Columbian civilizations once flourished is the village of Coita. A little ways out of town, up towards the sunny hillsides, there is a ranch with a cluster of buildings that has been turned into a home for almost 100 orphaned and abused children of the street.

It was started by an American businessman in 1936 and since his death, it has been run by a United Airlines captain and his wife, with the help of both American and Mexican volunteers.

The children at Hogar Infantil have escaped horrors of poverty, abuse, and abandonment, but are recovering both physically and emotionally by being loved, fed, and given the chance to go to school and enjoy sports and gardening. They not only grow all their own food and the chickens to feed themselves, but they have also learned the principles of bio-intensive mini-farming thanks to volunteers from Palo Alto, California. They have learned how to make and use organic fertilizers and a gravity-driven, drip irrigation system. Now the boys are training their neighbors to maximize the yield on a small amount of land to produce an abundance of good vegetables and vocational skills for the future. Children who would not have lived longer than a year or two on the streets can now look forward to long, healthy, self-sufficient lives as leaders of a new sustainable farming movement.

Next we go across the Pacific to the island of Palau, one of the U.S. Trust Territories. Palau has experienced one of the most rapid transitions in lifestyles within the Pacific region. The rural way of life has given way to an urban life based on a government service economy. Diets have also changed, with most families now depending on store bought, imported processed food. This has resulted in a high proportion of premature births, infant deaths, and nutritional deficiencies among young children. The Palau Community Action Agency is trying to promote home food production by encouraging parents and children to plant our seeds to supply fresh vegetables and then teaching mothers to combine them with store bought food for a more balanced diet.

Previous attempts to encourage better nutrition through radio announcements did not change behavior. But this hands-on approach, where children themselves became involved by learning how to plant and harvest vegetables, had dramatic results immediately. There was a "Benefits of Gardening" contest in all the elementary schools and this motivated the students to try techniques they had never used before, like inter-cropping with pumpkins, use of trellises for vine crops, and trying different types of mulch for weed control. The contest winners were publicized in the media and this inspired many more children to grow a garden that might win a prize the next year. The contest idea convinced the mothers, who are traditionally in charge of all food production activities, to delegate gardening tasks to the young members of the family. Since it was part of the school program, they agreed to it, and this opened up a whole new world of better eating habits for the children.

In Baguio in the Philippines, a recent earthquake destroyed many buildings and businesses and left people homeless with no jobs. American missionaries from Ohio were lucky in that the orphanage they ran was not destroyed completely, and one of the first things they did was ask for seeds so that their 150 orphan children could plant them on their six acres and distribute them throughout the community. This project was "adopted" by an organic gardening program in Cleveland, and the children were able to learn organic methods and then teach them to others on the island. They were able to grow enough to supply the orphanage and also help many other needy individuals and families grow enough food to help them through the aftermath of the earthquake. The children also help support the orphanage by planting flowers to sell to the many tourists who visit there.

In Africa, many children are blind because they lack Vitamin A in their diets. Missionaries in Aba, Nigeria, are teaching the elementary school children to grow squash and melons and carrots for their high Vitamin A content. By using a special selection of seeds that grow in that environment, and by building up the soil with organic matter, they were able to teach the children that it was fun to grow the seeds from America. It was even more fun to eat what they had grown themselves. They hope that by saving the seeds they can spread this practice to more schools so more children will be able to get the nutrients they need to avoid blindness and other problems associated with malnutrition.

Back across the Atlantic, in Nicaragua, an energetic young man from America has been working as a volunteer to create a "model barrio." The people have now built their own elementary school, their own neighborhood patrol for security, and their own cooperative to share available resources. The people in the barrio area are incredibly poor, but the one- and two-room shacks they live in are impeccably clean. The front yards are neat and filled with flowers, but until recently, no vegetables. An America the Beautiful representative from California visited the community and brought seeds for cucumbers, tomatoes, potatoes, corn, squash, onions, and beans for the school children to plant. Once they were producing enough fresh produce for the school to serve lunches from the garden, they convinced their parents that they could probably supply a good part of their family's food needs with home gardens.

No matter whether a child lives in the city or a small town, on a farm or on an island, is happy and healthy or sick and poor, they can all live better lives through learning to grow plants. They can also have the exciting experience of making their community a better place to live, which is what we need if our country is to remain strong for the next century. These projects are the models of what can be done when creative parents, teachers, administrators, and members of the community work together to provide our most precious natural resource, the children of the world, with the magical experience of growing plants.

Gardening, Education, and Children: The Task That Lies Ahead

By Mabel Miranda

Mabel Miranda is a gardener and member of the American Horticultural Society who lives in Yonkers, New York. She delivered this lecture at the 1993 symposium.

I would like to share with you an experience I had after I read George Ball's "Commentary" in the April 1992 *American Horticulturist.* My home faces a three-diamond baseball park, approximately the size of three football fields, known as Sullivan's Oval. Each diamond is separated by well-maintained turf. There are beautiful large boulders where fans sit when they come to cheer their teams on. To the west side of the field is Public School 23 and a playground with sandboxes, slides, swings, and a Jungle gym. To the east is Burroughs Junior High School.

In a wooded area that separates the street from the park can be found Solomon's seal, carpets of violets, spiderworts, goldenrod, Queen Anne's lace, daylilies, geraniums, and winter aconite. Sullivan's Oval is pretty in every season. Prior to the April issue of *American Horticulturist,* I would gaze out of my window in search of a solution to the senseless, malicious mischief going on in Sullivan's Oval. Here is what the changing seasons also brought. In autumn there were fires caused by burning leaves. In winter the park became a dump where people threw household objects, furniture, and whatever else they should have hauled to the dump. In the spring, we had not only the blossoming of the trees but also puddles of oil left behind from the changing of motor oil. In summer, garbage was left behind for Parks Department personnel to dispose of. Hot summer nights invited car thieves to joy ride and rip up the turf. Dogs roamed freely to dig up young daylilies, patches of violets, and irises. Each one of you would have been heartbroken if you witnessed the abuse to this splendid landscape.

It is my belief that this kind of thoughtless mischief occurs not because those who abuse the park wish to destroy it. These things happen because some people just don't know the difference. Some people were never educated in keeping with the true spirit of "Keep America Beautiful."

Then came the April *American Horticulturist.* It is my belief that this "Commentary" was prophetic. After reading it, I was inspired and my motivation escalated. I knew I was going to become committed to keeping the area green and the key would be to involve the students of P.S. 23 and Burroughs Junior High School in a bulb-planting project—a project that would beautify the park with flowers. Reading the April issue made me realize that this would be the end to my frustration.

Get the students involved! Get the schools involved! These words pounded in my head until I contacted the principals of both schools, who were very enthusiastic about having their students participate in a bulb-planting project. Once I had the schools' approval and commitment, I prepared a proposal whose objective was to ensure the preservation and long-term care of Sullivan's Oval by the students in cooperation with the Yonkers Department of Parks and Recreation. The plan was approved by the parks commissioner.

I then purchased 200 tulip bulbs and 300 daffodil bulbs. On the morning of November 1, 1992, 23 kindergarten students planted bulbs at the school's entrance. Prior to the planting, I gave each child a large daffodil bulb to investigate while Parks Department personnel and I gave them a short talk, explaining that while it might seem impossible, they were holding a bulb that would produce a flower the next spring. The talk was followed by enthusiastic questions. This was joy. Later on that same dark and dreary afternoon, 25 Burroughs students planted bulbs in areas that had been previously prepared by the Parks Department. Everyone was so happy planting the bulbs in the rain. Students and teachers shared with a news reporter their joy in participating in the planting. The event was aired by cable television that evening as part of their environmental issues coverage.

On April 3, 1993, I was saddened to learn that 150 tulips had been taken from the ground. Half of the daffodils were removed before they bloomed. The promise of a beautiful spring for all to enjoy was partially gone.

As I was arriving home from work one evening, I saw a young boy stomping on the remaining daffodils. I ran to him like a mad women, although I did not yell as I approached him. I asked him why he was destroying the flowers that were so beautiful, that had been planted to make everyone happy. Why was he doing it? He said, "I don't know." I felt much worse for him than I did for the daffodils that were lying on the ground. He wasn't educated to love and respect the park or the plants. The daffodils planted by the kindergarten class had their flower buds removed as soon as they appeared. I suspect it may have been by the same fellow.

Only with the interception of the AHS will our parks not end up like wind-up watches—a thing of the past. Our duty as

gardeners is to ensure the preservation of green areas. Unless we teach our children to love this earth, our playgrounds and parks will become city dumps, drug havens, and a dumping ground for domestic animals. I am sure that with the involvement of students we can put an end to this senseless destruction.

The Keep America Beautiful campaign endorsed by many of our first ladies is a wonderful thought to keep in mind. But my question is, how do we keep America beautiful if we do not properly educate our children? I believe the children will, in turn, teach the adults, if we first teach them how to plant and grow. Driver's ed, sex education, home economics, music and art appreciation are all taught in the schools. Why not also teach planting and sowing in "earth appreciation?"

I believe in my heart that this first symposium, "Children, Plants, and Gardens," is a revolutionary idea and it can turn our country around. It can change the way children view and treat our parks and other public areas if they are first taught to plant and nurture new growth.

Many of our children do not know love. I believe gardening teaches patience, but most of all it teaches love—love for the earth.

Workshops

Students Teaching Students

John Cloran, Agriculture Department, Future Farmers of America, and 4-H Advisor, Apopka Memorial Middle School, 425 North Park Avenue, Apopka, FL 32712, (407) 884-2208.

This presentation described a gardening program for rural, suburban, or urban elementary schools. The program is taught by middle school students in the school's agricultural program and students in the local 4-H and FFA clubs, who bring seeds, garden tools, and equipment to the elementary schools. The program uses indoor GrowLabs and concepts adapted from Walt Disney World's Epcot Center plant displays.

Cabrini Green Gardening Project

Jack Davis, Director, 3400 Dundee Avenue, #180, Northbrook, IL 60062, (708) 291-1333.

A successful horticultural program for young residents of a Chicago public housing project was described by a panel of the young participants and the program coordinators. The program gets children and adolescents involved in organizing, growing, and marketing garden crops to be sold at area businesses. This presentation also gave ideas for funding a gardening program through various marketing methods and community support.

Educational Programs Offered Through the National Junior Horticultural Association

William Fountain and Joe Maxson, Coordinators, National Junior Horticultural Association, Horticulture Department, N-138 Agriculture, Science North, University of Kentucky, Lexington, KY 40546-0091, (606) 257-3320.

This presentation described the programs and philosophy of the National Junior Horticultural Association (NJHA). The NJHA is the only organization dedicated solely to youth and horticulture. Its programs are designed to help young people obtain a basic understanding of and skills in the expanding field of horticulture and to help the horticulture industry by training and recruiting students to work in specialized fields. NJHA also strives to develop citizenship within the industry by emphasizing programs that build positive producer-consumer understanding.

Together We Can Do It— A Parent Participation Preschool Brings Nature to Asphalt

Esta Gallant Kornfield, Parent Participant and Teacher, Playmates Nursery School, 895 Head Street, San Francisco, CA 94132.

Playmates Nursery School is surrounded by an acre of asphalt in a relatively treeless neighborhood of San Francisco. To integrate life at school with the cycles of nature, a child-scale garden was developed with cooperation of staff, parents, kids, and community. This presentation covered the process of developing and maintaining a preschool garden, and covered topics such as how to obtain support, maintain school gardens, and deter vandalism.

The Challenges of a Volunteer-Based School Gardening Project

Amy G. Haake, Partnership Instructor, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166, (314) 577-5132.

The School Gardening Project is a hands-on gardening program sponsored jointly by the Missouri Botanical Garden, Gateway to Gardening (a St. Louis-based urban gardening program), and the St. Louis Public Schools Partnership Program. The program goal is to increase the knowledge, understanding, and pleasure of gardening among students. Trained volunteers are coordinated through the MBG and work with individual teachers to produce a spring vegetable garden.

Presenters discussed the educational assets of the program as well as the pros and cons, accomplishments, resources, and expectations of the participants.

Overcoming Objections to Youth Garden Projects

Holly S. Kennel, Extension Agent, Washington State University Cooperative Extension, 612 Smith Tower, Seattle, WA 98125, (206) 296-3900.

At some point in the planning process of most youth garden projects, there is at least one key person who can visualize the problems involved more clearly than the benefits. This presentation enumerated the most common concerns of administrators, teachers, and parents and how to address these concerns to make a convert. Kennel offered practical answers to objections like: it will be too expensive; the children

will get dirty; what could we grow between September and May?; I have a brown thumb; and what if the garden gets vandalized?

Schools, Nonprofits, and Other Community Resources—A Winning Combination

Ellen McCurdy, Children's Education Coordinator, and Judy Kline Venaleck, School Garden Liason, 11030 East Boulevard, Cleveland, OH 44106, (216) 721-1600.

This presentation detailed the School Garden Outreach Project of the Garden Center of Greater Cleveland, which has effectively combined numerous local organizations and resources to provide a cohesive horticultural education program for students in Northeast Ohio. A combination of indoor and outdoor gardening activities extends school learning beyond the classroom and into the community.

Local connections to be explored include working with botanic gardens/arboreta/garden centers; the local education fund; school science departments; county Cooperative Extension offices; school/corporate partnerships; and local garden clubs and horticultural societies.

Gardening at the Day Care Center

Linda Naeve, Extension Horticulturist, Iowa State University, 103 Horticulture, Iowa State University, Ames, IA 50011, (515) 294-0028.

A day care center for children of working parents is an excellent place to create gardens and introduce children to gardening. This presentation discussed some of the requirements and responsibilities involved in a day care gardening project: land availability, center staff cooperation and support, equipment and safety tips. Specific references were given to a successful gardening project at a neighborhood day care center in Ames, Iowa.

Philadelphia Green's Youth Program

Eugene Reeves, Youth Program Specialist, Pennsylvania Horticultural Society, 325 Walnut Street, Philadelphia, PA 19106, (215) 625-8280.

Reeves described how he motivates children to take an interest in gardening and how he makes this program work in urban schools and neighborhoods. He offered ideas for gardening with limited resources, reaching different ethnic groups, helping each child be proud of his/her accomplishments, and making a community gardening program both fun and interesting and complementary of the school curriculum.

Bringing the Wonder of Plants to Children Through Museum-School Partnerships

Ann Grall Reichel, Coordinator, CORE Program Development, Chicago Botanic Garden, P.O. Box 400, Glencoe, IL 60022, (708) 835-8323.

In 1987 the Chicago Botanic Garden developed the Collaborative Outreach Education program, a museum-school partnership with the Chicago Public Schools. The program focuses on a year-long study of the life cycle of a plant and culminates with an outdoor gardening experience at the botanic garden. City teachers receive training, classroom mentoring and support from botanic garden staff, curriculum materials, and science equipment.

Presenters shared what they learned from field tests and teacher workshops, discussed science education reform and its implications for the development of plant science curriculum, and provided insight on the role of museum-school partnerships in bringing plant science education to children.

The Success Garden and the Greening of Urban America

William Swindler, Director, Success Garden, The Parks Council, 175 West 134th Street, New York, NY 10030, (212) 926-5633.

Through school activities, summer programs, and workshops for teachers, the New York City Parks Council's Green Neighborhoods Program has been developing the Success Garden concept for more than three years. Central to the program is an outdoor hands-on science learning center for horticulture and the urban environment. Program leaders have a long-term commitment to revitalize inner-city neighborhoods through vacant open space development and a pilot educational program.

This workshop described the progress of the program from inception to current status with a focus on how to replicate it in cities nationwide.

The Dirt on Kid's Gardening Supplies

Jeff Minnich, Senior Vice President, and Drew Williams, Manager, Perennial Plants Department, Campbell and Ferraro Nursery, 6651 Little River Turnpike, Alexandria, VA 22312, (703) 354-6724.

Many gardening products, such as gloves, tools, and seeds have been specially developed to make gardening easier, safer, and more engaging for children. This presentation explained how and where to obtain such products, seeds, plants, and other equipment for children's gardening programs.

Financing a Children's Gardening Program—The Pumpkin Patch Approach

Susan Reynolds, Staff Coordinator, Mill Valley Children's Garden, Edna Macguire School, Mill Valley, CA 94941, (415) 389-7733.

This presentation addressed various ways to finance the needs of a children's garden once the interest, goals, and a location are established. One of the best ways to begin building a financial base is to have children plant seeds and plan a plant sale, such as a children-managed produce sale. Reynolds also suggested ideas for obtaining donations of tools, seeds, money, and grants of all types from foundations.

Money for the Asking: Funding Your School's Gardening Program

Frances R. Rosiak, School Garden Coordinator, Belle Valley Elementary School, Erie, PA 16504-3024, (814) 835-5600.

Are you having trouble getting your great gardening ideas to "take root" because of limited school budgets? There's money out there for the asking, said Rosiak, if you only know where and how to look for it.

Rosiak is an elementary teacher/garden coordinator who in the past two years secured six different grants and cash awards from local and national organizations. She offered tips for successful grantwriting, shared hand-outs listing funding sources and addresses, and suggested follow-up procedures to use after grants are secured.

Therapy in the Garden for People of All Ages

By Steven H. Davis

Steven Davis, Executive Director, American Horticultural Therapy Association, 362A Christopher Avenue, Gaithersburg, MD 20879, (301) 948-3010, Fax: (301) 869-2397. Davis is an invited author for these Proceedings.

The value of using plants and gardening as tools in therapy and rehabilitation is not a new concept. It is a reality that has been recognized since ancient times. Today this concept is universally accepted and represents an important approach to improved health and quality of life for people of all ages and with all manner of disabilities—or abilities. Since 1973 this concept has formed the underpinnings of the profession of horticultural therapy, whose practitioners serve as important members of the treatment team in hospitals, rehabilitation facilities, retirement centers, schools, and even correctional institutions. And some of the most dramatic of these programs are those that serve children and youth.

Horticultural therapy is a medical discipline that uses plants, gardening activities, and the innate closeness we all feel toward nature as vehicles in professionally conducted programs in therapy and rehabilitation.

Everyone who enjoys gardening knows that being close to the soil fulfills a certain basic human need. Gardening enhances physical condition, relieves frustration, provides a sense of accomplishment, improves mental health, and simply provides great joy. And the therapist who is trained in horticulture uses this people-plant connection to improve human health and well-being.

One simply needs to ponder the statement, "the therapy that is enjoyed very likely will prove to be the therapy that will give forth the greatest results," to realize the validity of using this vehicle of horticulture in the pursuit of improved health and quality of life.

After all, how many of us, whether or not we are active gardeners, do not feel pride and a sense of accomplishment upon observing the seed planted in early spring give rise to the lush plant of summer that is overflowing with perfect blooms? How many of us, after even the most confounding of days, do not feel the complete dissipation of anger and contrariness upon relocation to the benevolent, nonjudgmental setting we call the garden, wherein the excitements that abound can soothe the very soul? And how many of us do not feel absolutely renewed, regenerated, and excitingly alive upon the discovery of the first blooms of spring emerging from the vestiges of the last snow of winter?

There truly is great power within the realm of horticulture to influence the health and well-being of humankind. And today, horticultural therapy programs exist in every corner of the land, serving people of every disability population—children as well as older adults, people with physical disabilities and individuals who have mental disabilities, people who are substance abusers and those who are incarcerated, people who have been abused and people who are dying of AIDS. Horticultural therapy has application to every disability and every age group—especially young people, who so often enter horticultural therapy programs not having previously experienced the excitement to be found in plants and gardening.

In the growing of plants, whether indoors or outdoors, young gardeners have opportunity after opportunity to achieve cognitive development—through the learning of new skills and language, through problem solving, through learning to work independently, and through the enhancement of concentration levels and attention spans.

In the growing of plants, young gardeners can attain psychological improvement. Through caring for a living thing, an individual's nurturing needs can be met. Through experiencing success, an individual's self-esteem and sense of usefulness can be raised. Through flower and plant arranging, an individual's creativity can be enlivened. And through the processes of weeding, digging, and pruning, an individual's feelings of stress, anxiety, and aggressiveness can be diminished.

In the growing of plants, young gardeners have the opportunity to realize social growth when working with others in horticultural therapy groups. Through the guidance of therapists and through the sharing of new experiences, individuals can learn to work together toward common goals, learn how to support one another, learn how to compromise, and experience shared excitement.

Through growing plants, young gardeners have the opportunity to realize physical improvement. Through sowing seeds, planting or transplanting, maintaining gardens, harvesting and drying, flower arranging, and the hundreds of other gardening tasks, muscles can be developed or strengthened, and gross and fine motor capacity can be learned or relearned.

Through a child's involvement with gardening, every sense can be stimulated, mental anguishes can be calmed, self-esteem can be helped to flourish, and physical rehabilitation can be achieved—all as part of a process that can be thoroughly enjoyed. The approaches used by horticultural therapists in working with children and young people differ very little from those used with adults. The process chosen depends on the individual's abilities or needs, the plant materials and gardening pursuits available to the therapist, and the desired results. Diversity within horticul-

tural therapy programs is limited only by the therapist's imagination. Here are just a few examples:

✦ At a hospital in Pontiac, Michigan, plants are used to help children resolve fears related to a hospital stay. Upon admittance, each child is given a plant and is encouraged to play doctor and nurse to that plant. Through the child's enunciations of "ailments" discovered in the plant and care they prescribe for it, the hospital staff is able to realize the concerns and fears of the real patient and to help their young charges to overcome those feelings.

✦ In a preschool program in New York, a four-year old boy with language impairment and exhibiting a variety of behavioral problems and depressed affect improved dramatically through the use of horticultural therapy. The staff determined that this child had grown up in a family environment largely devoid of nurturance, and conjectured that if he was given the opportunity to provide nurturance to plants, he might begin to learn how to care for others, how to receive a pleasure through the giving of nurturance, and how to begin assuming personal responsibility. The staff conjectured correctly. Through this child's exposure to horticultural therapy, his self-esteem and relational skills were greatly strengthened, and he began showing increased attention to tasks, greater cooperation, and greatly diminished anger and classroom disruption. The nonthreatening environment of this facility's greenhouse provided him with the therapeutic influences and nurturing experiences with which he could fill his personal voids, and through which he could productively and enthusiastically redirect his energies and his focus.

✦ At a home for older adults in Atlanta, Georgia, a horticultural therapist brought residents together with a nearby class of second graders. The students were helped to overcome their stereotypical views and fears relative to older people, to experience the importance of sharing and working together, and to make new friends. Both generations realized important benefits. For the older adults, many of whom were physically and cognitively impaired, the experience was exciting, revitalizing, and inspiring; for the students, it offered an awakening to the realization that young and old can share an experience, as well the excitement and pleasures of that experience.

✦ Within a public school program for students with severe and profound mental disabilities in Greenville, South Carolina, the glass walls of a greenhouse enclose a "magical" garden in which every sense can be stimulated. Within this sensory garden are scented geraniums and herbs, plants of every color, shape, size, texture—even kumquats and oranges. And there are soothing sounds—music and nature sounds, windchimes, and a gently trickling fountain. And although some of the participants in this program can respond only with a smile or a "sparkle," those responses are tremendous in what they represent.

✦ At a psychiatric rehabilitation facility in Chicago, Illinois, mothers with severe and persistent mental illness and their at-risk children work together with plants. Both mothers and children pursue improved physical, mental, social and emotional well-being. In the process, mothers experience the giving nurturance that is so very important to the development of their children, and the children respond positively both to that nurturance and to the enriching environment of plants.

In *The Secret Garden,* the beloved children's book by Frances Hodgson Burnett, Mary Lennox and her cousin Colin restore a beautiful garden and Colin becomes physically and emotionally healed. The "magic" of plants truly holds an important position within the process of healing. Professionally administered, there is no limit to the achievements possible. And it is exciting, indeed, to realize that the growth in horticultural therapy programming in evidence today, translates into many more children receiving the benefits of those programs tomorrow.

Workshops

The Cerces Project From the Ground Up

Melanie K. Trelaine, Executive Director, Hands, Heart, and Health, 1042 East Stanford Avenue, Gilbert, AZ 85234, (602) 866-6895.

The Hands, Heart, and Health (HHH) program was established in 1989 as an Arizona non-profit corporation to promote, educate, and provide horticultural therapy services in the state. After three years of developing pilot programs with a variety of special population groups (mentally ill, developmentally delayed, elderly, disabled, and disadvantaged), HHH was award two substantial grants to expand its programs. In 1993 HHH opened a community garden that includes a greenhouse/garden site designed specifically for rehabilitation and therapy of employees with mental and physical disabilities.

Trelaine explained the group's experience in applying for grants and establishing networks with garden clubs, horticultural businesses, and others who have been key to the project's success. She also presented low-cost gardening ideas such as planting an entire garden using garbage bags as containers and linking up with national organizations and businesses to obtain seeds and expert advice.

There's An Inch Worm on My Cabbage! or Teaching Natural Science in the Garden

Nancy Bamberger, Horticultural Therapist, North Carolina Correctional Institution, 1034 Bragg Street, Raleigh, NC 27610, (919) 733-4340.

This presentation consisted of natural science activities that can be incorporated into all phases of gardening, ideas on how to develop your own activities, and a discussion of the use of resource materials by both students and teachers. It included slides of horticultural projects, hands-on projects, and lists of resource materials.

Let's Build 108,000 New Garden Classrooms for Children

By Anne Lusk

Anne Lusk, Chair, Vermont Trails and Greenways Council, 1531 River Road, Stowe, VT 05672. Lusk is also vice chair of American Trails and a member of the National Recreational Trails Fund Advisory Committee. She gave this address at the 1993 AHS children's symposium.

I have a job for you. This job is easy and there is money to do the job. The job is the creation of 108,000 new garden classrooms in America. That's the number of schools in the country. These gardens would be greenways or bicycle paths that would lead to every school in the nation and serve, coincidentally, as linear parks for kids.

My job is to convince you that this is a job you'd want to do. My job also is to assure you that this is a job at which, if you wanted to do it, you'd succeed.

We'll start with Greenways 101. The 1987 "Report of the President's Commission on Americans Outdoors" defined greenways as corridors of private and public recreation lands and waters that provide people with open spaces close to where they live and that link the rural and urban spaces in the American landscape.

A follow-up report titled "Trails for All Americans" further defined the goal as a network of trails so extensive that all Americans could reach a trail within 15 minutes of their home or work place. They might have to drive 15 minutes, but ideally, the trail or greenway would be safely accessible from their doorstep.

You might be wondering what this has to do with schools, kids, and gardens, but let's look back. When schools were first built, they were rural, one-room school houses fairly close to where people lived. Kids walked or biked to get to their community school.

Then we decided that bigger was better and we created huge education fortresses with impenetrable walls. Kids were bussed to these schools. Kids lost the exhilaration of getting to school and more important, the contact with the land and their surrounding neighborhoods. A bus is just transportation. Riding to school on a bus doesn't help a student academically. It is not a learning experience. Riding to school on a bus is a void in a child's day.

A study in the 1957 British *Journal of Educational Psychology* indicated that kids who bike or walk to school have a cognitive understanding of where home and Mom are. Children who are blindly whisked away by car or bus feel lost and disconnected from home. Now I'm not going to suggest that we build these 108,000 new classrooms just to serve as transportation to and from school. All kids can't get to school walking or biking. Second, we can't spend dollars just on a bicycle path for kids when we are all fully aware of the recession and the deficit.

What I am suggesting is that this greenway garden transportation system could also be a school classroom and help produce smarter kids. The students who live close enough will use the greenway system to walk or bike to school. The others will arrive by bus. When they are all in school and it's time for a certain class, they will go outside to learn in their new garden classroom. Let's look at some of those potential classes:

Science class. There is a theory that students should study science in the national parks. That's a good idea, but only eight percent of the population lives near a national park. If you discover nature near your home though, you develop a stewardship ethic about your own neighborhood. You learn about your own plants, your own trees, and your own wildlife.

When kids in an inner city school in Boston were taught about nature near the school, they took better care of their own neighborhood. They didn't trash where they lived.

Kids also learn about science when they dam up a stream, feed the ducks or pigeons, study wetlands, investigate why a pump brings up water, or see what lurks in the local river.

Geography class. Kids learn geography and map-reading first by understanding their own community. Children can't drive, so they can't learn spatial relations from a car. They can't even see over a dashboard. But if a pathway system, scaled for them, is created, they often know the whole community like the back of their hand.

Architecture and History. The greenway garden classroom can take children into the built environment. They can learn about historic bridge construction and new bridge functionality. A bicycle path can take the students to study city hall and its workings or a rural barn and its inhabitants. The outdoor classroom can offer the rich architectural history of an early settled neighborhood or the new urban landscape with zoning and redevelopment.

Gym class. Students can, of course, get all of their exercise at the local playground, but after awhile they need variety. They can run circles around the school track, but their best exercise comes with the exhilaration of getting out and away from the school grounds.

They can participate in bicycle rodeos and learn safe biking practices. A school might have rollerblades with pads to let groups try this new sport. In snow country, cross country skiing or snowshoeing can be options. Then again, there is just good old walking as an excellent athletic alternative.

Those are some of the potential classrooms. You might be saying, "That's a nice idyllic idea but the greenway classroom won't fit in my community." There are

many of us, though, who believe greenways will fit anywhere. But the major factor in the creation of these new garden classrooms is *you*. If you and your students don't play an active part in the creation of this greenway system, all 108,000 new garden classrooms could look like a replay of the interstate highway system—sterile and void of landscaping.

So what do you do? The following five steps should help:

1. People. You need to cultivate quality grassroots leaders. Steal good people from the other professions. You can attract them by having a few choice people who then serve as magnets for other good people.

2. Plan. Be innovative and shoot for the sky. Don't be intimidated by your lack of political clout. Joe Shumaker, who helped craft the Platte River Greenway in Colorado, once said that "Having no power means having all power." You don't have a boss so you can try anything. Keep in mind, though, that in your plan, you have to not only create the garden classroom, it has to be a thing of great beauty, unheralded in typical transportation corridor design.

3. Publicity. You have to be noticed if you want to get your greenway system created. Use every quirky publicity angle you can think of. The zanier the better. And repeat constantly. You'll be tired of hearing yourself but to the public, it will be new stuff.

4. Politics. Since you are probably dealing with land that is not all publicly owned, you must turn into a political animal. That means working on the government level as well as the citizen property owner level. You'll find that your earnestness takes you far and that other people are willing to help.

5. Money. Congress recently gave us money to create these new garden classrooms through the Intermodal Surface Transportation Efficiency Act (ISTEA). You will be building bicycle and pedestrian facilities that secondarily serve as garden classrooms to the school. Ask your state bicycle coordinator at your department of transportation about this funding. It is available to all communities. Congress now wants transportation systems to be decided at the local level and that means you can speak up—loudly—in the decision-making process.

I hope I've done my job. I hope I've convinced you that you'd want to build one of these 108,000 new garden classrooms. I hope I've given you enough information so that you will succeed . . . because now the job is yours.

Ten-Minute New Idea Forums

New idea forums allowed each presenter 10 minutes to showcase his or her new ideas, problem-solving tips, approaches, programs, and cooperative ventures for creating or enhancing children's gardening programs.

Physical Rehab: The Therapeutic Benefits of Gardening for Children

Kurt D. Baumgardner, Horticultural Specialist, Shepherd Spinal Center, 2020 Peachtree Road N.W., Atlanta, GA 30324, (404) 350-7787.

The child in physical rehabilitation has many needs, some of which may be met through the therapeutic benefits of plants and gardening. At Shepherd Spinal Center, children with spinal cord injury and other disabilities actively participate in gardening as therapy. Baumgardner offers ideas and approaches to involving physically disabled children in meaningful gardening experiences.

Bug Patrol

Pat Erwin, Garden Instructor, Battle Creek Public School Outdoor Education Center, 10160 Bedford Road, Dowling, MI 49050, (616) 721-8161.

A catchy way to entice children to control problem insects organically is to form a bug patrol in the garden. The captain of the Bug Patrol presents the idea that using organic or natural methods helps to keep the environment safe and balanced. These methods for eliminating harmful insects are simple to use and any materials required are readily available.

Project Bloom

Cathy Clement-Goetz, 4-H Program Associate, Michigan State University Extension, Lenawee Human Services Building, Suite 2020, 1040 South Winter Street, Adrian, MI 49221, (517) 264-5307, and Tina Podboy Laughner, Coordinator of Education, Hidden Lake Gardens, 6280 West Munger Road, Tipton, MI 49287, (517) 431-2060.

Project Bloom involves youth ages 9 to 17 of all mental and physical abilities in a horticultural/environmental education program. During a series of weekly summer sessions, able and non-able bodied youth meet to plant and maintain a raised-bed garden. The youth are also exposed to such topics as nature photography, fishing, attracting bluebirds, and herb gardening, and take trips to the horticultural gardens at the university and the local county fair.

Project Bloom is a cooperative program with the Michigan State University Extension-Lenawee County, Hidden Lake Gardens, and the Lenawee Intermediate School District. It was funded by the W.K. Kellogg Foundation for two years. Other components of the grant covered a wheelchair-accessible van; a science-oriented, interactive computer program; a wheelchair-accessible trail; and 10 GrowLabs—indoor gardening units for classrooms.

Now completing its third year, Project Bloom is popular with both parents and children. The youth get to interact with others they might have previously considered "different," and in an outdoor setting are exposed to topics unlikely to be covered in their school science curriculum.

The Flowering of Compost

Marty Grey, Master Gardener, Cleveland Heights, Ohio. Contact AHS for additional information.

Teaching composting to school children serves to teach them about such subjects as soil, recycling, and earth stewardship. Compost education enriches not only the science curriculum but also benefits the entire local community.

Blooming Partnerships: Examples of Building Networks Between Businesses, Communities, and Schools

Christy Holstead, President, and Pamela Linder, Marketing Director, McGreen Wisdom, Inc., P.O. Box 12926, Pittsburgh, PA 15241, (412) 835-1613.

McGreen Wisdom, Inc., has developed several successful local and national cooperative programs aimed at strengthening horticulture awareness, science skills, and earth stewardship. Holstead and Linder can provide details on such programs as Yoder's Magnificent Mum Education and Planting Program as well as examples of how businesses, associations, community groups, and schools can work together to execute such programs.

School Grounds as a Volunteer Garden

Dennis Greive, Horticulturist, Maryland-National Capital Parks and Planning Commission, 7345 Muncaster Mill Road, Derwood, MD 20855, (301) 417-0828.

Three years ago Strawberry Knoll Elementary School in Derwood, Maryland, formed a PTA Garden Club with the goals of beautifying the school by preserving and upgrading the existing landscape, creating new garden areas to serve as outdoor classrooms, and involving the students and community in multiple ways so they would perceive the gardens as "theirs."

The program has involved students, parents, the PTA, the school maintenance department, Cub Scouts, Boy Scouts, the Conservation Corps, and the local nature center. Participants have planted 189 native trees, 8,000 square feet of wildflower meadow, a butterfly garden, 10 shade trees, 2,000 naturalizing bulbs, and a historic tree dedicated to two outstanding volunteers.

Greive also presented methods of maintenance and obtaining administrative and community support and funding.

Gardening for Abused Children Living in a Residential Treatment Center

Sister Sally L. Kerr, Silver Springs Martin Luther School, 512 West Township Line Road, Plymouth Meeting, PA 19462, (215) 825-4440, Fax: (215) 825-3908.

Forty abused children volunteered to help maintain the organic garden at their residential treatment facility. The horticulture program at the Silver Springs Martin Luther School provided an opportunity for these emotionally and physically abused children to be a part of a creative, challenging activity through which they could not only gain knowledge about and respect for nature but at the same time nurture their own self-worth.

Children reported with pride that their garden produced more than 3,000 pounds of vegetables, and shared their excitement with the agency staff by bringing their food to its kitchen to be shared by everyone.

Gardening Through a Child's Eyes

Loline Hathaway and Patrick Kundtz, Tse Bonito 4-H Club, Yah-ta-hey, New Mexico. Contact AHS for additional information.

This presentation reviewed four years of one boy's 4-H garden project. His stories reveal that the highlights for the child gardener may not coincide with the "lessons" the adult has presumed to teach. Nevertheless, the child's experiences and values are equally important.

The Growing Seed: Wiliwili Project

Colleen Lopez, Education Coordinator, National Tropical Botanical Garden, P.O. Box 340, Lawai, Kauai, HI 96785, (808) 332-7324, Fax: (808) 332-9765.

The Growing Seed is an interactive curriculum for teaching botany and conservation through nature study, developed for fourth and sixth grade students in Hawaii. Curriculum materials includes an instructional video divided into a teacher training section and a student instruction section. The teacher training section describes supplies necessary to complete this project and how to plant and care for the wiliwili (*Erythrina sandwicensis*) plants. The student portion covers native Hawaiian plants, habitat, life cycle, and uses of the wiliwili tree, and demonstrates experiments using student participants. The Growing Seed curriculum also includes workbooks, seeds, and resource information providing teachers with all the curriculum materials needed to implement this class.

Moral Implications of Gardening With Children

Ruth Lopez, Owner, Gardens for Growing People, Point Reyes, CA 94956-0630, (415) 663-9433.

Lopez's presentation expressed her personal philosophy regarding gardening with children:

"Our relationship to the earth is a result of how we learn to view the land when we are children. Today's children are surprisingly informed and concerned with environmental issues such as pollution, global warming, and disappearing rain forests and wilderness areas. This is largely a result of their TV viewing.

"I applaud all the environmental awareness now being incorporated into many classroom curricula. While the wilderness ethic was a new concept for older generations, today's children are growing up with it.

"The problem is that we have learned to worship nature, but have not learned about about how to live with her. The wilderness ethic taught us about virginity and rape, but not about marriage. Our current wilderness ethic has helped us protect wild areas, but hasn't offered much guidance for our relationship to cultivated or 'spoiled' lands. Only 10 percent of our country is considered wilderness. What sort of environmental ethic should guide our relationship to the earth in the 90 percent of the land where we reside?

"The problem with the wilderness ethic is the view that man is separate from nature. Webster's dictionary defines wilderness as 'A region uncultivated and uninhabited by human beings.' Our landscape reflects this view of humans as separate from nature. We put up fences and draw boundaries around our wilderness areas and proceeded to overburden and damage the rest. We need a new environmental ethic to guide our relationships to the land outside the boundaries, one that views humans as part of nature.

"I believe that some of the answers may be found in the garden. Gardening has a lot to teach us about man's relationship to nature. Gardening teaches children many things, but perhaps most important, it teaches children to see themselves as part of nature, not separate from it. A gardener knows that the landscape is always changing. A gardener suspects that perhaps there is no such thing as 'virgin wilderness'; that wilderness areas have always been changing for many reasons including non-native species introduced by wind, birds, and humans. A garden is a man-made idea, but so is wilderness.

"Among the many things that gardening teaches us is that we do best in nature when we imitate her. With four billion years of trial and error experience, nature offers

enormous information on what works and doesn't work. By studying nature's ways, gardeners learn what their plants need to grow. Imitation of nature is the principle underlying organic gardening. The organic gardener mimics nature's methods of building soil fertility and recycling nutrients through composting. By studying insects, we learn about natural predators and ecological balance. Gardens seem to flourish the most when we respect the wilderness of the garden. A good gardener learns not to push for total control. Complete victory is usually only a delusion, such as the triumph of DDT over insects. When children grow up gardening, they grow up knowing much more than the fact that food does not come from the supermarket. They grow up knowing that every living thing and natural force affects a myriad of others, themselves included.

"This new approach to gardening is a direction worth exploring. Our children are the future. It is important that we bring children into the garden now and nurture their creativity there, for I suspect that they will be the ones to come up with some creative answers about our relationship to the earth."

All About The Worm Bin

Frances Mastrota, Director, Pleasant Village Community Garden, 441 East 118th Street, New York, NY 10035, (212) 263-6935, Fax: (212) 263-8570.

The worm bin is an integral part of this community gardening project. It is a wonderful vehicle to interest children in composting and recycling of organic matter. This presentation describes how to keep worms, compost with worms, and use worms to get children interested in gardening.

The Great Pumpkin Project

Jo Mercer, Extension Agent, Ornamental Horticulture, University of Delaware, Townsend Hall, Newark, DE 19717-1303, (302) 831-2506.

In this program, students receive pumpkin seeds and information about growing the pumpkins at the end of their third grade school year, and participate in growing the pumpkins from June through fall. The seeds and supplies are donated by a local merchant. Throughout the summer, the children receive periodic mailings on plant science topics related to their developing crops.

At the beginning of the fourth grade year, the students are invited to bring their pumpkins to the sponsor's business for a Pumpkin Contest. Awards are given for every category imaginable. The sponsor provides publicity and refreshments.

When There is No Space for a Schoolyard Garden

Rose Murphy, Assistant Director, Bronx-Green Up, New York Botanical Garden, Watson Building, Room 317, Bronx, NY 10458, (718) 220-8995.

For many urban schools, green open space on school property is in short supply. Furthermore, support in maintaining a garden, in whatever limited space may be available, is often non-existent.

In the Bronx, more and more schools are turning to community gardens for a safe, secure open space. There are many advantages to this cooperative venture. A nearby community garden can provide a classroom teacher with a space that can be used simply for field trips and/or with actual square footage for a gardening project.

Because community gardens have a solid membership, there are always people available to watch over the children's garden when class schedules do not allow them to be at the site. This is especially important during periods of drought or other stressful times in the garden.

The community garden serves as an active environmental resource. Urban children are often under the misconception that "the environment" is somewhere else—not in their back yard. A neighborhood garden gives children the opportunity to visit their garden even when school is not in session. In addition, the teacher has, as an added resource, a group of gardeners to lean on for information and supplies.

Along with gardening, community gardens can provide nearly limitless open-air classroom lessons. These are wonderful sites for art projects, for nature study, for creative writing ideas, for reading, and for earth and environmental science.

Murphy can provide teachers with an outline of how community garden partnerships function in the Bronx, and give suggestions for tapping into community gardens in their own communities.

Science and Math in the School Landscape

Mary Olien, Horticulturist, Clemson University. Contact AHS for additional information.

Four classroom projects for four grade levels were developed to introduce science concepts and to demonstrate the concepts with hands-on projects in the school landscape. For the upper levels, a math component was included. Olien briefly described each of the four projects—growing bulbs, rooting chrysanthemums, planning and planting a 12-foot-square pansy bed, and testing the uniformity of an irrigation system—as well as the successes and pitfalls encountered while developing the projects.

Fun and the Victory Garden for Children

Elizabeth Olson, Student, Historic Landscape Preservation, George Washington University. Contact AHS for additional information.

Olson gave a slide presentation on space-saving, short-season vegetables and novelty plants with unusual colors, shapes, or attributes that interest children.

Landscape as Metaphor: Case Study—Therapeutic Garden for Children

Douglas Reed, Landscape Architect, 23 Halifax Street, Jamaica Plain, MA 02130, (617) 522-7602.

Reed described a therapeutic garden designed to help traumatized children revise body-based beliefs at the root of their difficulties in order to relieve their mental suffering and promote psychological growth. Located in Wellesley, Massachusetts, the garden exemplifies the theory that the experience of landscape, designed for therapeutic purposes, enables a child to enter the deepest reaches of his/her inner self. As such, the garden creates a unique laboratory in which the embodied beliefs of traumatized children are both treated and studied.

Reed focussed on the physical design of the garden, which provides a sensorial extension of the clinic's treatment room and responds directly to the stages in the process of psychological recovery. He traced the evolution of the design—its theory, conceptual development, physical form, and built landform.

Beyond the Garden: Exploring Plant Science Topics

Cindy Reittinger, Education Manager, Atlanta Botanical Garden, Box 77246, Atlanta, GA 30357, (404) 876-5859.

In the spring of 1993, the Atlanta Botanical Garden launched its new "plant mobile"—a program designed to take educational programs about plants to the community. This presentation described the educational benefits of such a program

and how it brings plants and gardens to more children.

The Three Sisters: Exploring Iroquois Horticulture

Marcia Eames-Sheavly, Extension Support Specialist, Cornell University, 134A Plant Science Building, Fruit and Vegetable Science Department, Cornell University, Ithaca, NY 14853, (607) 255-1781.

In the "Three Sisters" project, young people examine the horticultural life of the Iroquois to gain a better appreciation of Native American culture. Exploring Iroquois foods, customs, and stories that evolved around the planting of the "Three Sisters"—corn, beans, and squash—provides a background for environmental and spiritual attitudes that surround these crops. Planting three native crops helps children become familiar with a crop managment system practiced by Iroquois people. Youth are introduced to plant breeding concepts and can observe how crops respond to interplanting. Issues are raised regarding genetic diversity and its preservation. Perhaps most important, youth will learn about several different types of corn and discover why this particular plant has been so honored, both agriculturally and spiritually, by the Iroquois.

Can Children Learn By Gardening?

Chris Strand, Horticulturist, Arnold Arboretum, 93 A Wachusett Street, Jamaica Plain, MA 02130, (617) 524-9497.

Strand's research addresses whether children's ideas about plants and gardening change as the result of participation in youth gardening programs. He interviewed children in Brooklyn and Washington, D.C., using a technique called the ethnographic interview. This interview technique is like a conversation but with the goal of discovering what the child knows about the subject. Each child was interviewed before and after the gardening program. Transcripts of the interviews were analyzed and condensed into protocol maps and flowchart-type descriptions of the children's concepts and procedural knowledge. By comparing the "before" and "after" protocol maps, Strand found that these children increased their conceptual, logical, and procedural knowledge of plants as the result of participating in a youth gardening program. Understanding what children learn from gardening programs, like those in this study, will allow educators to tap into children's natural modes of inquiry, a source of powerful modes of instruction.

Books for Growing a Garden

By Carolyn Wiseman

Carolyn Wiseman, formerly a library media specialist in Indiana, works part-time at the Breckenridge (Colorado) Public Library. This article was originally published in Book Links-Connecting Books, Libraries, and Classrooms. Book Links *is a bimonthly magazine published by Booklist Publications, an imprint of the American Library Association, and is designed to connect children with books. Subscriptions are $20 per year. For more information write to Book Links, 434 West Downer, Aurora, IL 60506, or call (708) 892-7465.*

Watching a seed sprout, a seedling grow into a plant, or a blossom turn into a beautiful flower or a delicious vegetable is a magical experience—one that teachers can bring into the science classroom.

Even young children can discover the factors that influence plant growth by using basic methods of inquiry. They can learn to identify the parts of a plant and enrich their vocabularies by becoming familiar with common and scientific names of vegetables and flowers. Soon they will realize that plants provide much of their food. Ultimately, young learners will appreciate plants' nurturing and aesthetic characteristics and the interdependence of plant and animal life. Language arts, music, and art activities can be easily integrated into this science study.

(Editor's note: Among the following books described by Wiseman, those with a ✦ are available through the AHS Book Program at discount prices for members.)

✦ **Bjork, Christina.** ***Linnea's Windowsill Garden.*** Illustrated by Lena Anderson. 1978. 52 pages. Storey Communications. $13; AHS, $11.10. (9-12-958314-4). Grades 2 to 4. This sprightly young girl who grows plants everywhere—pots, crates, and glass jars—takes readers on a tour of her green menagerie.

✦ **Bunting, Eve.** ***Flower Garden.*** Illustrated by Kathryn Hewitt. 1994. 32 pages. Harcourt. $13.95; AHS, $12.50. (0-15-228776-0). Grades 1 to 4. A little girl and her father plant a window box garden for Mom's birthday. Told in a simple rhyming text with bold, realistic illustrations.

Carle, Eric. ***The Tiny Seed.*** 1987. 32 pages. Picture Book Studio. $15.95. (0-88708-015-4). Preschool to Grade 2. Brilliant collage illustrations take the seed through its life cycle and through the seasons.

Caseley, Judith. ***Grandpa's Garden Lunch.*** 1990. 32 pages. Greenwillow. $12.95. (0-688-08816-3). Kindergarten to Grade 2. After a little girl helps her grandfather in the garden, the two enjoy a lunch made from home-grown vegetables.

Cooney, Barbara. ***Miss Rumphius.*** 1982. 32 pages. Viking. $13.95. (0-670-47958-6). Grades 1 to 5. Her wordly travels complete, Miss Rumphius, the lupine lady, comes home and discovers how she can help make the world more beautiful.

✦ **Creasy, Rosalind.** ***Blue Potatoes, Orange Tomatoes.*** Illustrated by Ruth Heller. 1994. 48 pages. Little, Brown/Sierra Club. $15.95; AHS, $14.25. (0-87156-576-5) Grades 1 to 5. Creasy details the joys of organic gardening and the surprise of a rainbow crop while Heller appropriately brightens the pages with vivid pictures.

✦ **Dowden, Anne Ophelia.** ***The Clover and the Bee: A Book of Pollination.*** 1990. 96 pages. HarperCollins. $18; AHS, $16.25. (0690-04677-4). Grades 4 to 7. Detailed drawings supplement the story of pollination and its part in the life cycle of flowers. Index of plants and pollinators.

Dowden, Anne Ophelia. ***From Flower to Fruit.*** 1994. 64 pages. Ticknor & Fields. $15.95. (0-395-68376-9). Softcover, $8.95. (0-395-68944-9). Grades 3 to 6. Intricate botanical drawings explain how flowers mature into seed-bearing fruit. This title and the author's *The Blossom and the Bough* are being reissued by Ticknor & Fields.

✦ **Ehlert, Lois.** ***Growing Vegetable Soup.*** 1989. 32 pages. Harcourt. $13.95; AHS, $12.50. (0-15-232575-1). Preschool to Grade 2. Bold print and colorful illustrations show how to plant the vegetables that will grow into daddy's soup ingredients. Also note Jeanne Modesitt and Robin Spowart's *Vegetable Soup* (Macmillan).

✦ **Ehlert, Lois.** ***Planting a Rainbow.*** 1988. 32 pages. Harcourt. $14.95; AHS, $13.50. (0-15-262609-3). Preschool to Grade 2. Mother and child plant bulbs, seeds, and seedlings, which results in a rainbow of flowers. Also note the author's *Red Leaf, Yellow Leaf* (Harcourt).

✦ **Florian, Douglas.** ***Vegetable Garden.*** 1991. 32 pages. Harcourt. $13.95; AHS, $12.50. (0-15-293383-2). Preschool to Grade 2. Watercolors depict the sun and rain helping to ripen the vegetables that this family plants, tends, and harvests.

Gibbons, Gail. ***From Seed to Plant.*** 1991. 32 pages. Holiday. $14.95. (0-8234-0872-8). Kindergarten to Grade 3. Glowing pictures combine with a succinct text to present seeds in varying shapes and sizes, the parts of a flower, and the growth of a plant.

Heller, Ruth. ***The Reason for a Flower.*** 1983. 48 pages. Grosset. $8.95. (0-448-14495-6). Grades 2 to 4. Rich illustrations and informative text focus especially on the interdependence of plants and animals.

Holmes, Anita. ***Flower for You: Blooms for Every Month.*** Illustrated by Virginia Wright-Frierson. 1993. 48 pages. Bradbury. $16.95. (0-02-744280-2). Grades 2 to 5. Beginning gardeners are introduced to 12 flowering plants through detailed, full-color illustrations and are offered helpful tips on growing new plants from cuttings.

Huff, Barbara A. ***Greening the City Streets: The Story of Community Gardens.*** Photos by Peter Ziebel. 1990. 80 pages. Clarion. $15.95. (0-89919-741-8). Grades 3 to 6. Using a photo-essay style, Huff describes the growing urban gardening movement in the United States and tells young people how they can involve their communities.

Johnson, Sylvia A. ***Roses Red, Violets Blue: Why Flowers Have Colors.*** Photos by Yuko Sato. 1991. 64 pages. Lerner. $14.95. (0-8225-1594-6). Grades 4 to 6. Johnson's straightforward text and Sato's full-color photographs closely examine the nature and function of flower colors. Glossary appended.

✦ **Jordan, Helene.** ***How a Seed Grows.*** Illustrated by Loretta Krupinski. Revised edition. 1992. 32 pages. HarperCollins. $14; AHS, $12.50. (0-690-40645-2). Grades 1 to 3. This cheery, fresh, factual instruction book tells how, with the proper balance of sun, soil, and water, a seed becomes a flower, a vegetable, or even a tree.

Kelly, M.A. ***A Child's Book of Wildflowers.*** Illustrated by Joyce Powzyk. 1992. 32 pages. Four Winds. $15.95. (0-02-750142-6). Kindergarten to Grade 4. Kelly and Powzyk identify 24 wildflowers commonly found in North America through the myths, history, and traditions surrounding them. Easy activities such as flower pressing, dying, and drying are also included.

✦ **Kraus, Ruth.** ***The Carrot Seed.*** Illustrated by Crockett Johnson. 1945. 24 pages. HarperCollins. $13; AHS, $11.75. (0-06-023350-8). Preschool to Grade 1. Confident that his plant will grow, a little boy is rewarded for his patience in spite of doubting adults.

Kuhn, Dwight. ***More Than Just a Vegetable Garden.*** 1990. 48 pages. Silver Press. $12.95. (0671-69645-9). Grades 2 to 4. Striking photos enable young readers to see up close the stages of growth in a garden. Also note the author's *More than Just a Flower Garden* (Silver Press).

Lauber, Patricia. ***Seeds Pop, Stick, Glide.*** Photos by Jerome Wexler. 1981. 57 pages. Crown. $12.95. (0-517-54165-3). Grades 2 to 5. Clear black-and-white photos and text reveal how plants distribute seeds, while encouraging the reader to observe how nature assures the dispersion of seeds. Also note the author's *From Flower to Flower: Animals and Pollination* (Crown).

Lerner, Carol. ***Plant Families.*** 1989. 32 pages. Morrow. $13. (0-688-07881-8). Grades 4 to 7. Clear descriptions, in text and art, of 12 of the largest families of flowering plants on this continent.

Llewellyn, Claire. ***Growing Food.*** 1991. 32 pages. Gareth Stevens. $12.95. (0-8368-0678-6). Grades 1 to 3. Children are introduced to the world of gardening and farming in this photo-essay and accompanying inquiry-directed text.

Lobel, Anita. ***Alison's Zinnia.*** 1990. 32 pages. Greenwillow. $14.95. (0-688-08865-1). Preschool to Grade 2. Lobel's beautiful pictures introduce flowers from A to Z while a subplot unfolds in the border along the bottom of the pages.

✦ **Maestro, Betsy.** ***How do Apples Grow?*** Illustrated by Giulio Maestro. 1992. 32 pages. HarperCollins. $15; AHS, $13.65. (0-06-020055-3). Grades 1 to 3. Colorful illustrations and easy text present in detail the life cycle of an apple—from bud to flower to fruit. Also note Gail Gibbons' *The Seasons of Arnold's Apple Tree* (Harcourt).

Moncure, Jane B. ***How Seeds Travel: Popguns and Parachutes.*** 1990. 32 pages. Children's Press. $8.95. (0516-08116-0). Kindergarten to Grade 2. A beginning concept book, this selection helps children understand seeds and their travels.

Morgan, Nina. ***The Plant Cycle.*** 1993. 32 pages. Thomson Learning. $12.95. (1-56487-091-6). Grades 4 to 7. Sharp full-color photographs and detailed text depict various stages of the growing cycle.

Muller, Gerda. ***The Garden in the City.*** 1992. 40 pages. Dutton. $13.50. (0-525-44697-4). Grades 1 to 3. As Ben and Caroline grow a garden they learn the joy of identifying and caring for many kinds of plants. The energetic illustrations are supplemented with sketches, helpful hints, and ideas for projects.

Robbins, Ken. ***A Flower Grows.*** 1990. 32 pages. Dial. $12.95. (0-8037-0764-9). Kindergarten to Grade 2. Beautiful hand-tinted photographs enhance the life cycle of an amaryllis as it turns from a plain-looking bulb into a delicate flower.

Rylant, Cynthia. ***This Year's Garden.*** Illustrated by Mary Szilagyi. 1984. 32 pages. Bradbury. $12.95. (0-02-777970-X). Kindergarten to Grade 2. Working together, a family plants, reaps, and preserves, then waits for winter's end so the growing cycle can begin again.

Seymour, Peter. ***How Things Grow.*** Illustrated by Carole Etow. 1988. 32 pages. Dutton. $6.95. (0-525-67243-5). Grades 1 to 3. Using a step-by-step approach and a numbered wheel with pictures, this easy book explains how apples, corn, a pine tree, and a sunflower grow.

Steele, Mary Q. ***Anna's Garden Songs.*** Illustrated by Lena Anderson. 1989. 32 pages. Greenwillow. $11.95. (0-688-08217-3). Grades 1 to 4. Fourteen poems

about beets, lettuce, cherries, onions, and peas are enhanced by Anderson's upbeat and amusing pictures.

Things That Grow: Step-by-Step Science Activity Projects from the Smithsonian Institution. 1993. 48 pages. Gareth Stevens. $13.95. (0-8368-0959-9). Grades 2 to 5. The Smithsonian step-by-step activity book provides numerous projects concerning flowers and plants that children can do on their own.

Thomas, Elizabeth. ***Green Beans.*** Illustrated by Vicki Jo Redenbaugh. 1992. 32 pages. Carolrhoda. $19.50. (0-87614-708-2). Grades 1 to 3. This delightful read-aloud shows what happens when Gramma leaves her reluctant garden in the care of her green-thumbed granddaughter.

Titherington, Jeanne. ***Pumpkin, Pumpkin.*** 1986. 32 pages. Greenwillow. $13.95. (0-688-05695-4); Softcover, $3.95. (0-688-09930-0). Preschool to Grade 2. Titherington lovingly depicts the life cycle of a pumpkin from spring planting to fall harvest.

Wexler, Jerome. ***Flowers, Fruits, Seeds.*** 1987. 32 pages. Prentice. $12.95. (0-13-322397-3). Grades 1 to 3. Beautiful photographs of fruits and flowers show varying sizes, colors, and seed formations in the plant world. Also note the author's *Wonderful Pussy Willows* (Dutton) and *Queen Anne's Lace* (Albert Whitman).

Wiesner, David. ***June 29, 1999.*** 1992. 32 pages. Clarion. $15.95. (0-395-59762-5). Grades 2 to 4. Holly finds her science experiment running amok when the seedlings she sent into the sky return as gigantic, fully grown vegetables.

Wilkes, Angela. ***My First Garden Book.*** Photos by Dave King. 1992. 48 pages. Grosset. $13. (0-697-81412-4). Kindergarten to Grade 4. An oversize guide to a wide range of digging-in-the-dirt projects for green-thumbed children.

Williams, Vera B. ***Cherries and Cherry Pits.*** 1986. 40 pages. Greenwillow. $13.95 (0-688-05145-6). Kindergarten to Grade 3. This happy read-aloud is about a girl who has important plans for her cherry pits; she plants them and starts "a whole forest of cherry trees" right on her block.

Wilner, Isabel. ***A Garden Alphabet.*** Illustrated by Ashley Wolff. 1991. 32 pages. Dutton. $12.95. (0-525-44731-8). Preschool to Grade 2. Lots of information about gardens is revealed as Wilner and Wolff take readers on a journey through the alphabet. Two other ABC garden books are Jerry Pallotta's *The Victory Garden* and *The Flower Alphabet Book* (both Charlesbridge).

Wilson, Sarah. ***Muskrat, Muskrat, Eat Your Peas!*** 1989. 32 pages. Simon & Shuster. $13.95. (0-671-67515-X). Kindergarten to Grade 2. At the animal picnic, Muskrat endures lighthearted teasing as his friends remind him of the hard work involved in growing the peas that are on the table.

Books With Seeds

Wes Porter's ***The Garden Book & Greenhouse*** includes a shatterproof greenhouse with removable tray for drainage and cleaning, marigold and tomato seeds, peat pellets, and a 64-page instruction book. It's available for $10.95 from Workman Publishing, 708 Broadway, New York, NY 10003.

Carol Anne Campbell's ***Wildflower Field Guide and Press for Kids,*** which includes a plastic press, eight blotting sheets and corrugated spacers, and a 64-page book, is available for $13.95 from Workman.

Kevin Raftery and Kim Gilbert Raftery's ***A Kid's Guide to Messing Around in the Dirt*** ($12.95 from Klutz Press) comes with six packets of vegetable and flower seeds attached to the book's spiral binding.

Key Gardening Books for Children

Maureen Heffernan, education coordinator for the American Horticultural Society, selected the following reference books as deserving of special attention.

✦ **Appel, Gary, and Roberta Jaffe.** ***The Growing Classroom: Garden-Based Science.*** 1990. Addison-Wesley Publishing Company. AHS, $30.50. One of the first and best classroom curriculum programs for teaching science through gardening in the elementary grades.

Brooklyn Botanic Garden. ***Gardening With Children: A Handbook.*** 1984. Reprint of Volume 40, #3, #106 issue of *Plants & Gardens*. Brooklyn Botanic Garden Press. This is an excellent booklet filled with tips on getting children started in planting and maintaining their own garden plots.

✦ **Jekyl, Gertrude.** ***Children and Gardens.*** 1982. Antique Collector's Club Ltd. AHS, $26.50. A profound and delightful classic on how and why it is important to introduce children to gardens and gardening.

Jeunesse, Gallimard, and Pascale de Bourgoing. ***Fruit.*** 1991. Cartwheel Books. This book takes children on a journey inside a fruit and through the seasons of a tree. The book has colorful illustrations with transparent plastic overlays.

✦ **Hunken, Jorie.** ***Botany for All Ages: Learning About Nature Through Activities Using Plants.*** 1989. Globe Pequot Press. AHS, $13.50. This book is filled with hands-on activities for children to learn about everything from bee-tricking structures of flowers to the dye hidden in acorns, and how pollen travels in the wind.

Lopez, Ruth. (1990) ***Gardens for Growing People: A Guide to Gardening With Children.*** 1990. Gardens for Growing People. A catalog filled with products and ideas to make gardening fun and educational for children.

✦ **Lovejoy, Sharon.** ***Sunflower Houses.*** 1991. Interweave Press. AHS, $17.95. A delightful book, full of charming illustrations, stories, and ideas for adults to help children enjoy plants and gardening.

MacLatchie, Sharon. ***Gardening With Kids.*** 1977. Rodale Press.

Ocone, Lynn with Eve Pranis. ***The National Gardening Association Guide to Kids' Gardening: A Complete Guide for Teachers, Parents, and Youth Leaders.*** 1990. John Wiley & Sons, Inc. A true classic in children's gardening reference books. This is a must-have if you are looking to create or enhance a garden or gardening program for children.

Project Wild. ***Project Wild Elementary Activity Guide.*** Rev. ed. 1985. Western Regional Environmental Council. Learn how to transform a barren schoolyard into a thriving, biologically diversified wild garden. Project Wild's guidebook gives great ideas and tips for how to install and maintain wildlife habitat garden sites.

✦ **Tilgner, Linda.** ***Let's Grow! 72 Gardening Adventures With Children.*** 1988. Storey Communications. AHS, $9.75. One of the best books for adults to use to get easy, creative, and practical activity ideas for teaching children how to plant, maintain, and use their gardens as a source of personal and community pride.

✦ **Waters, Marjorie.** ***The Victory Garden Kid's Book.*** 1988. Houghton Mifflin Company. AHS, $14.25. This book offers step-by-step instructions for gardening activities from early spring through fall.

Resources

This section includes lists of organizations that, while not directly participating in the 1993 symposium, offer valuable educational resources for youth gardening programs, teacher training, and financial assistance. The list has been excerpted from AHS's "Resource Guide for Teachers, Parents, and Youth Leaders." The guide was compiled for the children's symposium by Cynthia Klemmer with help from Maureen Heffernan. Klemmer is a 1994 graduate of the Longwood Graduate School Program at the University of Delaware.

Ag in the Classroom
Shirley Traxler, Director
USDA Administration Building
Room 317-A
Washington, DC 20250-2200.
(202) 720-5727, Fax: (202) 690-2842.
School programs and two curriculum guides, "Resource Guide to Educational Materials About Agriculture" and "Library Guide to Books About Agriculture." Programs vary from state to state; check with the national office for state contacts.

AIMS Education Foundation
P.O. Box 8120
Fresno, CA 93747
(209) 291-1766.
"Primarily Plants" curriculum for grades K-3.

Bureau of Curriculum Development
131 Livingston Street
Brooklyn, NY 11201
"Gardening Science Manual" for planning and building school gardens.

California Association of Nurserymen
4620 Northgate Boulevard, Suite 155
Sacramento, CA 94834
(916) 567-0200
"Planting Seeds, Growing Minds" curriculum guide.

Center for Science in the Public Interest
1755 S Street N.W.
Washington, DC 20009
"Ladybugs and Lettuce Leaves," a gardening and environmental curriculum for grades 4-6.

Children's Environments Research Group
City University of New York
Graduate School and University Center
33 West 42nd Street
New York, NY 10036
(212) 642-2970, Fax: (212) 642-2971
Publishes "Children's Environments," an international journal with a readership of researchers, designers, educators, and planners. It serves as a means of communication between scholars in child environment research and as a bridge to practice and policy in environmental design, planning, and education for children.

Common Ground Garden Program
2615 South Grand Avenue
Los Angeles, CA 90007
"Children's Gardens: A Guide for Teacher's, Parents, and Volunteers," a planning guide on gardening with children that includes project suggestions.

Garbage Bag Gardens
Duane Clupper
1711 Stockton Hill Road #310
Kingman, AZ 86401
(602) 757-4762
Container gardening in specially made trash bags.

Global ReLeaf
P.O. Box 2000
Washington, DC 20013
(202) 667-3300
"Global ReLeaf Guides and Kit," curriculum materials, Famous and Historic Tree program, "Growing Greener Cities" environmental education package, and Arbor Day kits.

Green Teacher
Tim Grant, Editor
95 Roberts Street
Toronto, ON M5S 2K5
(416) 960-1244, Fax: (416) 925-3474
Environmental/gardening magazine for teachers. The 1994 April/May issue theme was "The Promise of Gardening" and was devoted to school gardening ideas and resources.

Hydroponic Society of America
2819 Crow Canyon Road, Suite 218
San Ramon, CA 94583
(510) 743-9605
Hydroponic curriculum guide.

Magical Migrating Monarchs
Judith Levicoff
P.O. Box 212
Jenkintown, PA 19046
(215) 576-1359
Video and curriculum materials on creating butterfly gardens and habitats and rearing monarch butterflies.

National 4-H Council
7100 Connecticut Avenue
Chevy Chase, MD 20815
(301) 961-2934
"Exploring the World of Plants and Soils," a lesson and activity series of 15 booklets.

National Science Resource Center
Smithsonian Institution
Arts & Industries Building, Room 1201
Washington, DC 20560
(202) 357-2555
Plant curriculum modules.

National Wildflower Research Center
2600 FM 973 North
Austin, TX 78725
(512) 929-3600
Newsletter, wildflower materials, and poster with children's activities.

Project LEAP (LEarning About Plants)
Cornell Plantations
One Plantations Road
Cornell University
Ithaca, NY 14850
(607) 255-3020
Plant curriculum materials.

Project Wild
5430 Grosvenor Lane
Bethesda, MD 20814
(301) 493-5447

Curriculum materials and guides to transform school grounds into wildlife habitat gardens and outdoor environmental study classrooms.

San Francisco League of Urban Gardeners
515 Cortland Avenue
San Francisco, CA 94110

"Breaking Ground: A Guide for School and Youth Gardening Programs" for parents, teachers, and youth leaders.

Santa Barbara Botanic Garden
1212 Mission Canyon Road
Santa Barbara, CA 93105
(805) 682-4726

Offers hands-on, cross curricular, activity-based guides for teachers on trees, seeds, and cone-bearing plants.

Virginia Polytechnic Institute and State University Cooperative Extension
Diane Relf, Extension Specialist
Department of Horticulture
Blacksburg, VA 24061-0327

Curriculum materials and resource bibliographies on gardening with children including a book list for children's gardening.

Wisconsin Fast Plants
Carolina Biological Supply Company
2700 York Road
Burlington, NC 27215
(919) 584-0381

Plant science curriculum materials and outreach program developed at the University of Wisconsin and sponsored by the National Science Foundation.

Worms Eat Our Garbage: Classroom Activities for a Better Environment
Flower Press
10332 Shaver Road
Kalamazoo, MI 49002

Worms Eat Our Garbage is a 232-page guidebook with over 150 activities that use the world of worms to teach about gardening, natural science, language, and problem-solving skills.

Teacher Training:

Master Gardeners Program
1143 Coliseum Road
San Antonio, TX 78219
(210) 228-0417

Offers teacher/leader training and horticultural-training classroom programs. The program is usually coordinated through the Extension Service—contact your local county extension agency for more information on programs in your area.

See Also:

The Life Lab Science Program and the National Gardening Association's Grow Lab program have national and regional training programs for educators.

In addition to these, call to find out about training/education opportunities at your local:

- ✦ public garden
- ✦ university/community college
- ✦ natural history museum
- ✦ community park service
- ✦ garden clubs
- ✦ native plant societies

Sources for Financial Assistance and Gardening Supplies:

America the Beautiful Fund
Operation Green Plant
Nanine Bilski
219 Shoreham Building
Washington, DC 20005

National nonprofit association to assist development of community-level programs and projects. Distributes free seeds for community gardens and educational programs. Send a SASE for more information.

Common Ground Garden Program
Ricardo Gomez, Manager
Burpee/USDA Partnership
USDA Extension Service
South Building, Room 3347
Washington, DC 20250-0900
(202) 720-2471

Donations for groups serving the most needy and neglected urban areas.

National Endowment for the Humanities
Division of Public Programs
Room 426
1100 Pennsylvania Avenue N.W.
Washington, DC 20506
TDD: (202) 606-8282

Government agency that distributes funds for humanities-oriented events and programs—a good resource for interdisciplinary gardening programs.

The Foundation Center
1001 Connecticut Avenue N.W.
Washington, D.C. 20036
(202) 331-1400

"The Foundation Directory" lists corporate and private foundations. Call for locations and phone number of regional offices.

National Gardening Association
180 Flynn Avenue
Burlington, VT 05401
(802) 863-1308

School garden grants and free educator subscriptions to "Growing Ideas" newsletter.

National Science Foundation
Att: Grants and Agreements
1800 G Street N.W.
Washington, DC 20550
(202) 357-9859

Government agency that distributes funds for science education programs. Competition is national, but many garden-related programs have received funding.

In addition to the above resources, contact the following types of organizations to request cash or in-kind materials to fund your gardening program:

- ✦ Chambers of Commerce
- ✦ Community businesses
- ✦ Parent/teacher organizations
- ✦ Garden clubs and plant societies
- ✦ Commercial garden centers, greenhouses and nurseries
- ✦ Seed companies, garden equipment companies, and other horticulturally-related businesses
- ✦ Large home and garden discount store chains

You can also try to organize a special fund-raising event for your garden project/program. One good idea is to organize a spring plant sale selling seedlings that students have grown.

To receive a copy of the Resource Directory, send $5 to: AHS, Resource Directory, 7931 East Boulevard Drive, Alexandria, VA 22308-1300.

Children's Garden Designs

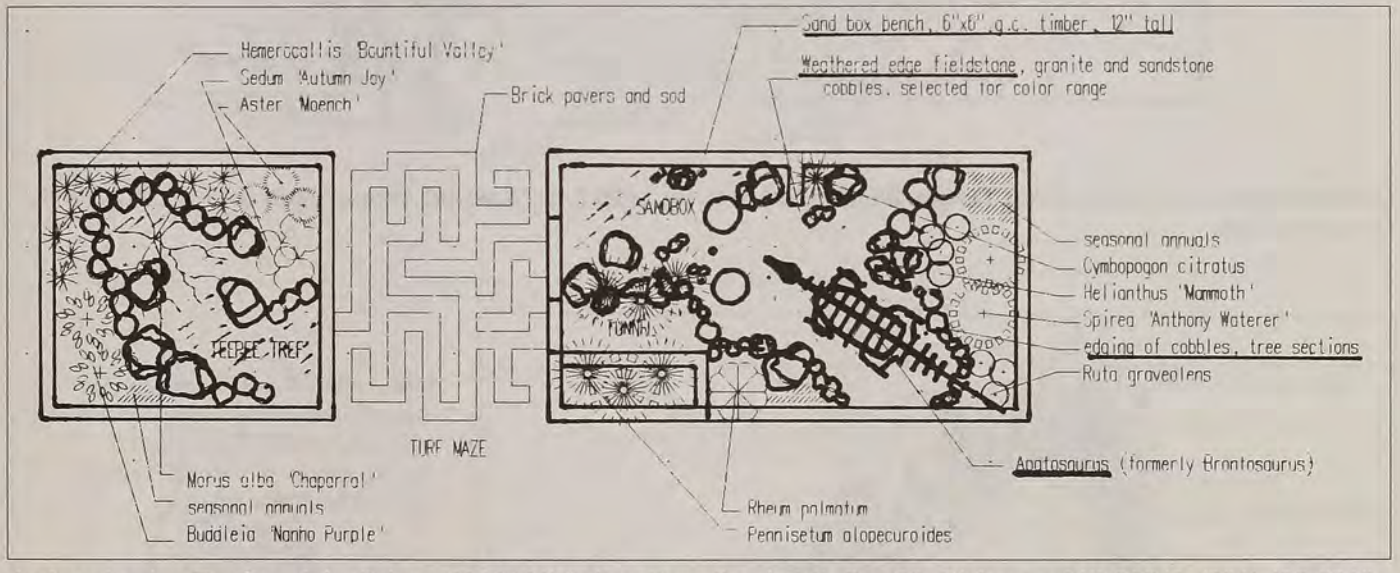
In conjunction with the symposium, 12 new gardens for children were installed at River Farm, the headquarters of the American Horticultural Society. The gardens were designed by both school groups and professional landscape designers.

The gardens were designed to be of sizes that could easily be incorporated into most home backyards or school sites—the average size is approximately 300 square feet for the larger gardens and 125 square feet for smaller ones.

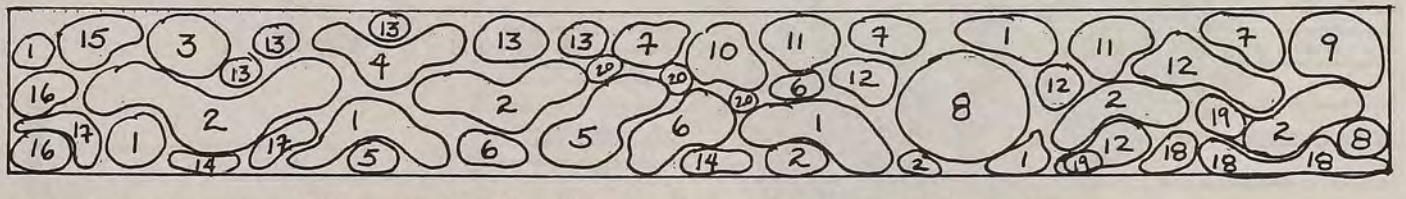
The project demonstrates a diverse range of creative ways to incorporate children's needs and interests into an outdoor area. Unlike most traditional landscaping, these gardens are meant to be living spaces for children to garden, play, learn, discover, and to fully use their imagination and all of their senses.

For more detailed plans for all 12 of the gardens, please send $2 to: AHS, Children's Program Guide, 7931 East Boulevard Drive, Alexandria, VA 22308-1300.

The following garden designs can be replicated exactly or used as a springboard for new garden design ideas.

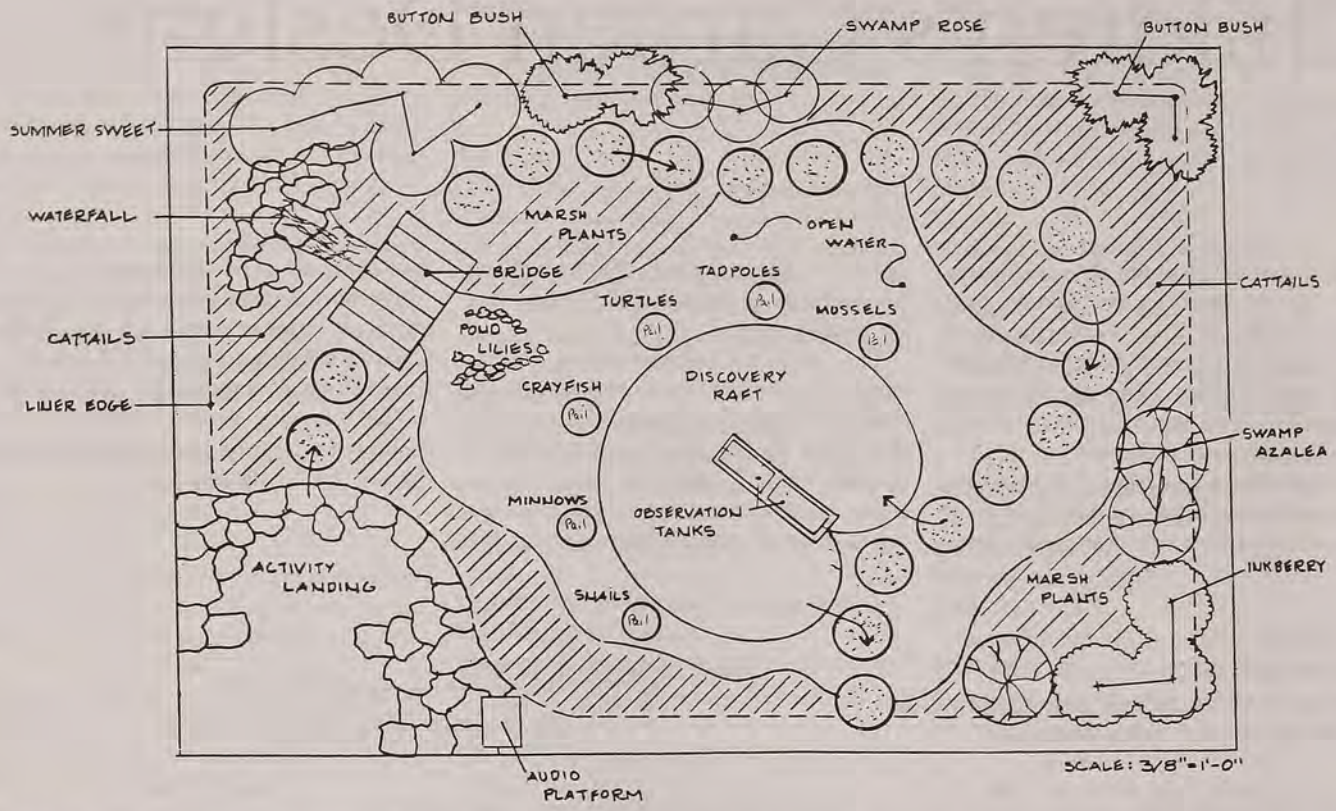


An Imagination Garden—John Snitzer, 22315 Nicholson Farm Road, P.O. Box 38, Dickerson, MD 20842, (301) 428-8310.

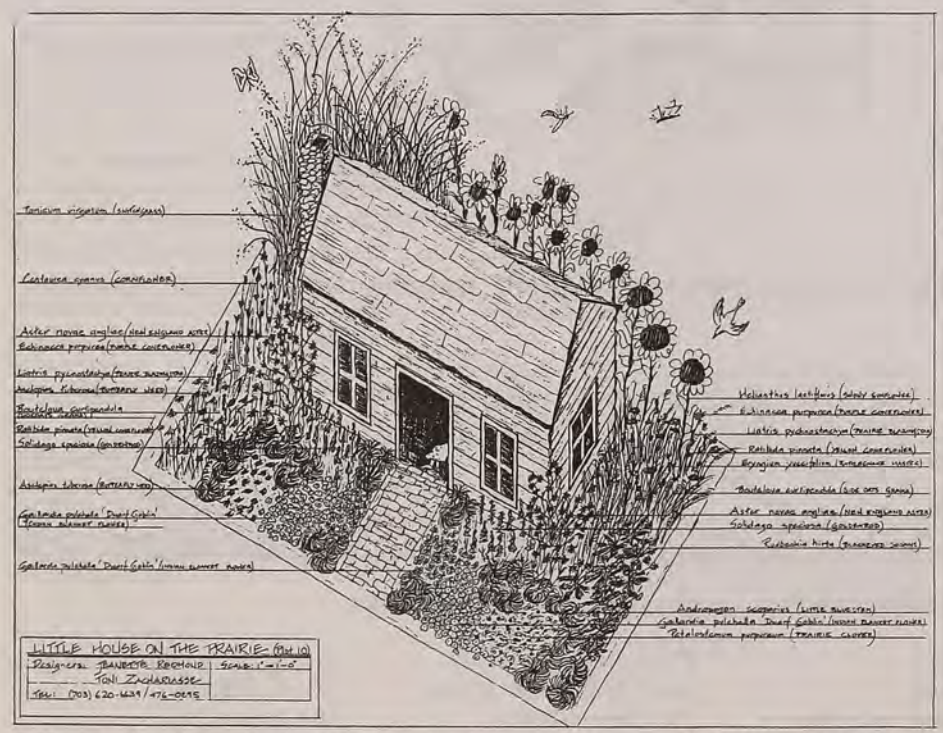


Butterfly Garden—Leena Bhimani and Kathleen Wheeler. Contact AHS for more information.

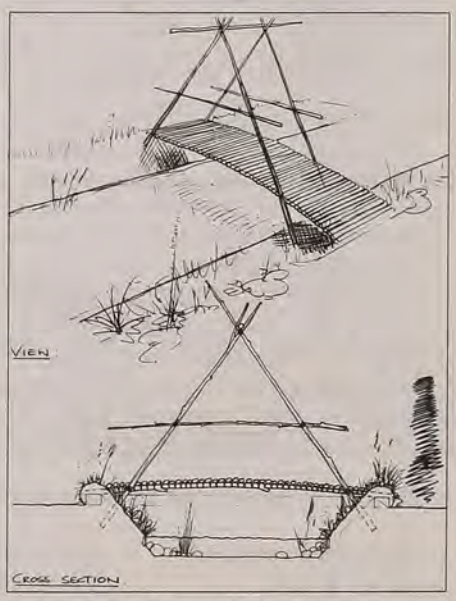
1—Echinacea purpurea
2—Salvia farinacea
3—Alcea rosea
4—Asclepias tuberosa
5—Penstemon
6—*Zinnia*
7—Buddleia
8—Aster novae-angliae
9—Tithonia
10—Asclepias incarnata
11—Lobelia cardinalis
12—*Madagascar Vinca*
13—Hemerocallis
14—Coreopsis
15—Achillea *'Cornation Gold'*
16—Achillea millefolium
17—Gaillardia
18—Ageratum
19—*Verbena*
20—*Phlox*



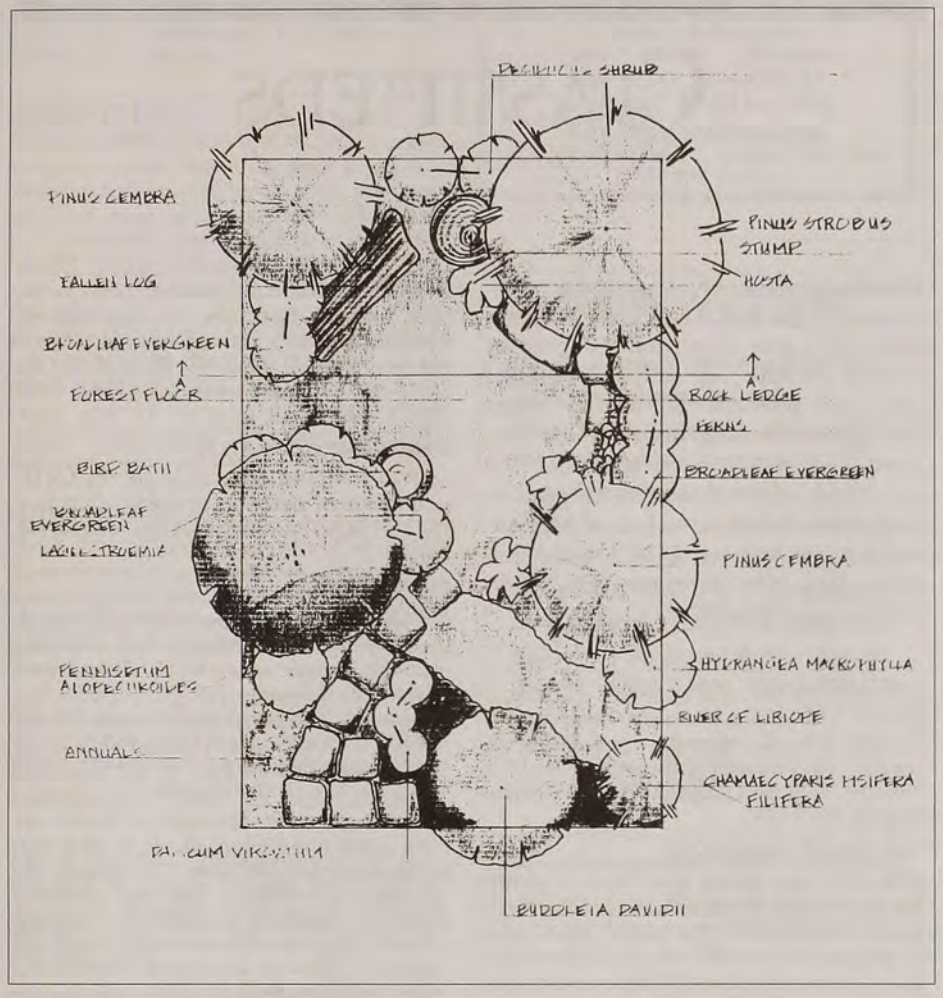
Children's Discovery Pond—Kibbe Turner, Wildlife Habitats, Inc., 420 East Diamond Avenue, Gaithersburg, MD 20877, (301) 670-1366.



A Prairie Garden—Outback Design, Oakton and Reston, VA, (703) 620-6639 or (703) 476-0895.

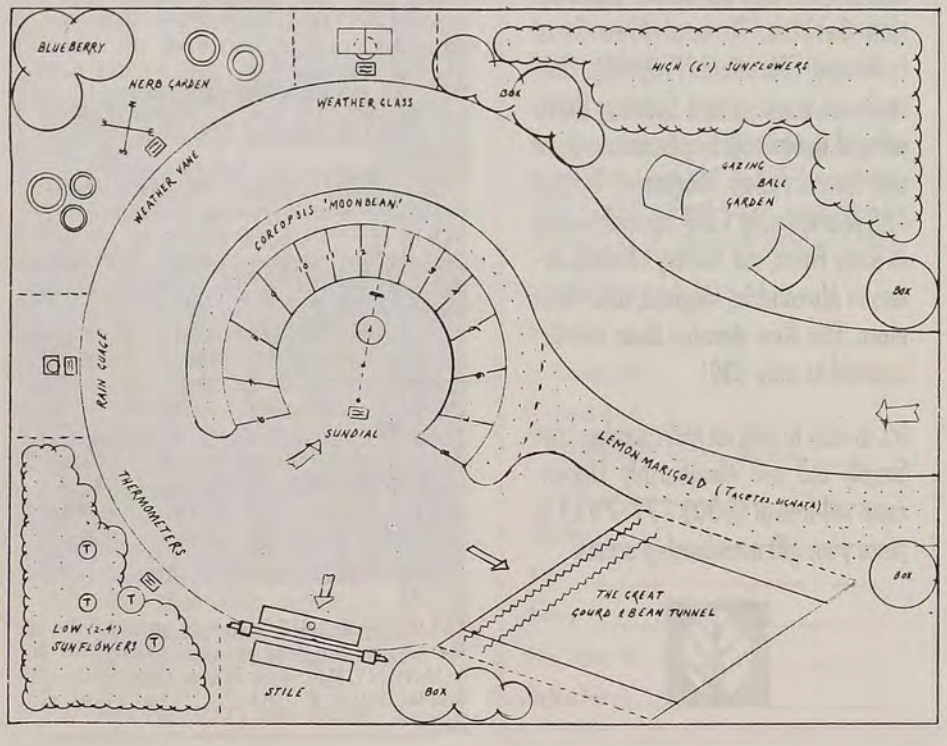


A Ditch Garden—Alastair Bolton, 110 North Peyton Street, Alexandria, VA 22314, (703) 549-1521.

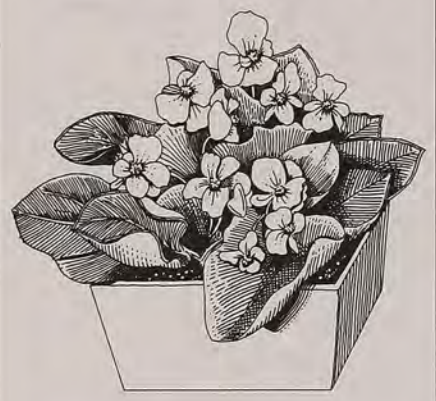


The Grove—DLM Design, 3906 East West Highway, Chevy Chase, MD 20815, (301) 654-4813.

Colonial Wind, Weather, and Sundial Garden—Thomas Arnold, Landscape Design, Ltd., 400 Underhill Place, Alexandria, VA 22305, (703) 548-9758.



LET'S GROW TOGETHER



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We at the American Horticultural Society are often asked to refer individuals to significant horticultural positions around the country. We are not in a position to offer full placement services to candidates or employers. However, as a service to our members—job seekers and employers alike—we welcome the résumés and cover letters of individuals seeking job changes and employers seeking candidates. All responsibility for checking references and determining the appropriateness of both position and candidate rests with the individuals. AHS's participation in this activity is only to serve as a connecting point for members of the Society. Inquiries and informational materials should be sent to HORTICULTURAL EMPLOYMENT—AHS, Dept. 794, 7931 East Boulevard Dr., Alexandria, VA 22308-1300.

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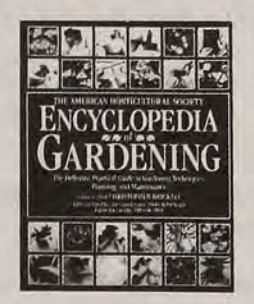

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