



# Newsletter

Volume 7, Number 3  
May - June 1990

## Summer at the Arboretum

- For the first time, a summer semester—four classes and an ecological excursion—is being planned by the IES Continuing Education Program. See the list of offerings in the Calendar on page 4.
- The Outdoor Science Center, behind the Perennial Garden at the Gifford House, welcomes visitors during Arboretum hours. The walk-through pond ecosystem and Eco-ponds are open now, and plants are starting to come up in the Air Pollution Garden . . . late July through August is the Pollution Garden's most interesting time.
- For the third year, the National Science Foundation has funded IES participation in the Research Experiences for Undergraduates program. Nine college students are doing independent research at the Institute for 12 weeks. Their findings will be presented at a public symposium in the Plant Science Building on Monday, August 20th. Call the Gifford House for information.
- The Perennial Garden is lovely! Bring your lunch and have a picnic at shaded tables overlooking the garden.

The IES Newsletter is published by the Institute of Ecosystem Studies at the Mary Flagler Cary Arboretum. Located in Millbrook, New York, the Institute is a division of The New York Botanical Garden. All newsletter correspondence should be addressed to the Editor.

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## IES Reaches Out for Earth Day

Earth Day 1990—April 22nd—brought perfect spring weather to Dutchess County. It was a day not only to appreciate the out-of-doors but also to look at the environmental condition of the world today, and to learn about what is being done . . . and what more can be done . . . to improve this condition.

The Institute of Ecosystem Studies and the Cornell Cooperative Extension of Dutchess County joined to offer a series of events in recognition of the 20th anniversary of Earth Day. The large parking lot at the Gifford House Visitor and Education Center was filled all afternoon as people participated in programs presented by IES ecologists and educators. In "Trees, Trauma and Time," for example, Drs. Alan Berkowitz and Charles Canham led a walk to show how different species of trees react to environmental stresses, and how forests change over time. Later, Dr. Gary Lovett took a group to the IES weather and atmospheric monitoring station to show how Institute ecologists answer the question: What does our air bring? Finally, using interactive components developed for the Institute's acid rain program for school groups, Kass Hogan spoke about "Acid Rain and the World of Water."

At the Farm and Home Center, site of the Cooperative Extension offices, Jeff Gersh is director of the Environmental Management Council (EMC). Coordinator of the Cooperative Extension's Earth Day events, he reported an attendance of over 2000 people who came to hear lectures and

storytelling, to see displays and demonstrations, to take a wetlands walk with Elsa Bumstead of the EMC, and to pick up free tree seedlings. IES programs were also held at the Farm and Home Center: Dr. Jonathan Cole spoke on global environmental change (with an epilogue by Jeff Gersh on how to make a difference in Dutchess County) and Jill Cadwallader led a program for children on how to make an origami wetlands ecosystem.

IES participation in Earth Day programs was not limited to Millbrook. Institute Director Dr. Gene E. Likens gave the commencement address at the April 22nd graduation exercises at Goshen College in Indiana. On "Protecting the Earth's Environment—It's the **Right** Thing to Do," Dr. Likens presented facts to support his argument that today's assault on natural systems—the dumping of toxic wastes, the paving of open space, the destruction of tropical forests and tribal homelands, the fouling of the atmosphere—is now exceeding the capacity of many systems to be "self-balancing." He urged the Earth Day graduates to "Live your lives as if any assault on environmental quality were pollution in your backyard, because that is precisely what it is."

Dr. Likens participated in other Earth Day-related events as well. On April 17th and 18th he spoke at The Ohio State University on acid rain and on insights gained from long-term ecological research. Two days later, at the Centennial Science Symposium

*continued on page 2*



Earth Day question: What does our air bring? IES ecologist Dr. Gary Lovett (on the left, with the light-colored shirt) led a group of IES Earth Day visitors to the Institute's weather and atmospheric monitoring station to demonstrate ways in which scientists answer that question.

# Eaton Fellow Studies Aluminum in Stream

Alexandra M. Shultz became interested in the relationship between aluminum and the pH of streams and lakes<sup>1</sup> while reviewing scientific literature in her chosen field of chemistry. Ms. Shultz is a senior at Vassar College in Poughkeepsie, New York, and last spring began considering ways to incorporate this interest into a meaningful independent study problem for the thesis project required of all Vassar chemistry majors. The answer to her search came in the form of a poster announcing the John S. Eaton Fellowship at the Institute of Ecosystem Studies. She submitted a brief written proposal, and was selected from a number of applicants for the fellowship.

It was fortuitous that, during a study of sediment-dwelling animals in the Coxing Kill (a stream in Ulster County, New York), IES aquatic ecologist Dr. David L. Strayer had discovered an unusually large pH gradient with values ranging from approximately 4 upstream to 7 only thirteen kilometers (8 miles) downstream. (This difference is probably due to different types of bedrock, with different buffering capacities.) Ms. Shultz learned of Dr. Strayer's finding during discussions with IES staff prior to finalizing her project, and in October 1989 began research to determine whether there was a relationship between the pH of the Coxing Kill and the presence of dissolved aluminum.

A full-time student, Ms. Shultz took advantage of her January break to do the field work component of her project. She collected ten samples from each of nine sites along the Coxing Kill, as well as from a tenth site in Fountain Brook, a small tributary with a high pH that enters the Coxing



Alexandra Shultz, the first Eaton Fellow, did her field work in an Ulster County stream and her data analysis in the IES laboratories.

Kill about halfway along its length. She then used instruments in the IES chemistry laboratories to analyze each of the 100 samples, measuring pH, determining amounts of organic and inorganic aluminum, and recording data on the general chemistry of the Coxing Kill.

After analyzing her data, Ms. Shultz reports that there is a higher concentration of inorganic aluminum, a toxic substance, upstream in the Coxing Kill, where the pH is low, than there is downstream. Previous research has demonstrated such a relationship between aluminum and acidic water in lakes and in larger stream systems, and now the relationship has been demonstrated in a small stream system as well. The data prove interesting enough that Ms. Shultz will be continuing her research on the Coxing Kill this summer, working at Vassar College while interacting with Institute scientists and using the IES laboratories.

\* \* \* \* \*

The John S. Eaton Fellowship in Laboratory Sciences was established in 1988 following the death of John Eaton, forest ecologist and IES laboratory manager. The fellowship is supported by donations from friends and colleagues. Eaton Fellows do research at the Institute, learn state-of-the-art analytical techniques and collaborate with IES staff. Their experiences provide them with the opportunity to perpetuate the insight and values that John Eaton brought to ecological science. Alexandra Shultz is the first of the Eaton Fellows.

**Ed. note:** Just before this issue went to press, we learned that Alexandra Shultz has been elected to the Vassar College chapter of *Phi Beta Kappa*.

<sup>1</sup> The logarithmic pH scale indicates degree of acidity or alkalinity. On a scale of 0-14, neutral is 7.0; vinegar, an acid, has a pH of approximately 3.0 while ammonia, a base, has a pH of approximately 11.0. Thus, the lower the pH value the higher the level of acidity.

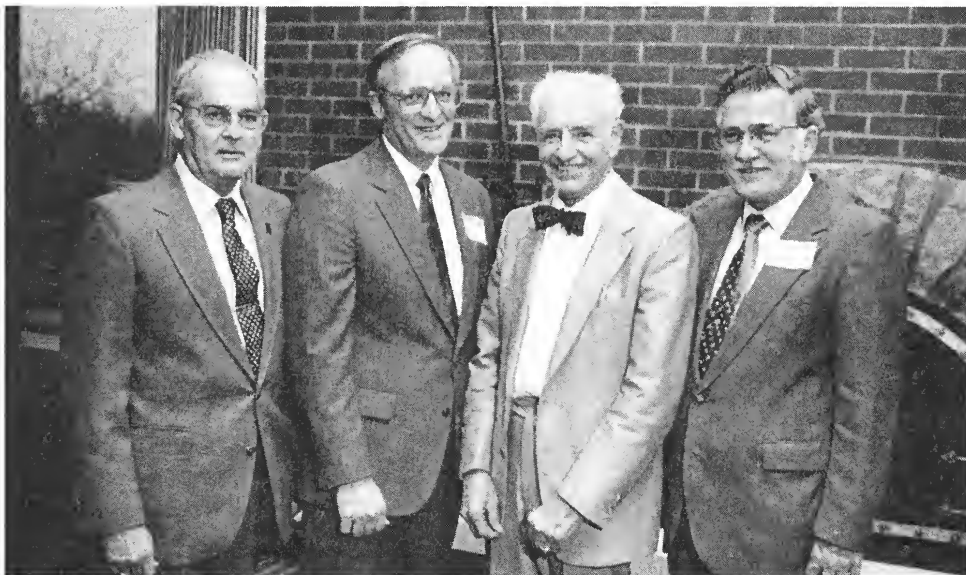
Soil is rich in minerals, and acidic water releases these minerals as it comes in contact with soil and with stream sediments. In this way, aluminum, a common element in soil in both its organic and its more toxic inorganic forms, can be transported into freshwater ecosystems where it will stay in solution while the pH remains low. Similarly, it is possible that in water with a higher pH, i.e., more basic, dissolved aluminum will settle out into the stream sediments. (For more on aluminum and acid rain, see IES NEWSLETTER Vol. 6 No. 5, Sept.-Oct. 1989).

## Earth Day, from page 1

held at Manchester College, Indiana—where he had received his undergraduate degree as well as an honorary doctor of science degree—Dr. Likens presented the keynote address at the symposium banquet, and described the “State of the World’s Ecosystem—Environmental Prospects for the 1990s.”

*continued on page 4*

Right: While at Manchester College for its Centennial Science Symposium, Dr. Likens visited with professors who had been especially important to him during his undergraduate years. L. to r.: Dr. Philip Orpurt, Dr. Likens, Dr. Emerson Niswander and Dr. William Eberly.



KINDNESS OF MANCHESTER COLLEGE

# Ceremony Honors IES Volunteers

The Institute's programs are strengthened by the 52 volunteers who work regularly in the greenhouse and gardens, the laboratories and the library, the education program and the field laboratory. Once a year these volunteers are honored at a special ceremony at the Plant Science Building. This year's Volunteer Recognition Dinner, held on April 26th, was attended by 44 volunteers and their IES supervisors.

After a social hour and dinner, Dr. Alan Berkowitz, head of the IES Education Program, introduced Dr. Gene E. Likens, director of the Institute. Dr. Likens gave an update on recent improvements—the new roof for the Plant Science Building, renovations to the Fern Glen and to the Carriage House—and outlined future plans that include the design and construction of an auditorium. He spoke of the quality of the IES research and education programs, and of one measure of this quality—the competition for available financial support—by reporting that a recent panel of the National Science Foundation received 60 proposals for funding in the field of ecological research, and awarded grants for six; one of those was to IES. Dr. Likens concluded by expressing his appreciation that the volunteers are an important part of the IES family.

## Presentation on The NYBG Forest Project

The evening's slide program described the preservation, study and management of The New York Botanical Garden Forest and was presented by IES ecologist Dr. Mark McDonnell, coordinator of The New York Botanical Garden Forest Project. Dr. McDonnell explained that out of the approximately 2000 hectares (5000 acres) of forest in New York City's five boroughs, the 16 hectare (40 acre) NYBG Forest in the Bronx is the only one that has never been cut. This forest, which contains some very large oak and hemlock trees over 250 years old, faces many challenges. Air quality is not very good. The rain is acidic. Levels of heavy metals, especially lead, are high in the forest floor. The soil in the forest during the spring repels water (the cause of this strange phenomenon is under investigation). Large numbers of visitors straying from the paths have taken their toll as well.

Dr. McDonnell began the forest project in 1984, with a grant from the DeWitt Wallace Reader's Digest Fund. The goals of the project are to do research, to promote education, and to develop an effective way to manage the forest. A formal management plan was approved in



*The greenhouse staff with its team of hard-working volunteers. L. to r.: greenhouse gardener Wendy Dembo, Mary-Esther MacFadyen, Lisa Bandazian, greenhouse manager David Bulkeley, Anne Kuchler, Edith Bancroft, Faith Lathbury, Ruth Melton, Betty Strattan and Rose Michaelis.*

1988. The plan, drafted by Dr. McDonnell, Dr. Likens and Mr. Joseph Warner, presented guidelines to encourage the maintenance of natural ecosystem processes and limit human intervention, and to encourage persistence of native plants and animals and discourage non-native species. After six years of hard work, The New York Botanical Garden Forest ecosystem is showing signs of recovery and is once again providing an attractive, welcoming and educational experience for its many visitors.

The awards ceremony followed Dr. McDonnell's talk. Dr. Berkowitz began with special recognition of the excellent work of Helen Vagts (see following article), presenting her daughter, Jane Straub, with the volunteer certificate and special service award that Helen earned for her work in 1989. He then invited each supervisor to come forward to present certificates to his or her volunteers, and closed the ceremony with a special thank-you to Marcia Davis, assistant to the education staff, for her work with volunteers throughout the year and for organizing the evening's program.

## More Volunteers Needed

The Institute has openings for volunteers in many areas, including the following:

*Gift and Plant Shop/Visitor Reception  
Horticulture  
Education  
Library*

Among other benefits, volunteers receive the IES Newsletter and enjoy discounts in the Gift and Plant Shop. Volunteers who work a specified number of hours may enroll at no charge in one continuing education course each term.

Call the IES Education Program office at (914) 677-5358 for information.

## In memoriam: Helen M. Vagts

Helen Vagts loved to work. In 1980, at age 68, she retired from her job as a clerk in Long Island and moved to Dutchess County. Before long, her endless supply of energy led her to look for opportunities to volunteer, and she began working at the Mary Flagler Cary Arboretum in June 1981. Assisting Education Program staff with clerical work and mailings, often two or three days a week if called upon, by January 8, 1990 she had accumulated a total of over 3,100 volunteer hours. At the Volunteer Recognition Dinner, Dr. Berkowitz told of calculations he did showing that based on a 35-hour work week Helen had contributed almost two years of full-time service. It had been in acknowledgement of such dedication and hard work that Dr. Likens presented her with the Director's Award for Meritorious Service in December.

Helen Vagts died on March 31st, three weeks after her 78th birthday. The IES Education Program office will not be the same without her.

## Earth Day, from page 2

Other IES participation in Earth Day and Earth Week events:

- Dr. Mark McDonnell, a terrestrial ecologist at the Institute and coordinator of The New York Botanical Garden Forest Project, worked with Edward S. Roy, NYBG forest manager, on Earth Day weekend, leading hourly afternoon tours that focused on the history and ecology of the forest, and on the management techniques that are used to restore the area.
- IES ecology educator Kass Hogan and fellow members of the Mid-Hudson Environmental Educators Association organized "Earth Day/Every Day" on April 26th at the Main Mall in Poughkeepsie, New York. Attendance was excellent, with area workers and groups from nearby schools enjoying the programs and displays provided by 16 local environmental groups. The IES acid rain exhibit described the effects of acid rain on freshwater ponds, and featured a giant fish soft-sculpture that unzips to reveal a freshwater food chain.
- Diana Wilson (also with the Institute's Education Program) worked with her New Paltz (N.Y.) Middle School Environmental Action Group to organize games teaching composting and recycling on Earth Day in New Paltz. Later in the week she spoke at Millbrook's Elm Drive School, and children in kindergarten through third grade played roles as water, sun and carbon dioxide molecules while she told a story about the life of a tree and the important role that plants play in producing a healthy environment.

## Summer Calendar

### CONTINUING EDUCATION PROGRAM

This year, for the first time, we are offering a **summer semester**. If you are not on the Continuing Education Program mailing list and would like a flier, please call the number below or stop by the Gifford House.

#### Classes

**Ornamental Grasses in the Garden** (July 10)  
**Birds and Butterflies in the Garden** (July 12)  
**Drawing I** (4 sessions beginning July 16th)  
**Wildflowers in the Garden** (July 25)

#### Excursion

**Wave Hill and The Cloisters** (July 19)

### SUNDAY ECOLOGY PROGRAMS

Free public programs are offered on the first and third Sunday of each month, except over holiday weekends. Programs begin at 2 p.m. at the Gifford House on Route 44A unless otherwise noted. For walks, dress according to the weather, with long pants, socks and sturdy footwear. Call (914) 677-5359 to confirm the day's topic.

June 17: **Fungal Foray: There's More to the Soil Than You Think!**, a walk led by Dr. Margaret Carreiro

July 1: **How Plants Defend Themselves**, a walk led by Dr. Clive Jones

July 15: To be announced

August 5: **Mammals of the New York Woods and Fields: Trapping, Tracks and Sign**, a walk led by Dr. Richard Ostfeld

August 19: **The IES Air Pollution Garden**, a demonstration led by an IES educator  
September 2: Labor Day weekend—no program

*In case of inclement weather, call (914) 677-5358 after 1 p.m. to learn the status of the day's program.*

### IES SEMINARS

The Scientific Seminar Series will resume in September.

*For more information, call (914) 677-5359 weekdays from 8:30 - 4:30.*

### GREENHOUSE

The IES greenhouse is a year-round tropical plant paradise as well as a site for controlled environmental research. There is no admission fee, but visitors should first stop at the Gifford House for a free permit.

### GIFT SHOP

**Senior Citizens Days:** On Wednesdays senior citizens receive a 10% discount on all purchases (except sale items).

**Father's Day and Pre-inventory Sale,** June 1-17. 10% off all merchandise.

**July:** New stock after June's sales.

### ARBORETUM HOURS

**(Summer Hours: May 1 - September 30; closed on public holidays)**

**Arboretum** grounds are open Monday - Saturday, 9 a.m. to 6 p.m.; Sunday 1 - 6 p.m. The Greenhouse and the Plant Science Building close at 4 p.m.

The **Gift and Plant Shop** is open Tuesday through Saturday 11 a.m. to 5 p.m. and Sunday 1 - 5 p.m. (closed weekdays from 1 - 1:30 p.m.).

*All visitors must obtain a free permit at the Gifford House for access to the Arboretum. Permits are available up to one hour before closing time.*

### MEMBERSHIP

Become a member of the Mary Flagler Cary Arboretum. Benefits include a special member's rate for IES courses and excursions, a 10% discount on purchases from the Gift Shop, free subscriptions to the IES Newsletter and Garden (the beautifully illustrated magazine for the enterprising and inquisitive gardener), and parking privileges and free admission to the Enid A. Haupt Conservatory at The New York Botanical Garden in the Bronx. Individual membership is \$30; family membership is \$40. For information on memberships, contact Janice Claiborne at (914) 677-5343.

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