

AGRICULTURE & LIFE SCIENCES NEWS

New York State College of Agriculture and Life Sciences at Cornell University

May 1985

Advanced Supercomputing Center Established at Cornell



Charles Harrington

At a Day Hall news conference announcing the establishment of the supercomputing center are (from left at the head table) Alec Grimison of IBM; Donald P. Greenberg, director of the Program of Computer Graphics; William L. Schrader, executive director of the Center for Theory and Simulation in Science and Engineering; Robert Barker, provost of Cornell; Joseph M. Ballantyne, vice-president for research and advanced studies; and Alison A. Brown, who is in charge of the networking and experimental supercomputing efforts of the Theory Center.

Cornell has been named by the National Science Foundation as one of four national supercomputing centers.

The center will be associated with Cornell's new Center for Theory and Simulation in Science and Engineering, which will be directed by Kenneth G. Wilson, the James A. Weeks Professor of Physics at Cornell and winner in 1982 of the Nobel Prize in physics.

Comstock Hall, which will be transferred administratively from the College of Agriculture and Life Sciences to the university, will house Cornell's supercomputer.

The other supercomputing centers will be established at Princeton University, the University of California at San Diego (UCSD), and the University of Illinois at Urbana/Champaign.

Acquired through a \$200 million NSF grant, the four supercomputers will be the core of a network that will connect more than 30 schools. The network will greatly increase the high-speed computing power available to thousands of researchers and will enable scientists throughout the nation to work more closely with one another.

"Supercomputers will create a completely new strategy for scientific investigation," Kenneth Wilson says.

In addition to NSF start-up funding exceeding \$7 million each year, the Cornell Theory Center will receive more than \$30 million worth of equipment and services from IBM and support from several other corporations. More than \$60 million will be committed to supercomputing research at Cornell over the next three years.

Cornell's computer will be a top-of-the-line IBM 3084-QX, which will be combined with several scientific processors that each have up to 2 million words of memory. The system's extraordinary "information-crunching" and graphics capabilities can provide computer simulations of such events as the birth of a tornado, the potential actions of a new drug, or the stress on an airplane wing in high-speed flight.

Supercomputers are generally used to solve problems that could take years on conventional mainframe computers. Because of their high cost, the machines have previously been used almost exclusively by the Defense Department, intelligence agencies, national laboratories, and a few major corporations.

The researchers in Cornell's Theory Center will develop new tools required for advances in science, education, and industry. They hope to achieve

(continued on page 51)

Two Cornell Scientists Win National Science Medals



Two Cornell professors, Wendell L. Roelofs (left) and Roald Hoffman, were among 19 Americans awarded the National Medal of Science this year. They received their medals from President Ronald Reagan in ceremonies at the White House in February.

Roelofs, professor of entomology at the New York State Agricultural Experiment Station at Geneva, won the 1983 Wolf Prize in Agriculture, the top international award in agriculture. Hoffman, a 1981 Nobel laureate, is chairman of the chemistry department in the College of Arts and Sciences.

Recipients are selected on the basis of their contributions to the present state of physical, biological, mathematical, engineering, behavioral, and social sciences. The Committee of the National Medal of Science chooses 20 or fewer nominees from about 150 each year. The names of these individuals are then submitted to the president, who makes the final selection.

Roelofs was cited for his "fundamental contributions to basic and applied biology in the field of insect pheromones, their chemical composition and blends, their biosynthesis, how insects perceive and respond to them, and their use in insect pest management."

Hoffman's citation credits him for "creative applications of theory to organic chemistry, [which have] brought together the world community of chemists. The magnitude and uniqueness of his contributions to modern chemistry and the scientific process are contributing to an ever-improving understanding of chemistry."

A member of the Cornell faculty since 1965, Hoffman is the John A. Newmann Professor of Physical Science. A theoretical chemist, he has developed a variety of computational procedures, as well as qualitative symmetry and bonding theories, and has applied these methods to problems of structure and reactivity of both organic and inorganic molecules. His Nobel Prize, shared with Kenichi Fukui of Kyoto University, Japan, was for devising a set of rules, based on the geometry of atoms, that predicts whether chemical reactions will occur.

Roelofs joined the Agricultural Experiment Station in 1965. His pioneering research on the isolation, identification, and synthesis of the insect sex attractants known as pheromones has resulted in an increased use of these substances in agriculture. Roelofs's technique for monitoring biologically active compounds in pheromone extracts was regarded as a monumental breakthrough. His studies have improved pest-management programs in orchards by reducing the need for pesticide applications.

Advanced Graphics to Be Part of Supercomputing Program

Ever since the first drawings of the wheel appeared on cave walls, humans have been using pictures to make new and complicated ideas easier to understand.

The complex supercomputer age will be no exception, according to Donald P. Greenberg, director of the Program of Computer Graphics at Cornell.

In fact, says Greenberg, "For supercomputing to work, you really need advanced computer graphics. Computers will produce so much information that we won't be able to keep up with

them unless they show us pictures of what they're doing."

Cornell's new Center for Theory and Simulation in Science and Engineering will work closely with staff members in Greenberg's 11-year-old computer graphics program to improve graphics capabilities by a factor of 100 to 1,000. In turn, these improvements will become instrumental tools for interacting with and understanding high-speed computer processing.

Today, computer graphics images—created fr

(continued on page 51)

John Sterling Appointed Director of Alumni Affairs

John C. Sterling '59 has been named director of alumni affairs and assistant to the dean. He succeeds Gerald H. Hill (M.P.S. '80), who is now executive director of the New York State 4-H Foundation at Cornell.

Mobilizing volunteers has been the theme of Sterling's career.

Sterling was the first executive director, from 1969 to 1973, of the New York State 4-H Foundation, Inc. Under his leadership, a fund-raising campaign generated \$1 million in three years and a statewide organization of some 200 corporate and community volunteers was established.

Sterling started his career as an assistant 4-H agent in Nassau County. In 1960, he became a county 4-H program leader and, later, extension staff chairman in Tompkins County. Through the efforts of a 525-member volunteer organization that he supervised, membership in Tompkins County 4-H grew from 650 to 5,700 in nine years.

In 1979, as state 4-H program coordinator for Cooperative Extension at Cornell, he prepared a report, "Middle Management Volunteer," that was instrumental in establishing a nationwide 4-H management-level volunteer system.

For the past 3½ years, Sterling has been assistant director of the Massachusetts Cooperative Extension Service. The Massachusetts 4-H program, a component of Cooperative Extension, involved 83,000 youths taught by 4,500 volunteers.

Under his chairmanship, an American Cancer Society crusade in Ulysses, N.Y., exceeded its annual goals for four years in a row.

Sterling has served on several national committees on volunteer development and private support and has directed workshops for extension professors and volunteers throughout the country.

The most important element in building a volunteer network, Sterling says, is to know what the volunteers need to accomplish goals and to have clearly defined tasks—also the basic principles of business management.

"Volunteers should be involved in management decisions," he notes, "rather than just given directions. I have a lot of confidence and high expectations for the alumni association's board of directors. In turn, they rightfully expect that I will provide strong leadership for their association efforts."

(continued on page 3)

Agriculture and Life Sciences News is published twice a year by the New York State College of Agriculture and Life Sciences, a statutory college of the State University, at Cornell University, Ithaca, N.Y.

Acting Dean
Kenneth E. Wing

Associate Dean
Robert J. Young

**Assistant to the Dean,
Director of Development**
Glenn O. MacMillen

**Assistant to the Dean,
Director of Alumni Affairs**
John C. Sterling

Editor and Writer
Zorika Petic Henderson

Managing Editor
Ellen Murphy Bonn

Copy Editor
Erica Fox

Designer
Barbara Drogo

Photographer
Donald Albern

Production Coordinator
Marilyn M. Kelly

Contributing Writers
Joe Eller, Mark Eyerly, Robert L. Johnson, Yong H. Kim, Mary McGinnis

Produced by Media Services at Cornell University. Subscription is free upon request. Send address changes and requests for subscriptions to Office of Development and Alumni Affairs, 242 Roberts Hall, College of Agriculture and Life Sciences, Cornell University, Ithaca, NY 14853.
5/85 33M II 9598

Cornell University is an equal opportunity, affirmative action educator and employer.



Donald Albern

John Sterling (right) and alumni association treasurer George J. Conneman review plans for a special membership drive. Conneman is director of instruction at the college and professor of agricultural economics.

Doubling of Alumni Membership Sought by '86

The college's alumni association has set a goal of 4,000 total members by Dec. 31, 1985, double the current number and reversing a decline in membership.

Our goal reflects the spirit and energy of the association's board of directors. To support this ambitious initiative, the membership committee has recommended that an intensive membership campaign be launched immediately. Six New York district directors—Judith Riehlman '80, Cortland; Andrew Piscione '65, Fonda; Paul Tilly '58, Lima; Albert Beard, Jr. '52, Milford; Hans Kunze '82, Cayuga; and Jane Adams Wait '43, Lake George—volunteered at a recent board meeting to conduct a special effort campaign. Nearly all other district directors have initiated plans for membership drives.

Consideration is being given to the creation of state coordinator positions. Sandi Leigh '84 has volunteered to head up alumni work in Florida. This position is similar to one held by Robert Gellert '63 in New Jersey. Each director will seek

(continued on page 3)



Kenneth MacLaurey '59 (left) of Auburn helps district director Hans Kunze '82 recruit alumni for leadership roles for Kunze's district (Oswego, Onondaga, Seneca, and Cayuga counties) in New York State.

I want to be part of the "4,000 in '85" alumni membership campaign.

Enclosed is:

- \$200 for a lifetime membership
 \$70 as a first installment on a three-year commitment to a lifetime membership
 \$15 for a two-year membership

I would like to assist with:

- Alumni activities in my area
 Alumni activities on campus
 Admissions
 Placement

(Please make checks payable to ALS Alumni Association)

Please send information on:

- Regional meetings in my area
 Estate planning
 Other _____

Name _____ Degree/Year _____

Address _____

City _____ State _____ Zip code _____

Home phone _____ Office phone _____

Occupation _____

Personal news _____

Mail to: ALS Alumni Association
 242 Roberts Hall
 Cornell University
 Ithaca, NY 14853

Alumni Membership (continued from page 2)

help from county/area campaign captains and local contacts. We will list districts, directors, and membership results in the fall issue of *ALS News*.

Robert Bitz '52, Plainville, chairman of the nominating committee, and committee members are working to fill all 27 district directors positions. Membership will be among the district directors' responsibilities. Nine of the 27 districts require new leaders this year.

The fall of 1985 will see our district director system in place, membership increasing, and summer alumni activities in the districts and on campus. Attention will then turn toward district get-togethers and a strengthening of the association's programs to serve a larger membership and meet local district needs. Among the events planned for the summer are local district picnics for alumni to get acquainted.

The top priority for the alumni office is to assist association officers, district directors, and committee chairs in reaching their goals. We expect to respond rapidly to needs in support of the momentum within our alumni leadership. I hope to have met personally with each district director in or near New York State by mid-April. It is going to be an exciting year.

—John C. Sterling '59
Assistant to the Dean
Director of Alumni Affairs

Autumn Roundup '85 Set for September 28

Autumn Roundup will be held on Saturday, September 28, starting at 9:00 A.M. in Bailey Hall. The program includes recognition of outstanding alumni, faculty members, and students.

A chicken barbecue in Barton Hall at noon precedes the Cornell-Colgate football game, which kicks off at 1:30 P.M. Tours of the Cornell Plantations and the Laboratory of Ornithology will also be offered at 1:30 P.M.

Following the game and tours, a postgame party will be held on the Ag Quad.

Andrew Piscione '65 is chair of this year's festivities. Alumni interested in donating wines, chesnes, or other foods and refreshments for Roundup can contact him at 4067 Boshart Rd., Box 230, Fonda, NY 12068, (518) 853-3418.

Details on Autumn Roundup will be sent to all alumni in August. Anyone who would like information sooner can contact the Office of Development and Alumni Affairs, 242 Roberts Hall, Cornell University, Ithaca, NY 14853, (607) 256-7651.

Alum Brings Lifetime Membership Fund to \$100,000 Goal

Paul R. Spiers '41 is the 1,000th lifetime member of the college's alumni association.

With his fee of \$100, the Lifetime Membership Fund has reached its goal of \$100,000. The endowment will be used for student aid and innovative educational programs.

Spiers is a banker with the Lake Ontario Farm Credit Service in Sodus, N.Y. The bank provides long-term mortgages as well as loans to farmers in the Wayne County area. He joined the Farm Credit Service 20 years ago after working as the manager of Farm Bureau Insurance Services in Monroe County and as a farmer in Batavia, N.Y.

During World War II, Spiers was a B-17 bomber pilot in the 8th Air Force. Following the war, he returned to his family's farm and entered into partnership with his father, Arthur Spiers. The major enterprise of the farm, which had been started by his grandfather at the turn of the century, was lamb feeding. Underweight lambs from rangeland states such as Wyoming and Montana were fattened for market and sold to stockyards in Buffalo. Consumer demand for lamb in that area gradually declined, however, and in the late 1950s the Spiers were forced to sell their farm.

A career in banking was a logical alternative to farming, says Spiers, who majored in agricultural economics at Cornell.

He remembers best the ag economics courses taught by Stanley W. Warren. "Professor Warren had a wonderful dry wit," Spiers recalls, "and he taught in a down-to-earth way that made learning come easily." The late William I. Myers, a dean of the college, and the late Frank A. "Happy" Pearson, both in agricultural economics, also made lasting impressions on him, he says.

Spiers was a member of the Ag-Domecon Council, the Roundup Club, the Infraternity Council, and Alpha Gamma Rho. He was on the junior varsity basketball team, for which he earned a letter, and was acting president in his senior year of Scarab, an honorary society for ag and hotel students.

His undergraduate days, he says, were "some of the best years of my life."

He became a lifetime member of the alumni association, Spiers notes, because "I have always been a promoter of the university, and it's a way of partially repaying Cornell for what it has done for me."

News and Notes

Private support for the college reached a new high in the 1983-84 year. Gifts from alumni, friends, corporations, and foundations surpassed the \$7.7 million mark (in excess of \$1.5 million more than in 1982-83). Fifty percent of the gifts were earmarked for research.

Thanks to the efforts of the college's alumni association and the administration in the early 1970s, we can now boast a total of 82 undergraduate scholarship endowment accounts representing more than \$2 million. Last year, 550 students received financial assistance.

Three new scholarship funds and three support funds have recently been added to the general college endowment.

The J. C. Williams Family Scholarship was a gift of John C. Williams, M.D. ('65) of Scottsbluff, Ariz. Dr. Williams designated the scholarship for students who are participating in intercollegiate athletics. This scholarship is in recognition of the value of competitive athletics at the university, he noted.

Established for "worthy farm students in the College of Agriculture and Life Sciences," the Jay Coryell Scholarship Fund is a bequest from Helen Coryell in memory of her husband, Jay Coryell.

The Ronald St. John Scholarship Fund was recently established with a gift from Ruth St. John. It is intended for sophomores, juniors, or seniors with financial need who reside or attend school in Genesee County or western New York and who are majoring in production agriculture.

Included among the new endowment funds is the Kieckhefer Adirondack Fellowship, which was established from the sale of a gift of real estate. Income from this account will support graduate fellowships for students from the Adirondacks.

The Bernice Scott Fund was established in honor of the late emerita professor of rural sociology by friends and colleagues at the time of her retirement last year. Income will be used to continue her 4-H programs.

Dairy Cattle Innovators was developed to promote gifts of cows for Prof. Robert Foote's research program in the department of animal science. The cows will be used directly in research or sold and the income used for the program.

—Glenn O. MacMillen '54
Assistant to the Dean
Director of Development

Sterling (continued from page 2)

"As director of alumni affairs, I will be guided by the opinions and needs of alumni association volunteers. The real work of increasing association membership—which is expected to double in the next year—will be done by the association's 27 district directors. My goal is to strengthen the organization and communication in support of these directors. We all expect the membership goal to be reached."

At a recent board meeting five district directors volunteered to lead a special spring membership campaign. Heading this drive are alumni association president and district director Judith L. Riehlman '80, district directors Andrew Piscione '65, Hans R. Kunze '82, Paul Tilly '58, and Albert J. Beard, Jr. '52.

Recognition of volunteers' efforts is another essential aspect of any successful volunteer program, Sterling comments, and he would like to publicize the work alumni are doing in behalf of the college. He adds, "It is important that alumni develop leadership skills and interests not only for the benefit of this college but for the entire university."

Sterling's own volunteer work has certainly been noticed. He received the New York State Emergency Corps Award for Citizenship, Fellowship, and Leadership in 1968 and the Outstanding Young Men of America Award in 1972. In 1965, he was a finalist for the Junior Chamber of Commerce Young Man of the Year Award. He received the Epsilon Sigma Phi Award in 1966 for

advancing the work of Cooperative Extension and the Distinguished Service Award from the National Association of Extension 4-H Agents.

He has been vice-president of Ithaca Kiwanis; national treasurer of the National Association of Extension 4-H Agents; a member of the Cornell Club of western Massachusetts; and chairman of the Jacksonville Church building committee. As a Cornell student, he was a member of Ho Nun De Kah, the Ag-Domecon Council, and 4-H; he is currently a member of several organizations, including the Association of Voluntary Action Scholars.

In Massachusetts, he was appointed by the state commissioner of food and agriculture to chair Massachusetts Agriculture in the Classroom, part of a nationwide program to teach students in elementary and secondary schools the importance of agriculture. The 12 educational and agricultural organizations involved incorporated two years later, in 1984, with Sterling as its first president. Governor Michael Dukakis of Massachusetts has publicly cited the program's accomplishments. The corporation raises \$100,000 annually in support of the program. The Massachusetts model has been emulated by a number of other states.

Sterling received an M.A. (1967) in public relations from The American University in Washington, D.C., and is currently a doctoral candidate in education, with a focus on interorganizational relationships and volunteer development, at the University of Massachusetts.

Alumni Breakfast to Be Held June 15

This year's alumni breakfast will be held on Saturday, June 15, at the Sheraton Conference Center.

Professors who are retiring will be recognized, acting dean Kenneth E. Wing will report on the college, and new directors of the alumni association will be announced.

All alumni and friends are invited to attend. Reservations are necessary, and tickets will be issued at the door. We regret that we are unable to mail tickets in advance.

Please return the form below by May 31 to:

ALS Alumni Association
242 Roberts Hall
Cornell University
Ithaca, NY 14853

Enclosed is my check for _____ reservations at \$8.00 each (payable to ALS Alumni Association) for the reunion breakfast and annual meeting on Saturday, June 15.

Name _____ Class _____

Address _____

Food and Agriculture Leadership Institute Launched

The Empire State Food and Agricultural Leadership Institute has been established to train leaders for farming, agribusiness, and the food industry.

Sponsored by the College of Agriculture and Life Sciences, Cornell Cooperative Extension, and the New York State Agricultural Society, the institute was founded by 14 companies and organizations. The founders, which have contributed \$10,000 or more, are the Agway Foundation; Curtice-Burns/Pro-Fac; the Dairy Cooperative Association, Inc./Upstate Milk Cooperative, Inc.; the Empire State Council of Agricultural Organizations, Inc.; Farm Credit Banks of Springfield, Mass.; Farmland Dairies, Inc., of Wallington, N.J.; the Metropolitan Dairy Institute of New York City; P & C Food Markets, Inc.; Price Chopper Supermarkets; and Wegman's Food and Drugs. Other founding contributors are the American Agriculturist Foundation; the Beacon Milling Company; the Eastern Artificial Insemination Cooperative, Inc.; and Norstar Bank/Oneida National Bank, Utica, N.Y.

Thirty participants in agricultural fields and the food industry, as well as in government, journalism, and education, will be selected to participate in the institute's two-year program. The first in a series of workshops and study tours will begin on October 31. The deadline for applying is June 3, 1985.

James C. Preston, professor of rural sociology, is the director of the institute.

The institute is overseen by a 22-member advisory council chaired by Alice Schoonmaker, a farm leader and representative of the New York State Agricultural Society. W. Keith Kennedy, former provost of Cornell and past dean of the College of Agriculture and Life Sciences, is the vice-chair.

For more information about the institute, contact Professor Preston at 434 Warren Hall, Cornell University, Ithaca, NY 14853-7801, (607) 256-4514.

Publications Offer Nutrition Guidelines

Cornell Cooperative Extension bulletins offer tips on the nutritional needs of athletes, for reducing sodium and fat from one's diet, and for losing and maintaining weight.

Nutrition and Exercise for the Athlete (\$.35) describes how the body functions during exercise and discusses myths, such as the need for large amounts of protein, associated with getting into top athletic shape.

Food for Health: The Carbohydrate Connection (\$.75) is a packet of eight fact sheets on the importance of including foods high in fiber and complex carbohydrates in weight-loss and maintenance diets.

Carbohydrates: The Inside Story (\$.50) discusses the role of carbohydrates, sugar, and fiber in the body.

The Sodium Content of Your Food (\$.100) lists hundreds of foods and their sodium content on a per-serving basis.

Nutrition and Your Health (\$.100) is a no-nonsense 20-page guide to a healthful diet.

These publications are available, postage paid, from the Cornell Distribution Center, 7 Research Park, Ithaca, NY 14850. Checks and money orders should be made payable to Cornell University.

Correction: Because of a printing error, the photograph of Eliot Wigginton and John S. Dyson that appeared in the fall issue of the *News* was reversed so that the picture and caption were mismatched. Wigginton should have appeared on the left and Dyson on the right, as indicated in the caption. We regret the error and apologize for any confusion it caused.

Judith Riehlman Is Advocate for Farm Families



Gordon Maynard

Judith Riehlman (right) and campaign manager Ann Homer share a happy moment as election returns show Riehlman winning the county clerk seat in Cortland County.

At first glance, Judith F. Riehlman's high-profile lifestyle may seem like a departure from her years as a farm wife.

But Riehlman '80—president of the college's alumni association, county clerk of Cortland County, and president of Cooperative Extension in her area—regards her present life as a mere transition.

By the time she entered college, at the age of 36, she had been a legislative executive secretary to state assemblyman Lloyd S. Riford for seven years. Her duties included answering constituents' questions, from an office out of her home, and meeting with legislators in Albany to discuss issues related to farming.

The job was a great opportunity, Riehlman says, to work toward her objective of making legislators aware of the problems facing farm families. She chose her major, ag economics, because she wanted to learn about economic policies affecting farms.

"Agriculture is the largest industry in New York State," she says, "and acts as a stabilizing force in the state's economy. Other industries are leaving New York at a fast clip because of the high taxes. Farm families are much less mobile; we can't just get up and leave when times are hard. Our physical and financial roots are here. If farm families aren't looked upon as a somewhat different case than other commercial industries, farming might be eroded to the point where the state could lose a crucial part of its economy."

Riehlman and her husband, Hugh, and his brother and sister-in-law are partners in a 600-acre dairy farm in Homer. The arrangement has made for a close extended family. Judith and Hugh Riehlman live one-eighth of a mile from the farm, their partners on the farm itself, her parents three miles away, and his mother next door to the farm.

"I can't think of a better situation for raising children," she comments. "Someone is always around to help, and the many interested relatives add to the children's sense of security." Their three children had "excellent preparation for adult life because of their experience on the farm. They

worked hard and earned wages for it, and it was up to them how to spend or whether to save their money." Working with others and witnessing the hardships adults face made them feel needed and gave them respect for other people, she says.

Farming wouldn't be everyone's idea of an ideal life, Riehlman points out. "I knew what I was getting into," she says jokingly. She grew up on a dairy farm in Pulaski, N.Y., and was accustomed, she says, to her parents' 14-hour work days, with even a weekend off a rarity.

But the benefits are compelling, Riehlman adds: being one's own boss, the tangible evidence of work done, the chance to carry on a heritage, the feeling of being connected to the land and animals.

Riehlman's farm background led her to become a Cooperative Extension 4-H leader, a position she held for 10 years, and a member of the Cortland County Farm Bureau's board of directors. She also served as president of the Farm Bureau's women's committee. Her biography is included in *Bicentennial Women in the History of Cortland County*.

Her current activities include membership in the Cornell Women's Club and Zonta, a women's volunteer organization, as well as in the American Society of Farm Managers and Rural Appraisers and the New York State County Clerk's Association.

She plans to run again for county clerk and to go to Albany from time to time to help keep agriculture in the forefront of legislators' interests.

As president of the alumni association, she presides over board of directors meetings on campus, attends such alumni events as Roundup, the senior barbecue, and the alumni breakfast, and meets with professors to keep up-to-date on the college's programs.

Her tenure, she says, "has been exciting and rewarding. The college, besides being a top research institution internationally and nationally, provides direct benefits to the state through the development of new ideas and products to improve the quality of life. It's been an honor to be affiliated with it and to represent its alumni."

Faculty News

John P. Barlow of the Division of Biological Sciences has been awarded the title professor emeritus of biology. A member of the faculty since 1956, Barlow is an expert on oceanography. His research in the section of ecology and systematics in the division stressed the role of nitrogen and phosphorus in limiting algal growth. Barlow and his students pioneered the use of chemostats, now a widely used technique, for studying the growth of natural populations.

George W. Hudler, assistant professor of plant pathology, received the 1985 Award of Merit from the New York State Arborists' Association, an affiliate of the International Society of Arboriculture. Hudler specializes in diseases of forest and shade trees and conducts research and extension programs in this area.

Arthur L. Berkey, professor of education, is president-elect of the American Association of Teacher Educators in Agriculture, an organization of university educators. Berkey will serve in the position for the remainder of this year and will become president of the organization in 1986.

Gerald W. Olson, associate professor of agronomy, received a Certificate of Appreciation from the New York State Association of Coastal Extension Professionals for his contribution to coastal-erosion control education programs in the state. He is the author of two books, *Soil and the Environment: A Guide to Soil Surveys and Their Applications* (1981) and *Field Guide to Soil and the Environment: Applications of Soil Surveys* (1984).

Robert L. Plaisted, professor of plant breeding and biometry, was elected an honorary life member of the Potato Association of America for his contributions to the potato industry. Plaisted is on a team of Cornell scientists that developed several new potato varieties, including Bake-King, a baking variety of high culinary quality, and Rosa and Hudson, which have built-in resistance to the golden nematode, an important potato pest in New York. Another variety that is resistant to golden nematode is being readied for commercial use.

Supercomputing (continued from page 1)

major advances in graphics, software, communications, and superfast parallel computers. To further this effort, they have challenged U.S. industry to design a super-supercomputer a thousand times more powerful than the one Cornell is about to receive. Cornell plans to be prepared to host such a machine if it becomes available.

Cornell and Illinois were the first single universities to be designated as national supercomputing centers under the current NSF initiative.

A consortium of 18 universities around the country will be connected via high-speed networking to the center at the University of California at San Diego, which will be located on the university's campus and managed by GA Technologies. The UCSD facility will be centered around a Cray XMP machine, a supercomputer manufactured by the Cray Research Corp. of Minneapolis.

Princeton's center will be located near its campus and managed by the Consortium for Scientific Computing, composed of 12 universities. Princeton's supercomputer will be a Cyber 205, manufactured by the Control Data Corp. In 1987 this machine will be upgraded to an ETA-10, a multi-processor supercomputer that is currently under development by ETA Systems, Inc.

The Illinois facility, centered like UCSD's around a Cray XMP, will be located on the Urbana/Champaign campus. There will be a close connection between this center and the newly established Center for Supercomputer Research and Development in Urbana, which is involved in the design of supercomputer hardware and software.

All four supercomputing centers will be partially funded by their respective states. The facilities will become available for use by the scientific and engineering research communities in late 1985 or early 1986.

The four institutions were selected from among 22 that responded to an NSF solicitation issued in July 1984. All proposals underwent a four-stage review that included evaluation by a technical committee, site visits to interview the people who would operate the centers, and, finally, discussions

Raymond T. Fox, professor of floriculture and ornamental horticulture, was one of approximately 100 volunteers who created an array of floral decorations for the 1935 presidential inaugural. The arrangements were used for galas held throughout the capital.

Peter J. Bruns, chairman of the section of genetics and development, has been appointed associate director of the Cornell Biotechnology Program. Bruns focuses his research on the genetic and reproductive functions of *Tetrahymena*, single-celled protozoa that share genetic characteristics with higher animals.

Reappointments

Robert C. Baker, reappointed chairman of the department of poultry and avian sciences. Baker is known internationally for his work in the development of numerous convenience food items made from poultry and eggs.

Eugene C. Erickson, reappointed chairman of the department of rural sociology. Erickson, whose work focuses on regional development, has served as the leader of Cornell Cooperative Extension programs in his department and as the university ombudsman.

William D. Pardee, reappointed chairman of the department of plant breeding and biometry. Pardee is a specialist in field crops and an authority on seed production. He has developed numerous educational programs for seed growers and dealers, farmers, and Cornell Cooperative Extension agents.

Maurice J. Tauber, reappointed chairman of the department of entomology. Tauber, who is the author of more than 100 scientific articles and monographs, specializes in biological control and insect seasonality. He is coauthor with Catherine Tauber and Sinzo Masaki of the new book *Insect Seasonal Cycles*, published by Oxford University Press.

between NSF personnel and an advisory committee of scientists familiar with supercomputing.

Kenneth Wilson, who presented innovative ideas for the application of supercomputers and who lobbied hard on behalf of Cornell, is credited by university officials with Cornell's selection.

The Theory Center will have two thrusts. A production facility for supercomputing will be used by hundreds of university, government, and industry researchers in the sciences and engineering. They will investigate questions at the forefront of research in fields ranging from astrophysics to chemical engineering to economics.

In addition, Cornell researchers will explore the strengths of highly parallel supercomputers, which can do thousands of calculations simultaneously. Most other computer systems are designed to process each calculation one at a time in a sequential mode.

Other plans for the center include the development of computer languages and interactive computer graphics. The project, Wilson notes, "embraces a unique research capability in multi-dimensional color graphics that will make it possible for scientists to monitor their simulations as they occur, through interactive graphics."

The Theory Center will encourage advances in fields as diverse as fluid and plasma dynamics and turbulence, the evolution of green plants, the structure of the proton, the mechanics of granular materials, planetary atmospheres, the analysis of mathematical algorithms, and the modeling of economic and environmental systems.

"We plan to use massive computing power to overcome the mathematical obstacles at the core of some of the most difficult problems in science and engineering," Wilson says.

The Cornell scientists will not undertake any proprietary product research and will make their findings available through scientific channels.

Cornell has established an industrial associates program to encourage research cooperation and resource sharing among corporate, government, and university scientists. More than 30 corporations, several national laboratories, and other universities are being sought to work with Cornell.

Alumna Named Dean of Teachers College

Judith Berman Brandenburg '61 has been appointed dean of Teachers College at Columbia University. She becomes the first woman to serve as the college's dean since its founding in 1887.

Before her appointment, Brandenburg was associate dean and dean of academic life at Yale University. During her seven years there, she played a key role in the creation of Yale's Women's Studies Program.

Her research has focused on gender differences in students' attitudes, aptitudes, and achievements, including the choice of science as a career.

Brandenburg received an M.A.T. degree from Harvard University in 1962 and a Ph.D. in psychology, with honors, from New York University in 1971.



Judith Brandenburg

Graphics (continued from page 1)

mathematical models and displayed on devices similar to a television screen—help architects, engineers, and illustrators produce designs, perform stress tests, and create cartoon animation. Computers can produce multidimensional line drawings and full-color pictures that show, for example, the effect of air flow on airplane designs or the behavior of subatomic particles.

But the power of most current research computers is still insufficient to meet the full graphics needs of advanced research, Greenberg explains. Hours of computing time are often required to make a few changes in a computer simulation, and, once the change is made, only the new image is displayed; the computer cannot show the steps it went through. Therefore, insights that might be gained from watching the simulation unfold are lost.

Supercomputers will eliminate this shortcoming, Greenberg says. One of the goals for Cornell's supercomputing facility is to develop the capacity to display simulations as the computer is performing its calculations and analyses. This capability would allow an engineer to observe how a fracture in a propeller blade spreads in response to stress. The engineer might then be able to uncover possible solutions that are not evident from charts and tables of figures.

The full-color images produced on supercomputers will be in at least five dimensions: the three spatial dimensions, time, and another parameter such as energy level or stress, which can be depicted in color.

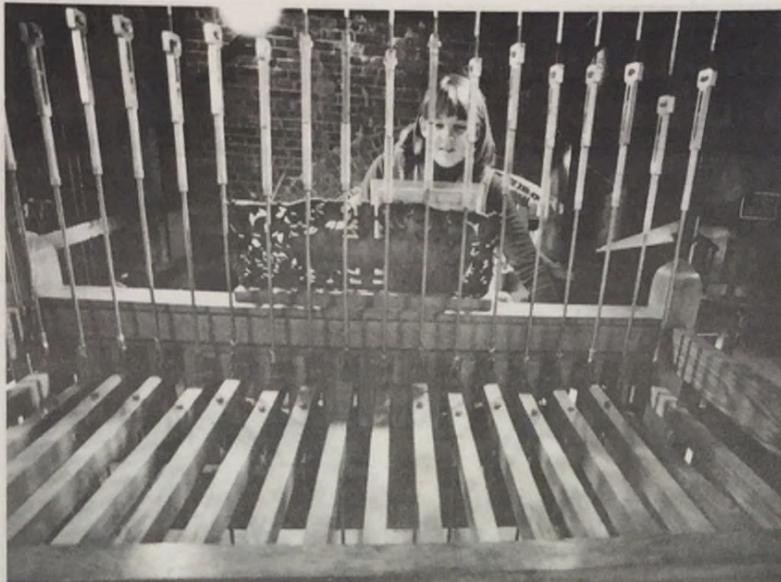
Such simulations will be possible because of the enormous speed and precision of supercomputers. "The only limitation will be our ability to comprehend and keep up," he says. "Supercomputers will generate enough data to fill an office in minutes, if printers could print that fast. You cannot understand and respond to that much information quickly, unless you communicate through comprehensive graphics."

Greenberg adds, "Graphics will be the computer language of the future. As computers handle more complex work, we have to make it easier to interact with them."

Researchers will eventually be able to watch complicated computer simulations as they occur and to use pictures to communicate with the computer and alter the simulation, rather than having to cope with complex mathematical formulas.

"I really don't see any limits to this," he says. "I'm excited as can be about the possibilities."

—Mark Eyerly



Donald Albern

Nancy J. Grambow, graduating ALS student and head chimesmaster, plays an early-morning concert.



Donald Albern

The clavier's hand levers and foot pedals are connected to vertical metal rods that move the 19 bells.

The Bells Peel for Tradition

Cornell wouldn't be Cornell without the chimes. They are a symbol of collectiveness—shared history, aspirations, loss—yet they remain coolly above it all.

The sound of the chimes is impressive from a distance, but inside the tower it "reaches into your bones," says chimes adviser and chimesmaster Judy S. Ogden (B.A. '71, M.P.S. '75, J.D. '77).

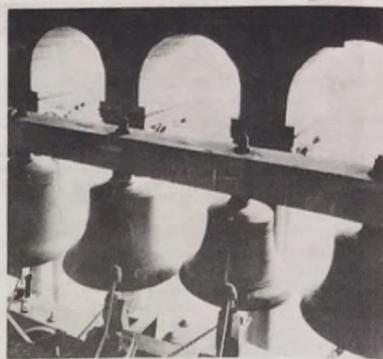
Ogden's roommate was a chimesmaster, and after dropping by for a concert one day, Ogden innocently thought, "I'll have to try that." Now, 14 years later, she is "thoroughly addicted." Besides advising the student chimesmaster organization, she plays two concerts a week.

As is common of "competes," Ogden was petrified during her final set of auditions to become a chimesmaster—when much of the Ithaca population gets to hear the student's efforts, mistakes and all, for the first time. Even for a while after becoming a chimesmaster, she regularly became slightly ill after each concert, she confesses.

The competition to become a chimesmaster is keen. In the first stage, which lasts four weeks, students are required to play silently the three traditional Cornell pieces—the alma mater, "The Jennie McGraw Rag" (named for the donor of the original chime), and "The Evening Song," played every day.

At the end of the fourth week, the competes are tested by the head chimesmaster on their silent playing of the three songs. If they pass the test, they are invited to enter the second stage of the competition.

In stage two, the students give one morning and evening concert for six weeks. The final four concerts of each compete are listened to by all the chimesmasters and are the basis for choosing the new chimesmasters. Of the 40 to 80 students who sign up each year, around a dozen make it to the end of the first stage. Most drop out of their own accord because they get discouraged by the amount of time required. Of the dozen who pass muster



John P. Troy

Interior of the belfry.

for stage two, one to five are chosen as chimesmasters.

During both stages of the competition, competes are encouraged to attend the chimesmasters' concerts. Daily practice on a xylophonelike clavier in the tower is also advised, but so many students are vying for practice time that competition for the clavier is intense.

The competes are all too aware of the standards for selection. In case they forget, they can refer to a handout on chimes competition: "Remember, perfection is the goal."

Many who try out are drawn to it by their backgrounds in music. Ogden played clarinet in the Cornell Symphonic Band, and head chimesmaster Nancy J. Grambow '85 played the xylophone in the Cornell Wind Ensemble and Symphonic Band.

Grambow was smitten with the chimes during visits to her sister, Bonnie J. Grambow '84, now finishing her first year as a student in the vet college. Grambow's parents are also Cornellians. Her father, Dr. Richard C. Grambow, attended the ag college for two years and graduated from the veterinary college in 1957; her mother, Barbara (née Allen), graduated from the arts college in 1956.

"It's fun to think everyone is listening to you," Nancy Grambow says of being a chimesmaster. *She hasn't made any major blunders yet, she says. Her and every chimesmaster's fear, she confides, is hitting the wrong note at the end of the song, when "unlike in the middle, you can't cover it up."*

Chimesmasters must endure the elements to sound the bells. The 94-year-old tower has an antiquated heating system that heats only the bottom levels. Midway up the 161-step staircase, the temperature starts to drop and the wind—only moments before mild at ground level—begins to whistle outside.

A few flights higher, and the wind is blowing into the stairwell. The outer door to the belfry is left open during concerts to allow the player to hear the bells clearly. The door is a short stair flight away from the playing room, and on a winter day the temperature makes for a frosty performance. Moreover, for maximum tactile sensitivity to the pedals, most chimesmasters play barefoot.

At a recent afternoon concert, Ogden stood in front of the clavier, which is played standing up, and talked to the half dozen visitors. Suddenly, the appointed time having arrived, she started furiously slapping the hand keys, long wooden levers connected to metal rods that move the clappers against the bells. While reaching rapidly all over the keyboard, she used her left foot to hit the row of pedals.

The hand levers are heavy and somewhat awkward to operate. During a fast piece, their resistance makes every note seem as though it will be hit too late or missed altogether.

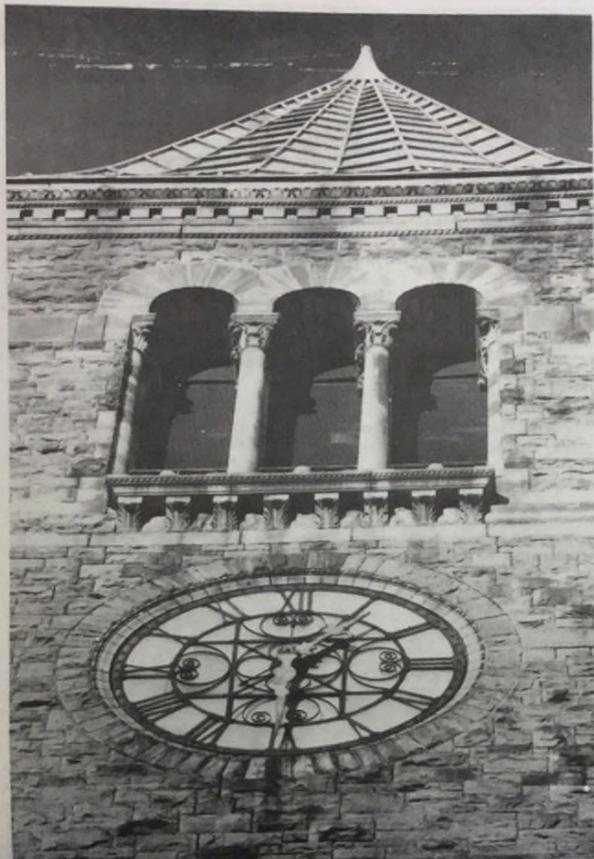
In the concert room the resonance of the bells rattles the tower. On the belfry's partially enclosed terrace surrounding the 19 bells, the sound is unbearable.

The clavier itself has a humble, clattering sound, like horses running across an old wooden bridge.

At this concert, Ogden played six songs, several of which were energetic, complex pieces. The serious selections included "We Shall Overcome," which on any other instrument would have sounded weak compared to the traditional sung version. The rendition on the bells was powerful, seeming to urge people on.

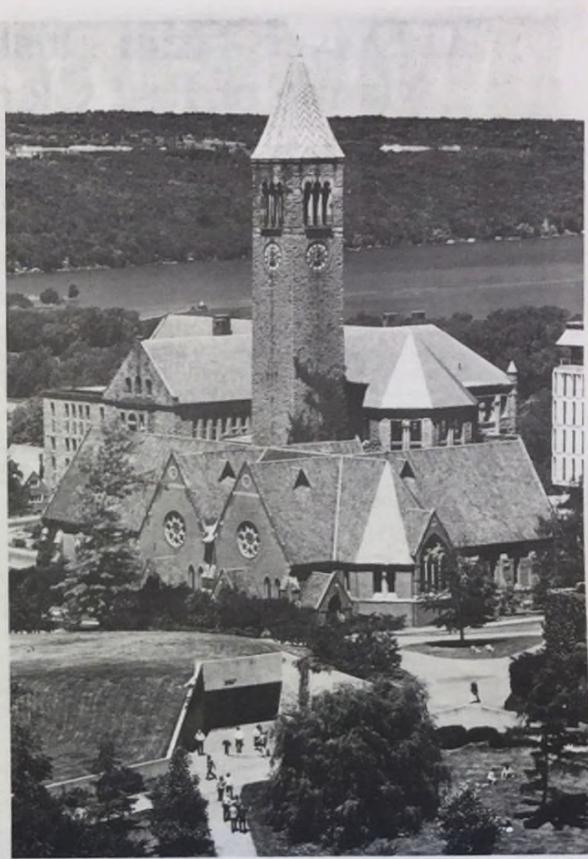
The belfry terrace offers a commanding view of the town and lake, and most visitors use the time just before and after the concert to climb to the top for a look. For safety reasons, the tower is open only at concert times.

(Continued on page 7)



Russell Hamilton

The belfry's lead-coated copper roof has an intricate herringbone pattern. Behind the pillars is the lookout terrace.



Russell Hamilton

Chimes tower looms elegantly above campus and Cayuga Lake.

Bells (continued from page 6)

The interior of the tower building is a combination of brick and exposed posts and beams. On one of its seven levels, a glass-encased room houses the 1875 Seth Thomas clock mechanism that for 82 years powered the four large clocks on the faces of the tower. This large, elaborate mechanism was retired in 1957, and the clocks were run for 18 years on the same system that controls the university's library clocks. Since 1975, the chimes tower clocks have been operated by an electronic mechanism designed by John A. Hupcey ('74, M.S. '75, Engin.) while he was a student.

There are two museums in the tower building—the official and the unofficial. One contains old photographs and other memorabilia of the chimes tower. The other is the stairwell, an archives of graffiti: political messages, jokes, "I-was-here" signatures, announcements of romances, and scat-

ological advice. The scrawlings are reminders of the 10,000 visitors annually.

To date, there are several hundred alumni chimesmasters. A newsletter, available free to former chimesmasters, was started two years ago by Robert L. Feldman ('66 Arts, Ph.D. '75, ALS).

For Cornellians who want to take an auditory nostalgia trip, an album of Cornell songs, classical selections, and popular music—"Cornell Chimes"—may be purchased at the Campus Store and Triangle or by mail order (\$5.75 plus postage) from the Chimes Program (Office of Campus Affairs, 313 Day Hall, Cornell University, Ithaca, NY 14853-2801). Proceeds go to the Chimes Program.

By and large, the chimesmasters have been an upright group, Ogden says, and there are no known tower skeletons or scandals. Except for such Halloween pranks as covering the clocks'

faces in orange cellophane and playing the alma mater in A minor, the chimesmasters have conducted themselves with decorum.

One transgression, mild by today's standards, occurred during alumni reunion in 1941. Chimesmaster Richard H. Lee '41 (Arts) and some of his friends were celebrating on the Saturday before graduation and went up to the chimes with appropriate refreshments at midnight, when the tower is off-limits. Lee was only a few minutes into a song when he was stopped by the campus patrol. The next morning, Lee was introduced to Cornell President Edmund Ezra Day, who asked him if he was the one playing the bells at midnight. Lee admitted he was. Day said, "Of all the ways of being awakened at night, I can't think of a nicer one."

If You're Hiring or Applying, There's Help

Alumni can get help in finding qualified candidates for job openings—and assist students—by participating in two innovative placement programs, the Cornell Connection and the Cornell Tradition summer job network.

Career experts estimate that 80 percent of the permanent jobs available nationally are never advertised but are filled through contacts: friends, relatives, colleagues. These positions constitute the hidden job market.

The Cornell Connection, administered through the university's career center and college placement offices, taps this hidden market with the help of alumni who serve as contacts.

As entry-level jobs are referred to the Connection, they are entered into a computer at the career center. A job description, qualifications for the position, and instructions for using the Connection are then transferred to a campuswide computerized information system. Employers are not listed by name but are referenced by type of business.

Seniors can review job openings at any time on one of more than 200 computer terminals in academic buildings and dormitories. They can also review posted listings at the career center and college placement offices.

To apply for jobs, seniors submit cover letters and résumés to the career center. These materials are mailed by Connection staff members to employers, who can then contact applicants and arrange for interviews.

Alumni who would like to list jobs with the Connection can contact Tina Walker, The Cornell Connection, Career Center, 14 East Avenue, Sage Hall, Cornell University, Ithaca, NY 14853-2101, (607) 256-5221.

The summer job network, a component of the Cornell Tradition, is administered by the student employment office and matches qualified students with summer jobs developed by alumni. The emphasis is on developing challenging, career-related jobs.

Employers who hire a Cornell student through this program can apply for a subsidy from the university for the student's gross wages if the position is new or would not exist without outside funding. For positions in business, one-third of the student's gross wages is subsidized, and for positions in the nonprofit sector, two-thirds of the gross wages is subsidized. Employers participating in the summer job network are identified only to those students receiving referrals for particular job openings.

Résumés of the students applying to the program are screened by Tradition personnel before referral to employers.

Employers who wish to participate in the Cornell Tradition summer job network can contact the Student Employment Office, 203A Day Hall, Cornell University, Ithaca, NY 14853-2801, (607) 256-3497.

CU Debate Team Dusts off Mantle of Past Glory

After two decades of dormancy, the Cornell forensic team is coming back strong.

During intercession, five team members went to a national meet at UCLA, where Cornell placed fourth out of 56 teams.

The CEDA (Cross-Examination Debate Association) team defeated MIT in the Northeast league's semifinals and Suffolk University in the finals. It won first place out of 20 teams. Based on its string of wins this year, Cornell now ranks number one in CEDA debate in the Northeast.

Fifteen team members competed in the Northeast event in IE (Individual Events) and CEDA debate, and the team as a whole took second place out of 14 schools, which included MIT, West Point, and Syracuse.

Behind the success of Cornell's debating team—which from the early 1900s until its dieback in the mid-1960s was a leading light in forensics—is Pamela Stepp (M.S. '80), a lecturer in communication arts.

When Stepp joined the faculty five years ago, the team had four members and no money or coach. Starting slowly, she built the membership back up and then two years ago "really decided to get the program off the ground." The payoff is that Cornell has ranked in the top three schools in

kind words," she adds, referring to correspondence in which he cheers the team on.

The club's members represent nearly all majors, notes Stepp, "animal science, engineering, prevet, genetics, English, comm arts. One thing I often hear from other schools is how unusual Cornell's team is in not having mainly prelaw or government students."

Most multievent programs such as Cornell's are administered by five faculty members. Stepp is both the director and sole coach. As a result, the students coach one another to a large extent.

The forensic team consists of a speech team and three debate teams. The speech team competes in individual events, a total of 10 each meet, and the three debate teams participate in on-topic debate, parliamentary debate, and CEDA events.

Among the individual events are the dramatic duo competition, in which two team members read together from a published work; the epideictic event, in which debaters get to heap either praise or blame on a person, place, or thing; and the after-dinner speaking event, which calls for tactful comedy as speakers use humor to persuade listeners of a view on a serious issue.

The other individual events are extemporaneous speaking, persuasion, impromptu speaking, inter-



Donald Albern

Practicing cross-examination debate before a tournament are forensic team members (from left to right) Robin L. Goldstein '85, William W. Baker '85, Cynthia A. Thomas '87, and Laurie E. Strauch '85 (Arts).

the Northeast in forensics for the past several years.

The team is financially healthier as well. Since 1983, Stepp has raised more than \$22,000, but drumming up funds is a perennial hurdle. Some of the money came from Cornell administrative offices, but a major benefactor has been F. R. "Flood" Newman '12 (Arts). Newman was a close friend and roommate of a former debate team member, the late Howard G. Wilson '12 (Arts).

"Without the friendship and support of F. R. Newman, the program wouldn't be in existence today," Stepp says. "He motivates us through his

The word *forensic* conjures up images of a pathologist sleuthing for clues of foul play. In fact, its usage in the contexts of medicine and debating has a common origin. Forensic is defined as pertaining to, connected with, or used in courts of law; suitable or analogous to pleadings in court. Forensic medicine, or medical jurisprudence, is medicine as it relates to law.

pretive prose, interpretive poetry, expository speaking, and rhetorical criticism.

"On-topic debate is the traditional one," Stepp explains. "Students get a resolution—such as, 'Resolved, that the U.S. government should increase exploration of space'—and then debate it all year long. It takes a huge amount of research."

In parliamentary, or off-topic, debate, students are given a resolution shortly before the competition. Style and wit count more heavily than the use of facts.

CEDA debate is a hybrid of on-topic and parliamentary debate. "The students still present evidence," says Stepp, "but they debate value resolutions—whether a policy is good or bad—and the resolution changes each semester." (For example, "Resolved, that the federal government is justified in giving military aid to nondemocratic nations.") The use of facts and a polished delivery are stressed. Most schools are turning to CEDA, she notes.

With its increasing success and publicity, the Cornell forensic team is growing fast, says Stepp, and now numbers 60. The team "should make the Cornell community proud."

What Warns a Cricket to Flee?

Just one pair of nerve cells sparks a cricket's flight from its arch predator, the bat.

Crickets leave their hatching grounds and fly at night—when bats are on the prowl—in search of new homes. Surviving the trek requires instant revisions in steering.

"In the animal world, there are two kinds of prey—the quick and the dead," says Ronald R. Hoy, associate professor of neurobiology and behavior. "Crickets have a simple and speedy response to predators."

Hoy and Thomas G. Nolen, a former Cornell graduate student and now a postdoctoral student at Yale, are building a model of predator-detection and social behavior based on their studies of neural reflexes and communication in animals. Findings from their research on crickets were published last December in *Science*.

The ultimate goal of the research is to diagram the interworkings of the cricket's nerve cells and resulting behaviors.

"Detailed analyses of mechanisms operating in less complex animals will enlighten similar studies in animals more closely related to humans, or even in humans themselves," Hoy says.

A response elicited by a single neuron is rare in nature, he notes, and had previously been found only in crayfish, worms, squid, and some bony fish.



Charles Harrington

Researcher Ronald Hoy with field cricket.

In the case of crickets, the nerve cell is excited by ultrasound (high-frequency sound waves) emitted by bats. Auditory receptors on the cricket's forelegs pick up the ultrasound waves and transmit the information to one of a set of neurons, which signals a warning to the brain.

To evade less threatening landborne predators that do not emit ultrasound, crickets are guided by low-frequency sounds (infrasounds) produced by the air movements of their predators. These sounds are perceived by hearing organs on their abdomens. At least 14 nerve cells are summoned in detecting infrasound waves.

The single-cell escape mechanism, Hoy remarks, illustrates an evolutionary process that streamlined an organism's response to a major survival threat.

Bernice M. Scott Dies

Bernice M. Scott, professor emerita of rural sociology, died March 26, 1985, at St. Joseph's Hospital in Kokomo, Ind., following a long illness. She was born Aug. 21, 1919, in Jefferson County, Ohio, a daughter of the late Reid and Usher Gault Scott.

Professor Scott, who retired in May 1984 after 35 years on the faculty, was involved in many Cornell Cooperative Extension youth programs and developed a statewide project for 4-H on national heritage that focused on architecture, crafts, and cultural traditions.

She is survived by a brother, Jack Scott of Kokomo, Ind.; and two sisters, Mary Elizabeth Riddle of Mount Sterling, Ohio, and Emma Christian of Columbus, Ohio.

Memorial donations may be made to the Bernice M. Scott Scholarship Fund, Office of Development and Alumni Affairs, 242 Roberts Hall, Cornell University, Ithaca, NY 14853.

Thoreau's Method: A Handbook for Nature Study

A book on nature appreciation by an alumnus, David Pepi (M.S. '80, Ph.D. '82), has been chosen as a Book-of-the-Month Club and Natural Science Book Club selection. *Thoreau's Method: A Handbook for Nature Study* (Prentice-Hall, 1985) is a practical and poetic treatise on how to heighten one's experience of the natural world. Pepi studied at Cornell under professors Richard A. Baer, Verne N. Rockcastle, and D. Bob Gowin, all of whom he credits with shaping his philosophy and writing. The book was begun while Pepi was a doctoral student in natural resources at Cornell and was supported in part by a grant from the Jessie Smith Noyes Foundation. He is currently an assistant professor in the Environmental Studies Program at Iowa State University.

Pepi grew up in northeastern Massachusetts along the Sudbury River, which, with the Assabet River, flows into Henry David Thoreau's beloved Concord River. As in Thoreau's day, the rivers were surrounded by marshes, sedges and rushes, sweeps of goldenrod, woodlands, and abandoned farmland. (Today, they are thronged with suburbs, Pepi says.) "I like to think that some of the vibrations I picked up from the land were the same that animated Thoreau," reflects Pepi. Although his earliest interests in nature were inspired by his native countryside, his book has a "heavy Cayuga Basin accent" from the years he lived in Ithaca. He says that his work owes much to the tradition of nature study started a century ago by Cornell naturalists Liberty Hyde Bailey and Anna Botsford Comstock.

The following passages are reprinted with permission of the publisher.

...
Felt-significance, the goal of qualitative natural history, occurs when meanings and feelings merge in human experience. . . . Whether they occur when appreciating nature or in other situations, experiences of felt-significance tend to be relatively intense because the elements involved combine synergistically. Meanings and feelings magnify each other: feelings give meanings the power to move us, and meanings give feelings focus and therefore the power to satisfy rather than merely to agitate.

...
The home-center system is used so widely that most of us don't have a name for it. It consists of orienting yourself to a fixed starting point, or home center, and defining any position you take thereafter in terms of that point. The telling question is, "Where's home center?" and it's answered by maintaining a mnemonic (of the memory) thread with your starting point as you move away from it. Then, wherever a walk takes you, you can find your way back to your starting point—be it a house, campsite, or car—by following the mnemonic thread in reverse. . . . Hills, rivers, vegetation types, and cultural features are not randomly strewn over the landscape. Each piece of land has a distinctive lay, or grain, to it, and as a natural navigator you have to be aware of it. Then, like an orb-weaving spider, you can anchor your thread to pieces of the terrain that will hold it securely.

Prepare to spin your thread before you enter the woods by observing the lay of the land as you

drive to your starting point. Are there any prominent mountains or hills in the area? Which way do the major valleys run? Where does the sun rise and set? Are there lakes or rivers in the area that the small streams in the woods will be heading for? Is there a highway nearby whose traffic sounds can be counted on as a reference point? Are the trees in the area bent by a prevailing wind? These sorts of questions will enable you to set the broad outlines of your mental map. In some situations, it's helpful to ask them from the roof of your car or from some other high point just before entering the woods.

The New Testament injunction against looking back may get you to heaven, but it won't get you back to the car, so look back often as you walk away from your starting point.

...
Economically, the Canada goldenrod occupies an enviable and safe position: It's generally perceived to be useless. In North America there is little or no interest in harvesting it, cultivating it, or "improving" it in any way. Natural history writers don't even recommend its leaves for tea, and they'll decoct anything for a paragraph. (They do recommend a tea made from the leaves of the sweet goldenrod [*Solidago odorata*].) Thus, in its native land the Canada goldenrod is free to grow unmolested in hedgerows, vacant lots, and abandoned fields.

...
Nothing recommends a walk more than good reasons for not taking it.

In Quest of the Ultimate Apple

Tasting 200 apples a day might sound like an obsession. But for Roger D. Way, the tastings are part of his single-minded mission to develop the perfect apple.

Way, professor emeritus of pomology at the New York State Agricultural Experiment Station at Geneva, could have retired on his laurels. Few pomologists can claim, as he can, a hit apple variety—Empire—as the result of their work. But even Empire, Way's personal favorite, does not meet the elusive criteria for a "10" rating. So Way gets to the experiment station at 8:00 each morning, as he has for the past 36 years, to work toward his goal.

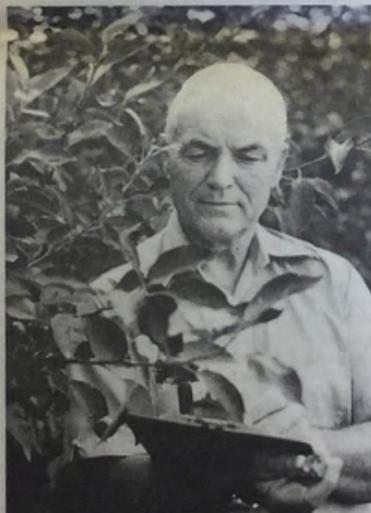
The dream apple would not ripen early—early ripeners tend to have squishy fruit. It would be right around the long-time ideal size of 2½ inches in diameter. A healthy blush would cover 80 to 90 percent of its crisp, firm skin. The flesh would show a trace of color (pure white produces gray applesauce). And the apple would be fragrant, rich, and neither too sweet nor too tart.

Way is a natural for his job. He is a seventh-generation member of a family of Pennsylvania apple growers and was on the apple-judging team at Penn State, where he received his bachelor's and master's degrees. He received his doctorate in pomology from Cornell in 1953.

To date, Way and colleague Robert C. Lamb have cross-pollinated, grown, and tested 100,000 apple trees. All of the varieties have been as different, Way remarks appreciatively, "as children in a family." Way concentrates on developing high-quality eating apples; Lamb emphasizes disease resistance.

The group of apple trees undergoing testing this year extends in half-mile rows, 400 trees per row, equivalent to 20 miles if the rows were put end to end. Around 700 of these trees have passed their first test and are in the second stage of testing as potential commercial varieties. Both phases are lengthy, as are the steps that precede them.

Crosses are made of two apple varieties, and their seedlings are then grown in greenhouses for a year. The 3,000 to 4,000 seedlings are raised through the end of the juvenile stage, at which point they bear fruit—an investment of 10 to 15 years. Way and Lamb evaluate each tree for such characteristics as age when the first fruit appears and growth habit—whether it is compact or sprawling. This is an important consideration to apple growers, who prefer dwarf, space-efficient varieties.



Scott Miles

Empire may be the apple of his eye, but pomologist Roger Way is still striving for that elusive "10."

Next, the fruits are evaluated for size, color of flesh and skin, aroma, acidity, juiciness, and storage qualities. The two pomologists taste-test the apples like connoisseurs. They take a nibble, savor the bouquet and flavor, and then spit the fruit out.

Graduates of the first evaluation are a select group: only 1 percent merit reevaluation, which lasts 10 years. From that elite corps, a handful is introduced to growers.

Only a few dozen varieties, from all sources, have ever made it to grocery stores. "In the final analysis," Way says, "the grocery store owners, and now the buyers for big chain stores, decide which varieties will succeed. They're looking for apples that are highly colored, uniform, and capable of long storage." The finer qualities of taste and texture are not of paramount importance to the supermarket buyers, he adds.

The trend is toward fewer and fewer varieties. "Ten years ago," he notes, "there were 13 com-

mercially important apple varieties available to consumers. Today, there are only 10. Three have been lost in a decade."

In New York, McIntosh is the leading variety of apple, followed by Rome Beauty, Red Delicious, Empire, Rhode Island Greening, Cortland (also developed at the Geneva experiment station), Idared, Golden Delicious, Twenty Ounce, and Northern Spy. Nationally, the number-one apple is Red Delicious.

Way is not a fan of Red Delicious. "I don't consider it the best for eating, especially after it's been around for 8 to 10 months. It can become punky."

Although he has a higher opinion of McIntosh, it, too, could be improved upon, he says. Among its defects, Way notes, are slightly mushy flesh and susceptibility to apple scab, a major fungal disease that causes the fruit to have a scablike appearance.

Empire, a cross between McIntosh and Red Delicious is "a beautiful apple, redder than the McIntosh and a better eating apple than the McIntosh." Introduced by the Geneva experiment station in 1966, it now ranks fourth in new plantings by New York apple growers, behind McIntosh, Red Delicious, and Idared.

The Jonagold, which Way developed, is a bit of an ugly duckling story. A cross between the Jonathan and Golden Delicious, it is a large apple—up to 3½ inches in diameter—with pale scarlet stripes on a yellow base. Way regards it as the best eating apple on the market—the European market, that is.

It cannot be found in American supermarkets because, although it is 80 percent red, it is slightly scarfskinned, or grayish in cast. Bright red color is the highest priority among American shoppers, Way comments.

At the rate that Jonagold is being planted in England, France, and Belgium, Way predicts that it will be the dominant apple in Europe in 25 years.

Although Way would like American buyers to become guided more by flavor than color, he says his research takes heed of consumers' preferences and proceeds accordingly to keep New York's apple industry competitive with Washington's, the nation's leading apple-growing state. New York, which has 1,183 commercial orchards and 4.5 million apple trees producing a billion pounds of apples a year, ranks second.

Way, who retired in 1983, says that he plans to keep working until he's 80.

Prevention Is Rx for Dairy Cows

There's no cure like prevention for reducing the incidence of reproductive problems in dairy cows, conclude Cornell researchers.

Improvement in health and reproductive performance can be achieved through effective management, the researchers say, with little or no direct cost. And the potential savings can be vast: reproductive disorders in dairy cattle cost farmers and consumers more than \$500 million annually.

R. David Smith, associate professor of animal science, Hollis N. Erb, assistant professor of veterinary preventive medicine, and Pascal A. Oltenacu, associate professor of animal science, conducted a study that examined the relationships between health problems and reproductive disorders in cows. A snowballing effect was found: the occurrence of one health or reproductive dysfunction increased the chances that the cow would suffer a second and possibly a third.

Many of these problems arise because the cows eat an overly rich diet during their dry periods, the seven to nine weeks a year when they are not lactating. Once a dysfunction occurs, however simple the cause, even the best medical care may not prevent the chain-reaction effects on health.

The researchers monitored 33 Holstein herds, each with at least 35 cows and considered representative of New York dairy cows. All the herds were enrolled in the New York Dairy Herd Improvement Cooperative program and received monthly or bimonthly visits from veterinarians with the Cornell veterinary college's Ambulatory Clinic. Data were collected on 2,852 cows that calved during an 18-month period.

The most common reproductive disorders were retained placenta and metritis (a uterine infection); 12 percent of the cows were treated for each. The incidence of ketosis (a metabolic problem characterized by low blood sugar), milk fever, retained placenta, and cystic ovaries—all of which contribute to reproductive malfunction—exceeded benchmarks for good performance in more than 50 percent of the herds.

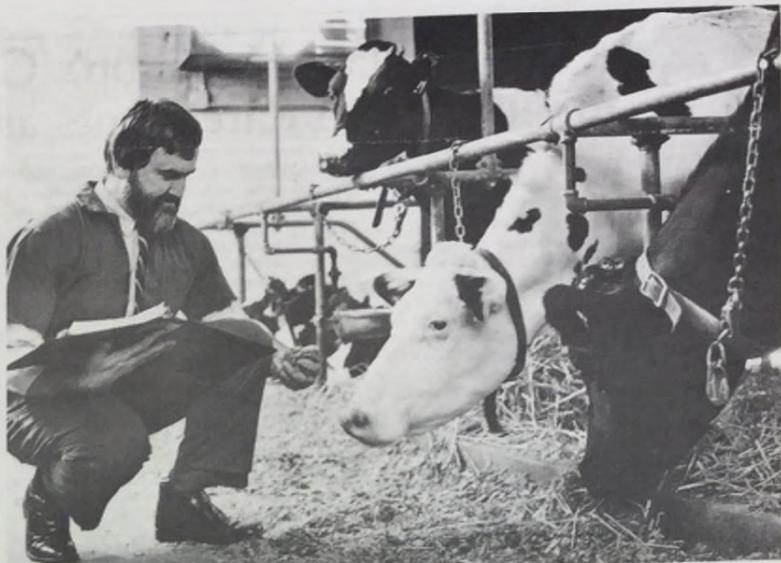
Milk fever, a metabolic condition caused by a calcium deficiency, increased the risk of calving complications, retained placenta, and metritis. In addition, milk fever and retained placenta were risk factors for ovarian cysts because they increase the risk of metritis, which predisposes cows to cysts.

Cows treated for milk fever were 4.2 times more likely to require veterinary aid at calving; 2 times more likely to have retained placenta; and 1.6 times more likely to be treated for metritis even if they did not have retained placenta.

Animals requiring veterinary assistance at calving were 3.7 times more likely to be culled from the herd—with a cost of \$1,100 to raise a replacement animal—and 3.5 times more likely to be treated for metritis. Veterinary assistance at calving can drive pathogens into the reproductive tract, thus increasing the risk of metritis.

Cows with retained placenta were 5.8 times more likely to be treated for metritis, and those with metritis were 1.7 times more likely to be treated for cystic ovaries.

Any stress, says Smith, but particularly disease at or shortly after calving, increases a cow's chance of developing cystic ovaries. Ovarian cysts usually respond to treatment, but the hormonal disruption



David Reuther

Metabolic disorders in dairy cows often lead to a chain reaction of health and reproductive problems, conclude R. David Smith (above) and other Cornell investigators. An overly rich diet during a cow's dry, or nonlactating, period is a prime cause of these disorders.

they cause results in low fertility and poor reproductive performance.

Financial losses stemming from cows' health problems can be minimized, the researchers state, by practicing sound nutrition in a cow's dry period, good hygiene in barns, and regular herd monitoring by veterinarians.

Larry E. Chase, an animal science professor who specializes in dairy cattle nutrition, explains that the dietary needs of a dry cow are markedly different from those of a lactating cow. A dry cow requires only 50 to 60 percent of the nutrients needed by a milking cow. The dramatic difference in dietary needs, Chase says, "makes it hard to control the nutrient intake of dry cows unless they are separated from the milking herd" and fed a ration tailored to their needs. Many dairy farmers, not realizing the consequences, combine the two herds and place them on identical feeding regimens. As a result, the overfed dry cow becomes overweight.

"Fat cows," Chase notes, "are more susceptible than leaner ones to ketosis, milk fever, displaced abomasums [the fourth intestine of ruminants], and downer-cow syndrome," which prevents the animals from rising.

Milk fever is a classic example of a health problem that can cause multiple effects. Cows are commonly fed calcium-rich legume forages and grains during their dry periods, when their need for the mineral is reduced. The resulting oversupply of calcium causes the mechanism that releases calcium stored in the bones to shut down. Lactation makes massive demands on the body's calcium supply. When the cow delivers a calf and its milk production goes from zero to 25 quarts daily almost overnight, it is unable to tap the desperately needed reserves of calcium in its bones.

As a result of the sudden deficiency of calcium,

which is a primary regulator of muscle activity, the cow is unable to contract its muscles and becomes immobilized. The reproductive tract, exposed to pathogens on the stall floor, frequently becomes infected. Prolonged contact with these pathogens can also lead to mastitis, an infection of the udder. In addition, because the muscles need to contract to expel the placenta, calcium deficiency may contribute to retained placenta and uterine infection.

Downer-cow syndrome, also associated with excess intake of high-calcium nutrients during the dry period, resembles milk fever but has a poorer prognosis. If the paralyzed animal is unable to recover and rise on its own after two to three days, it usually dies.

Chase has the following management suggestions for reducing health and reproductive disorders in dry cows: dry cows should be separated from the milking herd to prevent them from consuming high-nutrient rations; their calcium intake should not exceed 0.22 pounds per day; the calcium to phosphorus ratio should be between 1.5 to 1 and 2.5 to 1; legume hay should be restricted, as should grain (grain should be reintroduced during the last two weeks of the dry period, just before calving, to permit rumen microorganisms to adapt to grain concentrates); appropriate minerals to supplement the forage program should be provided; and at calving, grain feeding should equal about 0.5 to 1.0 percent of body weight.

Exercise might not be a bad idea either. Recent research at Utah State, Chase notes, indicates that dry cows allowed to exercise—if only to take a walk around the barn—have fewer metabolic and reproductive problems than their tied-up barnmates.

Biotechnology Symposium to Be Held at Cornell

An international symposium on the applications of biotechnology to plant breeding and agrigenetics will be held at Cornell June 23-27.

The symposium—"Biotechnology in Plant Science: Relevance to Agriculture in the Eighties"—is being organized by the Cornell Biotechnology Program, which fosters research on the molecular aspects of genetics and cell biology for application to plants, animals, and cell production. The conference will be held in the Statler Auditorium on campus.

Milton Zaitlin, associate director of the Cornell Biotechnology Program and cochairman of the symposium, says, "Dramatic developments in biotechnology and in the plant sciences, principally in the last decade, have opened possibilities for developing plants with enhanced genetic capacity

to greatly boost the production of food and fiber. This symposium will explore these advances in detail and address the potential for applying the new technologies to plant breeding and to agrigenetics." Zaitlin is a professor of plant pathology and an authority on virology.

The Cornell symposium will feature six plenary lecture sessions dealing with plant regeneration and genetic events associated with tissue culture, large-scale tissue culture operations, plant transformation, genes for transformation, and the application of genetic engineering to the uses of agrigenetics. Sessions will feature talks by invited speakers from the United States, Australia, England, Germany, Hungary, and Japan.

In addition to discussion of the latest advances in biotechnology related to the plant sciences, the

conference will include two panel discussions—"Plant Molecular Biology and Agrigenetics" and "Agricultural Biotechnology and Industry"—on the prospects for applying the new technologies to commercial agriculture.

Initiated in 1983, the Cornell Biotechnology Program comprises the New York State Center for Advanced Technology for Biotechnology at Cornell, supported by New York State, and the Cornell Biotechnology Institute, financed in part by several private corporations.

For registration forms and more information about the symposium, contact Sheila Huey, Baker Laboratory, Cornell University, Ithaca, NY 14853-1301, (607) 256-2300.

William Hamilton's Garden Abounds with Rare Plants and Tall Tales

Make your garden rather small, or you'll have no fun at all.
—William J. Hamilton

Like many words of wisdom ignored by their originators, these are for public consumption only. Hamilton has violated his own advice to splendid result.

Thousands of plant species from Africa, Japan, Saudi Arabia, the Mediterranean, Chile, Argentina, the Himalayas, and the United States abound in his three-acre garden on Highland Road in Ithaca. At 82, Hamilton, professor emeritus of zoology and an expert horticulturist, tends his garden for up to six hours a day during the growing season.

Hamilton delights in locating varieties that textbooks say cannot be grown in cold climates and then proving the books wrong. He publishes the results of his trials in gardening journals and shares his secrets of success with the many visitors who stroll through his garden.

"Wild Bill," as he was known to generations of students, retired in 1963 after 37 years on the faculty. He is the author of two books, *American Mammals* and *The Mammals of the Eastern United States*, and more than 200 papers on mammals and the coauthor of *Conservation in the United States*.

His travels around the world to study mammals and reptiles convinced him that detailed studies were better carried out near home. The shrews in his back yard—some "weighing no more than a penny"—have kept Hamilton's daily diary filled for 40 years with observations about the animals' behavior. "When I was a graduate student, I thought you had to go to the end of the earth to do research. But the most interesting sites are our own back yards. I used to preach to my students, 'Work on the commonplace close to home if you really want to understand something.'"

Hamilton's interest in zoology and horticulture grew from his childhood experiences in Flushing, Queens. Although his home was only 10 miles from Times Square, "it was farm country then." Jackson Heights, Queens, he adds, "was a cattail marsh." He trapped muskrats in Flushing Meadows and as a teenager collected rattlesnakes in Suffern, N.Y., on the New Jersey-New York border, to sell to the Bronx Zoo. Hamilton knew to look for the hibernating snakes in rock fissures and could lift the torpid animals out without getting bitten.

When Hamilton was seven, his Sunday school teacher gave him a potted hyacinth. The gift incited his passion for gardening, he says, and encouraged him to start observing plants in the wild.

Hamilton was planning to attend Harvard as an undergraduate, when one day a high school teacher handed him a catalog about Cornell. "It showed you could study butterflies, fish, birds, snakes. I thought, 'If the place will give me a degree for having a good time, that's where I'm going.'"

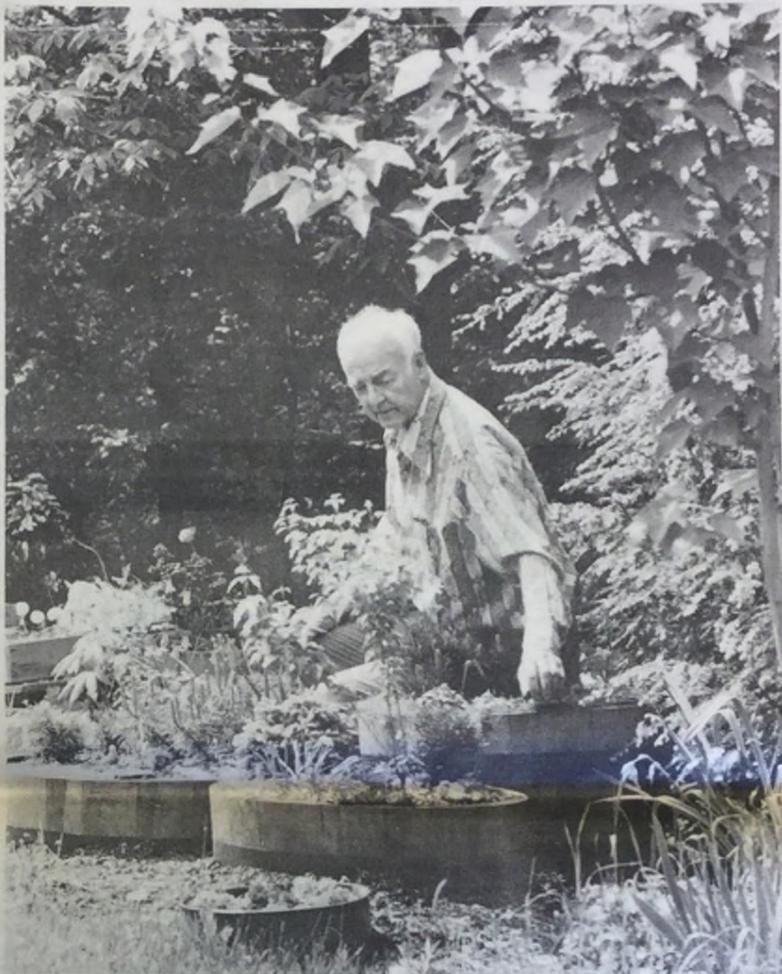
He received his bachelor's, master's, and doctoral degrees in zoology and, shortly after joining the faculty, began earning his nickname.

Stories about Hamilton are legion. During a field trip behind Fernow Hall, Professor Hamilton was pointing out rabbit tracks and explaining how to distinguish them from those of grey squirrels. "These rabbits were here not five minutes ago; the tracks are still warm." Students dutifully kneeled to feel the snow before realizing that they'd been had.

Another time, he wondered aloud what kind of worm he was holding in his hand, and, to the astonishment of the students looking on, he licked it for "identification."

One of his students, Perry W. Gilbert, now professor emeritus of neurobiology and behavior at Cornell, was an unwitting participant in one of Hamilton's pranks. Gilbert wanted to do graduate work under Johns Hopkins anatomist Brazier Howell, whom he had never met or seen in a photograph. One day, Hamilton called Gilbert into his office and introduced a surprised visiting farmer as "Dr. Brazier Howell." Assuming that some good was to come of all this, the farmer didn't protest. Gilbert spent an hour showing the visitor around Fernow Hall. Later—much later—Gilbert found out why the "distinguished anatomist" had been tongue-tied.

While he was a graduate student, Hamilton met Nellie Rightmyer '28, a native Ithacan, in the lab



Raymond Pompilo

Prof. William Hamilton weeds around cacti and miniature trees growing in sawed-off whiskey barrels.

class he was teaching. They were married the following year. The Hamiltons have three children, all Cornellians: Ruth ('51, Fine Arts), who lives in South Dennis, N.J., and is involved in an effort to save the Pine Barrens; William ('53), a professor of environmental ecology at the University of California at Davis; and June ('58), who lives in North Rose, N.Y., and is an agricultural inspector for canning plants.

Nellie Hamilton has been "translating" for her husband ever since their wedding, she says. As he speaks, she waves her hands and shakes her head to let puzzled visitors know they're being put on. She'll even pick up the extension phone to set the facts straight. Hamilton has been known to tell unsuspecting callers that he just got out of jail for killing the aphids on a fuschia or that he's distraught because his pet elephant ran away and can't be found.

When he isn't telling wild tales, Hamilton finds other ways to make people entertain the impossible, such as planting a row of fake daffodils in his snow-covered front yard in February to make passersby pause for a second look.

A few weeks later, they would be stopped instead by a sea of genuine daffodils—literally thousands—along with yellow aconites, grape hyacinths, glory-of-the-snow, tulips, crocuses, miniature snow trilliums, shadblow, and rhododendrons.

The showy spring display, and, in fact, his year-round garden, is the culmination of months of indoor work. During the winter, Hamilton starts plants and trees from seeds in plastic-covered pots placed under fluorescent lights. Practically all of the seeds are obtained through seed exchanges run by botanical gardens and rock garden societies. Several thousand choices are listed, and members of the societies swap desired varieties. Not only

are the seeds free, Hamilton points out, but the selection can't be matched commercially anywhere.

In the summer, the garden is ablaze with lilies, heathers, summer-blooming rhododendrons, and an assortment of annuals.

An Alpine plant collection prized by Hamilton contains miniature trees and shrubs, as well as Mugho pines from northern Italy—"which can fit inside a hat"—that grow happily in sawed-off whiskey barrels amid succulent sempervivums. He is particularly fond of an Arctic pussy willow tree that grows only an inch high and a yard across.

Some of his plants and trees are considered too tender for cold climates, but in his garden they grow with ease: bamboo; ginger from the foothills of Nepal; Shortia, an evergreen plant with pale pink flowers native to the Great Smoky Mountains; and a variety of Chinese witch hazel that has gold fruity-scented flowers.

Hamilton, who has been a consultant to the Cornell Plantations for 30 years, has advice for struggling gardeners. Foremost, he says, disregard the classic advice not to disturb the roots of trees and shrubs when planting them. "Container-grown nursery plants have badly compacted roots. Left like that, the plants have little chance of doing well; many die in the first year after planting. The trees should be taken out of the container and the root ball smashed on the ground. Stomp up and down on it. Then take a knife and make half a dozen cuts around the periphery of the roots. Soak what's left of the root ball in a weak fertilizer and water solution overnight before planting."

Other practices he recommends are to "make a dollar hole for a 10-cent plant," soak all seeds in water for at least 24 hours before planting, sow seeds thinly, and never add sand to break up clay soil "unless you want cement."

Guardian of the Cranes

George W. Archibald ('76 Ph.D.) was planning to attend medical school until on a lark he hitchhiked from Montreal to Ithaca for a look at Cornell's famous ornithology lab. His change in plans—to become an ornithologist—was a fortuitous event for the world's cranes.

From it grew Archibald's mission to save endangered species of cranes by raising them in captivity for release to the wild. His endeavor has required him to gain the cooperation of 22 countries, including some bitterly hostile to one another, and has been the subject of documentaries in the United States, Japan, Canada, France, Australia, and Great Britain. He was honored last year with a MacArthur Foundation award.

Archibald's graduate work on cranes—a family of birds that captured his fancy while he was working as a bird caretaker for the Alberta Game Farm in Canada—made him aware that cranes were in greater danger of extinction than was generally realized. In writing to ornithologists and zoo curators for information for his research, he "kept being told that the answers didn't exist because there were too few cranes to study."

For his doctoral study of cranes' mating calls, he devised "The Cranium," a makeshift crane-observation center that became the germinal project of the International Crane Foundation, which he cofounded in Baraboo, Wisc., in 1973. The Cranium was a collection of sheds next to the ornithology lab that was home not only for the birds but for Archibald. It was quite a local attraction, and through it Archibald became close to a

group of other neurobiology and behavior students specializing in ornithology, including Ronald T. Sauey ('85 Ph.D.), who was also studying cranes.

William C. Dilger, recently retired associate professor of neurobiology and behavior, was faculty adviser to both Archibald and Sauey. "Professor Dilger was my greatest inspiration," says Archibald. "Everything and anything scientific excited him. When I got enthusiastic about something involving cranes, he would get just as enthusiastic, which fueled my interest further."

When Archibald's research was complete, he personally transported the cranes—which had hatched in incubators at Rice Hall—by truck to zoos all over the country. The sheds, says Archibald, "were an eyesore, so they were razed from the face of Tompkins County. It was a sad moment for my friends and me, the end of a chapter in our lives."

Although the facility was gone, Archibald's and Sauey's commitment to continuing their work was by no means diminished. They approached Sauey's father, Norman, who owned a 65-acre Arabian horse farm on the outskirts of Baraboo, with a proposal to use the farm as a center for propagating cranes. The horses were being moved to a farm the Saueys owned in Florida, and Norman Sauey agreed to lease the Baraboo farm for a dollar a year to the embryonic International Crane Foundation. Huts surrounded by large yards were built for the cranes, horse stalls were converted to crane pens, and an incubator was installed in one of the barns.

Once the facilities were readied, Archibald, Sauey, and a volunteer staff began welcoming birds from Japan, the U.S.S.R., Europe, and North America. Some of the birds were on loan from zoos; others were collected in the wild. Eventually the foundation had acquired 14 of the world's total 15 crane species—7 of which were endangered. The development of a bank of threatened crane species was under way.

A bigger obstacle than replenishing the dwindling populations of cranes was protecting their habitats. Nearly all cranes breed in marshes and return to the same areas each spring. Marshes—widely considered wastelands rather than the nurseries they are—are increasingly drained for development and farming, thus leaving the birds without breeding grounds.

To protect the cranes' habitats, Archibald had to ask for the help of governments, which didn't intimidate him at all because, he says, "I believe in what I'm doing." He had already undergone a baptism in diplomatic waters in 1972 when he went to Japan to study red-crowned cranes nesting in the northern end of the island of Hokkaido. The marsh was slated for commercial development, but by mounting a public awareness campaign to save it and gaining the help of the Japanese royal family, he succeeded in laying the groundwork for its eventual preservation.

Uncomfortable living conditions are no deterrent to Archibald. In the winter of 1974, he received permission to live with the South Korean army and observe cranes near the demilitarized zone. A large percentage of the world's white-naped cranes, as well as rare red-crowned cranes, winter in the Han River estuary, which borders the DMZ. Alarmed by the draining and diking going on at the estuary, Archibald used the media to make a plea to the South Koreans to conserve the area. The Korean Ministry of Culture and Information became an ally in the crusade and helped designate the estuary a national monument. (Archibald, who is optimistic that international hostilities can be eliminated, even brazenly suggested that North and South Koreans feed the cranes together, in equal quantities, at a mutually agreed-upon rice field.)

Archibald's friend Sauey had an early triumph as well. In 1973, he persuaded Prime Minister Indira Gandhi to make the Keoladeo Ghana Wildlife Sanctuary, the only wintering grounds left in India for the endangered Siberian crane, a national park.

The revered status of cranes in many countries has been a decided asset in securing their protection. In China, the crane has for centuries been a symbol of longevity—some species can live into their 60s—and in Japan the bird symbolizes both longevity and joy. In Russian, Sicilian, Indian, and other folktales, the crane is often depicted as an animal guide, leading people on adventures they would not have braved on their own. From the time of the early Egyptians, many cultures have believed that cranes selflessly carry small, weaker birds on their backs on migratory journeys, and in both Chinese and Japanese legends, saving the life of a crane brings good fortune.

(Continued on page 131)



George Archibald (far right), cofounder of the International Crane Foundation, presents two red-crowned cranes to Soviet officials in Moscow last year. The mother of these birds is on loan to ICF from the Moscow Zoo; her offspring are returning to the Soviet Union, where they will be bred in captivity and used in public education programs.



Tex, a whooping crane, heartily approves of Archibald's crane dance. Archibald spent five years courting the human-imprinted Tex, who spurned crane suitors, to encourage her to lay a fertile egg.

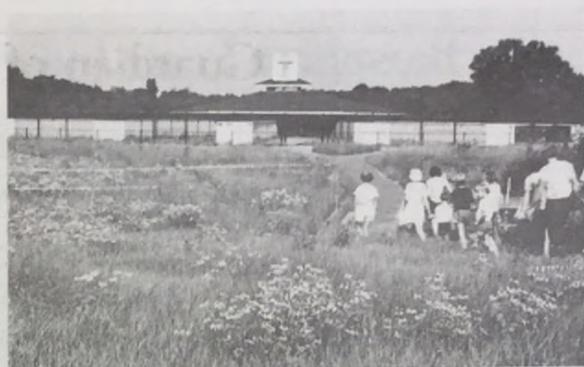


Archibald and Tex take a stroll across grounds of the International Crane Foundation.



International Crane Foundation

A flock of wild sandhill cranes, native to Wisconsin and much of North America.



International Crane Foundation

Visitors on a public tour of the International Crane Foundation.

Cranes (continued from page 12)

Efforts to breed cranes in captivity in zoos and through conservation programs have often ended in failure. In the past, Siberian cranes, for example, had never been bred in captivity, and others, such as the brolgas of Australia, had never been bred outside their native country. Archibald had a hunch what the problem was.

In the wild, the mating season of the brolga coincides with spring monsoons, which serve as a signal to the cranes that warm weather safe for raising young is around the corner. Twice a day, the brolgas at the International Crane Foundation were soaked with "rain" from a hose. Floodlights were placed over the pens of Siberian and hooded cranes to lengthen the hours of "daylight" and thereby encourage mating behavior. The strategies to make the birds feel at home worked: in 1976 the first hooded crane ever bred in captivity hatched at ICF; two years later, the first brolga born outside of Australia was hatched there. The first Siberian crane bred in captivity hatched at ICF in 1981. "What I learned at Cornell about photoperiodicity in the regulation of mating behavior really came in handy," Archibald says.

The foundation's most publicized accomplishment, however, was helping Tex, its only whooping crane, become a mother. Tex had been raised in a zoo and had never encountered other cranes as she was growing up. As a result, she had been imprinted on humans: she responded only to people and snubbed crane suitors. Because they pair for life, cranes, even under ordinary circumstances, are choosy about their mates.

There was no use trying to convince Tex of her cranehood. Instead, each spring for five

years, Archibald set up his living and work quarters in her pen and simulated pairing behavior. Out on the grounds, he would leap and strut in imitation of crane courtship dances. Tex liked what she saw. In 1982, she laid an egg that had been fertilized through artificial insemination. The birth of Tex's infant, Gee Whiz, was an exhilarating experience, Archibald says. "I was so excited, I felt like a father."

The elation was quickly dampened when the chick almost died from a twisted esophagus. The problem occurred because the shell of the egg from which it hatched was unusually thin and admitted air, causing dehydration. Eating was impossible for the bird. Archibald and his co-workers tube-fed the chick until it could handle food on its own.

Not long after this crisis was surmounted, Tex was found dead in her pen. Her killer, a raccoon, was still in the pen beside her.

Archibald was shocked at first but tried to be philosophical and look ahead. "Her genes had been replicated," he said later, "and it was time to move on."

These days, Archibald spends less time in Baraboo and more on excursions around the world, trekking through the Russian tundra with Soviet scientists to collect Siberian crane eggs, meeting with Iranian officials to provide a wintering ground for the birds, or presenting crane eggs to the queen of Thailand.

In February, Archibald had the unusual honor of visiting China's Poyang Lake, usually off limits to foreigners, as the guest of the foreign ministry. Four species of cranes, including approximately 1,350 Siberians, make their home next to the lake, and the Chinese recently set

aside 44,000 hectares of the area as a preserve. The peasants in the area earn their livelihoods by fishing, which requires them to dike the wetlands. Teams of Chinese ornithologists, government officials, and educators are exploring alternative ways, including tourism, to ensure that the peasants remain employed.

"One reason the International Crane Foundation has been successful," Archibald observes, "is that we're very much into compromise. We're concerned about what conservation programs might do to people living in the area" and try to avoid making gains in conservation at the expense of the region's economy.

ICF and Earthwatch, an environmental organization, are offering research/educational tours to see cranes in their Chinese habitats. Groups will be going to northern China in May and September and to southern China in February. Everyone will be put to work helping with research, making the trips tax deductible. Details can be obtained by writing to the International Crane Foundation, Route 1, Box 230C, Baraboo, WI 53913.

"Cranes are ambassadors of international good will," says Archibald. "The biggest threat to the world today is nuclear holocaust. The more people of all nationalities work together to develop friendships, the more we can diffuse situations that could lead to nuclear war. Cranes are a reminder of nations' common interests and vulnerabilities."

On a personal level, he notes of his efforts to save cranes, "My goal is to put myself out of a job."

CIVITAS: A Bridge between Cornell and the Ithaca Community

"I think Mrs. Robbins is very lonely, and I can really relate to that," the student said with sympathy as she set off to spend a few hours with an elderly shut-in, a woman she and her friends take turns caring for.

The student is one of some 300 CIVITAS volunteers who work throughout the Ithaca community each semester. Although most students volunteer for a few hours during the week, some find time to help in the evenings or on weekends.

For many, CIVITAS—Cornell-Ithaca Volunteers in Training and Service—is a gateway to a commitment to community service that lasts throughout their college years and becomes a lifetime pattern of volunteering.

CIVITAS, a program of Cornell United Religious Work, has been in operation for more than two decades. Community agencies look to the organization to recruit volunteers to fill many needs, and requests come from a range of human service organizations that is impressive for a community of Ithaca's size.

Most volunteers come to the CIVITAS office in response to an appeal for assistance. The *Cornell Daily Sun* and the *Cornell Chronicle* give the group the exposure it needs for successful recruitment. Occasionally, someone comes unsolicited, searching for a way to share knowledge and offer support, and staff members suggest the best way to use the volunteer's services. Potential volunteers are interviewed individually to provide placements that will

be satisfying to the volunteer and useful to the organizations in need.

Community service offers rich and varied awards. Feeling needed and doing something worthwhile appeal to students sequestered in a life of academic pursuit. Involvement in the world beyond the campus, especially with children and

old people, provides balance in an environment crowded with people one's own age and, for some, a welcome chance to gain practical experience in an area they are considering as a career.

In addition to the volunteer program, CIVITAS administers a year-round work-study program, sponsored by the university, which enables human service agencies in Tompkins County and Ithaca public schools to employ Cornell students at minimal cost. Jobs offered by agencies and schools are posted, and any Cornell student with a work-study grant may apply.

This year, more than 100 students are working in about 60 different locations, either with an individual or a group of clients or on the administrative support staff in an agency's office. They are involved in child care, educational and recreational programs for children, services for the elderly and handicapped, and health, social service, and legal organizations.

The increasing number and variety of jobs available each year attest to the community's appreciation of the students. Their personal commitment and energy make CIVITAS volunteers and work-study students Cornell's ambassadors of goodwill. As one program director commented, "Thanks for everything. Your support is one of the bright spots in my work life."

—Mary McGinnis
CIVITAS Coordinator



Jane E. Koestler

Carol Barkley '86, a CIVITAS work-study student, helps Edna Michael, a nursing home resident, as they set out on their weekly outing.

Biosphere Is an Indivisible Sphere of Life

The traditional concept of the atmosphere as merely a mixture of gases surrounding the earth is undergoing revision.

Douglas A. Paine, professor of meteorology, believes that the biosphere—the earth, its inhabitants, and its environs, which constitute a self-sustaining ecosystem—relies on its atmosphere for information.

To decipher the swirling, seemingly chaotic, and complex processes of weather, Paine has shifted his attention away from the large-scale phenomena often depicted on weather maps to such microscale processes as convection.

Towering cumulus clouds have long been recognized as efficient producers of rain and wind, as well as cleansers of atmospheric pollutants, all vital functions for the life process. Now it appears that convective events such as thunderstorms produce subaudible bursts of acoustic waves known as infrasound. Paine terms these acoustic waves "the atmosphere's quantum foam," the means by which information is continually exchanged not only among atmospheric levels but within the biosphere as a whole.

Ideal subjects exist for studying the effects of atmospheric communication on living creatures. Which organisms masterfully navigate through their kingdom of air and, furthermore, display readily observed responses to atmospheric changes? Birds, of course. The idea occurred to Paine one summer day 10 years ago as he was watching gulls sail over fields near Ovid, N.Y.

In observing the gulls ride up and down on thermals, small buoyant plumes of air, the question struck him: How do the birds know how to find these thermals, which seldom raise enough dust to be seen from afar?

The turbulence accompanying thermals emits infrasound. Several mysteries surrounding the art of navigation might be explained, Paine concluded, if it was determined that birds are sensitive to infrasound in their environment.

Paine approached a group of researchers in the department of neurobiology and behavior with the suggestion that an instrument be developed to detect whether birds do in fact perceive infrasound. The researchers—Douglas B. Quine (Ph.D. '79), Marilyn L. Yodowski ('75, Arts), Melvin L. Kreithen (Ph.D. '75), and the late Prof. William T. Keeton—were intrigued by Paine's idea, which complemented their own work with homing pigeons.

The resulting research, which led to the development of an instrument to produce low-frequency air vibrations and used an electrocardiogram to monitor the pigeons' accompanying heart rates, yielded a breakthrough for identifying a mechanism by which birds use environmental cues for navigation.

Later, at the University of Pittsburgh, Kreithen found that the pigeon perceives infrasound through an organ at the tip of its inner ear that relays signals to the brain via nerve fibers. Work in subsequent years confirmed and expanded these findings, which are thought to apply to all bird species.

What the birds are responding to are wave-breaking zones that produce the subaudible sound, explains Paine. "Many of the waves that amplify and break in the atmosphere," he adds, "move at speeds ideal for birds in flight. Migrating flocks of geese might literally hitch a ride on the crests of such air waves. Birds may locate the waves' presence and direction of movement by the Doppler shifts, or frequency changes, that accompany infrasound."

Doppler shifts, as they relate to hearing, are alterations in sound frequency caused by changes in the sound's velocity and direction relative to the listener. For example, to a person standing still, the sound of a train whistle will appear to change pitch as the train approaches, passes, and then recedes.

Douglas Quine, now a researcher at the Museum of Natural History in Champaign, Ill., did a pioneering study in the mid-1970s on barn owls that demonstrated the Doppler effect as it relates to infrasound in bird navigation.

In the case of homing pigeons, Paine thinks that the birds' habit of circling their release sites before heading toward their home loft is a clear indication of the importance of the Doppler effect. "Because the speed of a bird flying and the speed of infrasound are similar, alterations in the birds' direction of flight will cause a significant change in the relative velocity of the



Vertical wave-breaking zones release excess energy from the earth's immediate atmosphere to the stratosphere. The breaking waves produce bursts of infrasound.



Satellite view 22,000 miles above earth of horizontally breaking waves giving birth to tropical storm Anna.



These Cornell-reared homing pigeons may use environmental cues such as infrasound to find their way home from test sites hundreds of miles away. Bird navigation as guided by infrasound is an example of the many ways that the biosphere acts as a self-communicating system.

infrasound source. By flying in a circle, the pigeon can determine when it is flying toward or away from an infrasound source; and by monitoring changes in infrasound pitch, it can pick out the infrasounds that mark the way home."

Prof. Bruce Moore of Dalhousie University in Nova Scotia pooled 12 years of data on Cornell-reared pigeons released at numerous sites throughout the Northeast. He noted a consistent pattern of flights converging toward Cayuga Lake from all directions of the compass after the pigeons were turned loose.

Paine believes that Cayuga Lake acts like a radio transmission tower, broadcasting its presence by waves continually breaking on its surface. He speculates that occasionally the birds are unable to use the lake's infrasound broadcast to fly home because it is jammed by other sources of infrasound or the lake's surface is uncharacteristically calm. Then the pigeons have to rely on other environmental cues such as polarized light.

Infrasound pulses could serve as a kind of navigational map for migrating birds. "A bird flying from the Arctic to the tropics is effectively moving through a dense grid of infrasound beacons," Paine says. "The pulses are as unique as lighthouse signatures. Each lighthouse beacon has a specific 'blip' indicating its geographic identity. Captains of ships can determine that they are near, for instance, Cape Hatteras by recognizing its light pattern."

"Infrasound blips work the same way. Sound pulses emanating from a mountain range in British Columbia produce highly individual patterns, which we are able to discern with infrasound detectors. Mountain ranges are consistent sources of infrasound because of the eddies in the wind that form around them, much like the turbulence encountered when waves break over a large coral reef."

"It is theorized that birds, before beginning a long migratory trip, listen for whether these beacons are lit and strong. If they are, some members of the flock may behave in a way that indicates it's a good time to start." The added momentum of the winds ensures that the birds can conserve their strength for their energy-intensive migration.

Paine plans to discuss infrasound as an example of the biosphere's unity at an Audubon conference to be held at the University of Massachusetts this August.

Humans also use infrasound. Paine notes that findings from infrasound research have been put to use as a navigational aid for ships and planes.

Water waves exhibit the same patterns as air waves, he notes. As ocean waves break against shorelines and reefs, they cause bursts of infrasound. The Navy is currently using oceanic infrasound bursts to gauge turbulence in distant parts of the sea and alert commercial interests to typhoons and hurricanes. Likewise, most large aircraft now carry infrasound detectors, allowing the automatic pilot system to steer clear of areas producing abundant infrasound and thus avoid severe turbulence.

Paine says that he suspects whales and other migratory species in the world's oceans use infrasound as a means of charting pathways to feeding and breeding grounds.

The atmosphere itself uses infrasound to communicate with diverse systems to sustain its life-support role, he observes. "Squall lines form because there is an excess of energy in a relatively small atmospheric volume. The convective storms actually concentrate this energy excess, then convert it into a wave form that is free to escape the weather-producing troposphere." The troposphere is the stratum of air closest to earth.

As the infrasound reaches different atmospheric levels, its energy is absorbed over relatively thin layers. In the most severe instances, the boundary separating the stratosphere and troposphere buckles and breaks, much like a giant ocean swell or tsunami, causing a descent of very dry, ozone-rich, cold air into the severe storm environment. This has the effect—by cutting off the supply of warm, moist air—of preventing the initial storm from becoming too extreme as a wind and precipitation producer.

Paine first studied this process in the mid-1960s, when his thesis adviser at Penn State, Edwin F. Danielsen, discovered that the descending air stream was loaded with strontium-90, a radioactive substance. The radioactivity, Danielsen found, was scavenged from the upper atmosphere by duststorms, rain, and snow.

(continued on page 15)

CAU Summer '85



CAUers cool off in the "flat rock" section of Fall Creek above Beebe Lake.

"Learning vacation" courses offered by Cornell's Adult University end with parties, not finals.

Ranging from the strictly-for-fun to the serious, the courses include photography, wine appreciation, horticulture, writing, bread and cheese making, mountaineering, veterinary anatomy, investment strategies, marine science, nutrition, and international affairs.

Among CAU's teachers this summer:

Harlan P. Banks, Liberty Hyde Bailey Professor Emeritus of botany;

Charlotte Bruce, research support specialist in poultry and avian science;

Joseph B. Bugliari, professor of agricultural economics and business law and dean of the Cornell faculty;

Robert E. Cook, director of the Cornell Plantations;

Thomas Eisner, professor of neurobiology and behavior and Jacob Gould Schurman Professor of Biology;

Richard B. Fischer, professor emeritus of environmental education;

Dale A. Grossman, lecturer in agricultural economics and communication arts;

Harold F. Hintz, professor of animal science and veterinary clinical science;

Kenneth A. R. Kennedy, professor of ecology and systematics;

John M. Kingsbury, professor of botany and veterinary clinical science;

David A. Levitsky, associate professor of nutritional science and psychology; and

Verne N. Rockcastle, professor of science and environmental education.

After class, CAUers have access to all campus events and facilities, including the world-renowned Laboratory of Ornithology, with its tranquil ponds and wooded paths, and the Cornell Plantations, with its 2,600 acres of arboretum, gardens, waterfalls, and gorges. CAUers live and dine on campus for the week.

Biosphere (continued from page 14)

From there, it entered the human food chain wherever grazing, milk-producing animals ate the contaminated forage.

The need to understand the connections between such complex geophysical and biological systems was obvious, Paine notes. At the time, meteorological textbooks stated that stratospheric air seldom mixed with or entered the storm environment.

Nuclear testing in the middle atmosphere was ultimately banned after American and Russian scientists learned that the levels of the atmosphere behave as open systems, exchanging both energy and mass as part of the life-support process.

As a consequence of that and later work confirming the interdependent nature of the environment, Paine has been urging scientists to be less wedded to the classic Newtonian scientific approach, which views physical and biological systems as operating independently of one another. His current work in developing conceptual and mathematical models of DNA molecules and atmospheric processes based on Planck's quantum theory—originally conceived as relevant solely to atoms—may offer insight into the information channels that he believes link coevolving systems.

"The atmosphere is a life-support system that sustains and communicates with its individual parts," Paine says, "but it also freely exchanges information with the rest of the biosphere. If we do serious harm to the atmosphere's ability to heal itself—for example, by depleting the ozone layer through even a limited nuclear war—countless future generations will suffer."

A program for children and teenagers, who are divided into five age groups, offers activities designed to meet their particular interests. Counselors and teachers lead the groups through activities such as science experiments, drama classes, sports and recreational events, and evening programs that include supervision until 11:00.

CAU Summer '85 will be offered in five one-week sessions beginning on Sunday, June 30. For a brochure and registration forms, contact Cornell's Adult University, 626B Thurston Avenue, Ithaca, NY 14850-2490, (607-256-6260).

End of Diversion Program May Spur Milk Output

American dairy farmers are likely to be stepping up their milk production now that the federal government's milk diversion program has ended, according to a Cornell economist.

For the dairy industry, the end of the diversion program and proposals for further cuts in support prices may mean early retirement for a number of marginal dairy farmers whether production increases or not. For the consumer, farm price cuts may well mean steady, if not lower, milk prices. But for many officials in the federal government, it is further evidence that intervention programs are temporary solutions, not cures, for the problems of the dairy industry. These are the conclusions of Andrew M. Novakovic, assistant professor of agricultural economics.

Under the milk diversion program, the federal government paid farmers \$10 for every 100 pounds of milk "diverted" to spur them to cut production and thus reduce milk surpluses. (Diverted milk refers to the net decrease in the amount of milk currently marketed compared with the amount sold during an earlier "base" period.)

Although many dairy farmers who received the maximum diversion allowed under the program may retire permanently—because of their age or their belief that they are unable to compete any longer—the majority would be foolish not to return to full capacity after the end of the program, Novakovic says.

The milk diversion program was a result of the federal government's commitment to support dairy farmers' prices and incomes coupled with its reluctance to acquire increasing amounts of the milk produced by the country's most robust industry.

The years 1978-83 saw a steady rise in production, from 123 billion to 140 billion pounds. Record-breaking prices for dairy products in the late 1970s had made dairy farming look financially rewarding, causing an influx of people into the

industry and encouraging established farmers to expand their operations. Although consumption also rose from 1978 to 1983, it did so at a much slower rate than production. Result: surplus milk.

Under the dairy price-support program, manufacturers could sell surplus cheese, butter, and nonfat dry milk to the government. In 1979, the federal government purchased 2.1 billion pounds of milk in the form of such dairy products. By 1983, the figure had soared to 16.8 billion pounds. After repeated but more modest attempts to stem the tide, the government passed a four-part program, the Dairy Production Stabilization Act, in November 1983. The milk diversion program was a major part of this act.

Although the support price for milk was also lowered about 4 percent, proponents of the diversion program hoped it would reduce production more quickly and less painfully than simply lowering prices. It was a quick-fix, temporary solution for a complex, chronic problem, Novakovic notes.

The milk diversion program has helped the government reduce the amount of products it purchases under the support program, he says. In 1984, the government reduced the milk it bought from farmers by nearly 8 billion pounds—a 43 percent reduction over the previous year.

Some have argued that the diversion program was so successful that it should have been continued after its March 31 ending date. "But several important questions should be asked first," Novakovic says. Even if the government were to run the program for a few more years, is there any assurance that production would not leap again when the program finally ended? What would happen to price supports during this period? What are the long-term effects of such government intervention?

These same questions may be troubling government officials. Federal budget director David

Stockman recently proposed ending all federal price support for the dairy industry by this time next year. Secretary of Agriculture John Block, however, objected, saying that was too soon. The two have compromised, and if they get their way, the entire dairy price-support program may be phased out over the next five years.

This plan, of course, has to weather much opposition from the dairy industry and must be passed by Congress.

"Assuming the Reagan administration's proposals clear Congress, and I am doubtful they will in their present form," Novakovic comments, "then government purchases would be eliminated in 1987, and all forms of dairy price support would be removed in 1990. That would leave the dairy industry with a free market."

The result would no doubt be additional uncertainty and instability among farmers and the dairy-processing industry. To the owners of economically weak farms, it may mean retirement—"voluntary and not-so-voluntary," according to Novakovic. Other dairy farmers, however, would scale their operations up or down to match the prices and costs they face, and overall prices and production would be geared to the amount of milk that could be sold commercially.

Consumers may see quicker and greater swings in the price of milk. The immediate effect is likely to be lower prices for milk and other dairy products, predicts Novakovic.

It is less clear whether the dairy industry and consumers would be better off in the long run if the government eliminated dairy programs altogether, he says, or if it simply managed better the programs that have been used for the past 30 years.

—Joe Eller

Sage Chapel's 'Eminent Divines'

A distinctive tradition in university chaplaincy began at Cornell in 1872, when the university turned down Henry Sage's offer to endow a sectarian chaplain and decided instead to establish an endowment for "eminent divines" from the major biblical faiths.

The first preacher to be heard in Sage Chapel, in June 1875, was Phillips Brooks of Boston's Trinity Church (Episcopal). Andrew D. White's admiration of Brooks's rhetorical style no doubt influenced the selection. Indeed, White once said that he would have chosen holy orders rather than education and diplomacy had Brooks been preaching at an earlier time.

Over the years many important preachers have mounted the Sage pulpit, with its intricate tracery in Caen stone. Harry Emerson Fosdick, Reinhold Niebuhr, Stephen Wise, Paul Tillich, Martin Luther King, and Harvey Cox have all preached there to

Common Learning Program Gets High Marks

An educational experiment designed to stimulate students to integrate ideas across fields has earned high grades from professors and students.

Launched in the spring of '84, the Common Learning Program "turned out to be an exciting intellectual adventure," says Urie Bronfenbrenner, cochair of the Commission on Common Learning. Bronfenbrenner is the Jacob Gould Schurman Professor of Human Development and Family Studies and of Psychology.

The common learning concept arose, he says, from a series of faculty discussions several years ago during which faculty members expressed the need to develop and experiment with new courses that would serve the common educational needs of juniors and seniors across the university.

Peter D. McClelland, professor of economics and a Common Learning committee member, explains, "We concluded that there's too much specialization forced on students at the undergraduate level. That isn't to argue against specialization, but against it exclusively." In an attempt to remedy that imbalance, Common Learning courses give students a chance to confront problems from a variety of analytical viewpoints.

Bronfenbrenner observes that professionals in every field are increasingly faced with situations that require the ability to integrate information and knowledge from "beyond the sphere of their particular specialty. For example, the challenges of genetic engineering transcend the realm of biology since they raise social and moral issues that have deep roots in history, philosophy, and culture."

Written evaluations after the first round of Common Learning courses asked students to compare the course they had taken to the "best course" they had taken at Cornell. Common Learning courses tended to be ranked far higher for such educational goals as "evaluating alternative solutions and assessing social and ethical implications" and "professor's ability to generate discussion."

Each Common Learning course is taught by one professor but is developed by faculty members from several fields to provide a variety of viewpoints. Professors' evaluations frequently indicated that their intellectual interests had been broadened by this team approach.

Rural sociology professor Charles C. Geisler notes that in developing one of the courses, "Work, Identity, and the Nature of American Community," nearly 100 readings were proposed and discussed before the final two dozen readings were selected. "I was exposed to literature I would probably never have known about otherwise," he says. "And the students were able to study the topic from many perspectives—history, political science, sociology, and economics."

The course is taught by Nicholas A. Salvatore, a professor in the School of Industrial and Labor Relations. In addition to Geisler and Salvatore, professors Vernon M. Briggs (ILR), Isaac Kramnick (government, Arts), R. Laurence Moore (history, Arts), and Kenneth L. Robinson (agricultural economics, ALS) developed it.

Enrollment in a Common Learning course is limited to 20 juniors and seniors universitywide, and acceptance is based in part on a questionnaire about the applicants' interests and backgrounds.

Cornell students, staff, and faculty—as well as to townspeople playing hooky from their own congregations.

Because Cornell does not have a department of religious studies or a divinity school, the pulpit at Sage Chapel provides a critical forum for a spectrum of religious views. A regular attendee at Sage would certainly be aware of the major themes in the mainline Jewish and Christian faiths.

Last year's guest preachers included the secretary of the Faith and Order Commission of the World Council of Churches, William Lazareth (Lutheran), as well as the celebrated German theologian Hans Kung (Roman Catholic) and the charismatic Hasidic rabbi Zalman Schacter. This year worshipers will hear the popular Scottish preacher David H. C. Read, of New York's Madison Avenue Presbyterian Church; John Vannorsdall, chaplain of Yale University and former Lutheran chaplain at Cornell; Father Robert J. Drinan, the Massachusetts congressman who stepped down at the pope's request; Joseph Cardinal Bernardin of Chicago (Sage Chapel's first cardinal); Rabbi Max Tickin of George Washington University; and Blu Greenberg, an Orthodox Jewish feminist.

Cornell faculty and staff members have traditionally been included among the preachers, giving students a chance to discern connections between personal commitments and vocational disciplines.



Mark Damon

Bernard LaFayette, Jr., dean of the graduate school at Alabama State University, preaching at the Festival of Black Gospel held annually at Sage Chapel.

Daniel Sisler, professor of agricultural economics, gave a sermon last year in which he called for a broader religious concept of sharing. He observed that "the Bible and Judeo-Christian teachings provide excellent guidelines concerning interpersonal sharing and sharing within the intimate setting of a hamlet or village. But they do not address the issue of sharing across international borders. With a mounting food crisis, and an increasing gap between the have and have-not nations, it is imperative that we expand our Judeo-Christian mores to include the sharing of food and technology. Great institutions such as Cornell, which simultaneously molds personal values and generates food-producing capacity and technology, must be in the forefront of this enlarged concept of sharing."

Robert Wilson, professor emeritus of physics and a key member of the team that produced the first atomic bomb, was another of the guest speakers last year. His provocative talk, "The Conscience of a Physicist," included the suggestion that "as much effort be given to the study of benevolently guiding science as is given to science itself."

The chapel reverberates each week to the sounds of the Sage Chapel choir, under the direction of Donald Peterson, and each February to the distinctive rhythms of gospel music as local black congregations join the Cornell community in celebrating the black church tradition. This year's service featured the preaching of the Rev. Otis Moss of Cleveland.

Four years ago Cornell president Frank Rhodes played a key role in restoring a baccalaureate service as part of the commencement activities. The service, held in Bailey Hall, is administered by Cornell United Religious Work and has been well attended. The preachers have included Jacqueline Wexler (Roman Catholic), Sol Linowitz, J.D. '38 (Jewish), David H. C. Read (Protestant), and Edmund Pellegrino (Roman Catholic). This May the baccalaureate will be held at 9:30 A.M., earlier than the traditional time, and the preacher will be Rabbi Harold S. Kushner, the author of *When Bad Things Happen to Good People*.

Sage Chapel, now as always, provides a setting for worship consonant with the intention of Cornell's founders yet is open to the pluralism of today.

—Robert L. Johnson
Director, Cornell United Religious Work

AGRICULTURE & LIFE SCIENCES
NEWS

May 1985

New York State College of Agriculture and Life Sciences at Cornell University

DATED MATERIAL
MAY 1985

Nonprofit Org.
U.S. Postage
PAID
Cornell
University