Cornell University
Agriculture and Life Sciences
news
New York State College of Agriculture and Life Sciences, Cornell University, Ithaca, N.Y. May 1983

David Call Reappointed as Dean

David L. Call, dean of the College of Agriculture and Life Sciences, has been appointed to a second five-year term by the Cornell Board of Trustees, effective July 1, 1983.

In making the announcement, Frank H. T. Rhodes, Cornell University president, said: "Dean Call enjoys the complete confidence of all of us. . . . We are delighted with the progress that the college has made under his leadership, and we look forward to cooperating with him during the next five years in enhancing even further the various programs within the college."

Before being appointed dean in 1978, Call served for five years as director of New York State Cooperative Extension. From 1962 to 1973, he was the H. E. Babcock professor of food economics in the Graduate School of Nutrition (now the Division of Nutritional Sciences). He was the youngest professor ever to hold an endowed chair at Cornell.

An agricultural economist, Call has conducted research on government food and nutrition programs, factors affecting nutrition, and acceptance of food analogues and substitutes. He has also conducted research in international economics, malnutrition, and development.

Call received his bachelor's (1954), master's (1958), and doctoral (1960) degrees in agricultural economics from Cornell.

Cornell Biochemist Awarded Wolf Prize in Agriculture

Wendell Roelofs identifying insect pheromones using an electroantennogram.

Wendell L. Roelofs, Liberty Hyde Bailey professor of insect biochemistry in the department of entomology at the New York State Agricultural Experiment Station at Geneva, has been awarded the Wolf Prize in Agriculture for his work on insect sex pheromones (attractants).

The $100,000 prize is considered the top agriculture award in the world. Presented by the Wolf Foundation of Israel, five awards are given annually, one each in the fields of agriculture, physics, chemistry, medicine, and mathematics.

Roelofs has conducted pioneering studies on the isolation, identification, synthesis, and use of insect sex pheromones as an alternative to pesticides. Pheromones are widely used to monitor pest species and are being used to combat insect pests by disorienting them and preventing mating.

When he first arrived at the station in 1965, identification of individual pheromones was a laborious process involving thousands of insects. He developed a technique that uses an electroantennogram to monitor biologically active compounds in pheromone extracts. Using this technique and a series of synthetic compounds greatly decreased the number of insects and amount of time required to identify pheromones.

Roelofs has worked with private industry in designing insect traps and pheromone dispensers in practical kits, now a vital part of orchard pest-management programs.

In addition to the monitoring technique, which helps determine when populations are high and therefore the optimal time to spray, Roelofs has used pheromones for direct control. He has demonstrated that the redbanded leafroller, one of the leading pests of apples, can be suppressed in orchards using one trap per tree. With his colleagues at the experiment station, he has also developed techniques for disrupting the sexual communication of insects by broadcasting pheromones in fields. Commercial companies are now perfecting formulations of pheromones to be used in this procedure.

Currently, Roelofs is conducting research on pheromone biosynthesis, genetics, and behavior to understand better the mating communication system. Such basic knowledge is needed to develop better methods of disrupting these chemical signals in nature.

Roelofs is the author or coauthor of more than 200 scientific articles and has contributed to more than a dozen books on pheromones and insect biochemistry.

Roelofs, 44, received a bachelor's degree in chemistry from Central College, Iowa, in 1960 and a doctorate in chemistry from Indiana University in 1964.

He was honored with the J. Everett Bussart Memorial Award in 1973, the Alexander von Humboldt Award in 1977, the Outstanding Alumni Award from Central College in 1978, and was the Entomological Society of America Founder's Award Lecturer in 1980

—Roscoe E. Krauss

Cornell Designated State Biotechnology Center

Cornell has been designated a center for advanced technology by the state Science and Technology Foundation and Gov. Mario M. Cuomo. The center, which is expected to open in late 1983, will specialize in biotechnology.

Also designated were the University of Rochester, as an optics center; the Polytechnic Institute of New York, as a telecommunications center; and the State University at Stony Brook, as a medical biotechnology center.

The governor's executive budget proposed that $2.5 million be appropriated to support the four centers. In addition, several New York companies, including Eastman Kodak, Xerox, Bausch and Lomb, IBM, and American Telephone and Telegraph, have committed more than $2.5 million to the program.

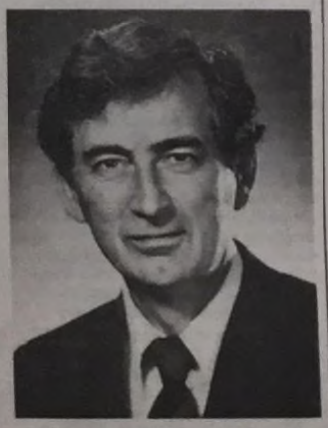
Each designation carries a state grant of between $400,000 and $600,000 to help set up a cooperative state-university-business research operation. Cornell's grant will help fund its Center for Agricultural Biotechnology.

When announcing the designations in March, Gov. Cuomo stated that "this program will create job opportunities in the years ahead" and "thanks to the corporations and the universities, New York is once again taking a lead in shaping tomorrow's economy."

President Frank H. T. Rhodes said that the designation "is a source of tremendous pride to everybody associated with the university" and "meaningful recognition of Cornell's continuing contribution to the vitality of our region and our state."

The Cornell center will concentrate on stimulating New York's agricultural, food, chemicals, and pharmaceutical industries. It will work with the recently formed Cornell Biotechnology Institute, which will be involved in a broad program of basic research in biotechnology. The two organizations could eventually employ 200 people.

Robert Barker Appointed Vice President for Research and Advanced Studies



Robert Barker, director of the Division of Biological Sciences and professor of biochemistry, has been appointed vice president for research and advanced studies at Cornell.

Barker succeeds W. Donald Cooke, who will retire in June after holding the post for more than 13 years.

As one of six vice presidents at Cornell, Barker will have overall responsibility for research programs, which totaled $144.3 million in fiscal year 1982. The position was recently expanded to include responsibility for graduate education and industry support of research, in addition to the office of sponsored research.

Barker came to Cornell as director of the Division of Biological Sciences in 1979 after holding a faculty position at the University of Iowa and serving as chairman of the department of biochemistry at Michigan State University. He has an active research program in the molecular structure of cell surfaces and is the author or coauthor of more than 70 publications, including a book on organic aspects of biochemistry.

Cornell to Work on Worldwide Water Management Project

Cornell has been designated one of three universities to work on a $20 million, five-year project to help improve water management and irrigation systems around the world.

Funded by the U.S. Agency for International Development (AID) through the Consortium for International Development (CID), a group of 11 universities in the western United States, the project, which will involve Cornell, Utah State, and Colorado State universities, will develop worldwide water management strategies in developing countries.

"Water now is the limiting factor for agriculture in many areas of the developing world," explains E. Walter Coward, Jr., Cornell's project director and a professor of rural sociology and Asian studies.

"But with efficient irrigation and good water management, a farmer could grow crops throughout the dry season, doubling and perhaps tripling production."

The three universities will provide technical assistance to irrigation agencies, research institutions, universities, and AID missions; training in the United States and abroad; an information and communication network on water management technology to include workshops, seminars, and materials; and research studies on topics related to irrigated agriculture.

Although Cornell faculty members will work with the other two universities on all facets of the program, they will focus on the humid tropics and the interaction of social and technical factors in irrigation development. This strength will complement those of the other universities in technical matters and arid regions.

At Cornell, initial efforts will focus on encouraging farmers to participate in designing irrigation systems, helping local universities and government agencies determine what socioeconomic research should be undertaken, and improving small-scale irrigation development.

Although the scope of the program is worldwide, work will center on South and Southeast Asia, where most of the irrigated agriculture in developing countries is concentrated. Coward expects development to be continued in Sri Lanka, where Cornell researchers have already worked for three years, and expanded to Indonesia, Thailand, or Bangladesh.

Cornell's subcontract will be administered by the Program in International Agriculture in the College of Agriculture and Life Sciences, which has been instrumental in helping several countries, particularly the Philippines and Indonesia, develop more efficient irrigation systems.

Participating faculty members at Cornell include Coward; Randolph Barker, professor of agricultural economics and Asian studies; Milton Barnett, professor of rural sociology and Asian studies; Gilbert Levine, professor of agricultural engineering and a water specialist; Michael F. Walter, associate professor of agricultural engineering; and Norman T. Uphoff, professor of government and chairman of the Rural Development Committee of the Center for International Studies in the College of Arts and Sciences at Cornell.

—Susan S. Lang

College Now Third Largest Ag School in Nation

The College of Agriculture and Life Sciences is now number three in size among agricultural colleges in the nation. Enrollments for the current academic year, submitted last fall at a meeting of the National Association of State Universities and Land Grant Colleges (NASULGC), place this college, which has 3,046 undergraduates, right behind Texas A&M University (3,393) and the University of California at Davis (4,280). Iowa State (2,947) and Purdue University (2,748) were ranked fourth and fifth.

Last year, the NASULGC, which ranks 70 agriculture colleges, placed the college eighth for undergraduate enrollment.

A total of 1,019 graduate students (M.S. and Ph.D.) are enrolled in the college, compared with 1,064 last year. Cornell is ranked third for graduate enrollment nationally; the University of Wisconsin is second (1,177), and Texas A&M first (1,456). Cornell ranks second in the number of doctoral candidates.

Whereas some agriculture colleges recorded major decreases in undergraduate enrollment, Cornell's increased slightly. Among those schools that had major losses were Ohio State (down 33 percent), New Mexico State (down 28 percent), the University of New Hampshire (down 22 percent), the University of Tennessee (down 18 percent), and North Carolina State (down 16 percent).

Cornell hopes to maintain enrollment at 3,000 undergraduates, a ceiling set by the State University of New York. Of its 3,046 undergraduates, 80 percent are New York State residents.

A 50:50 male-female ratio was also achieved. Last fall's figures show that 1,547 men and 1,499 women are enrolled in the college.

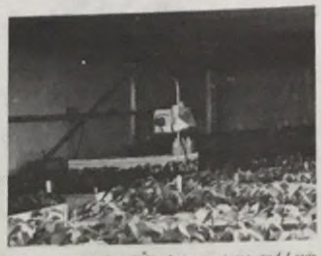
Commenting on the college's ability to maintain enrollment, George J. Conneman, director of instruction here, notes: "We enjoy a larger pool of students primarily because of our reputation, and we offer more ways to help students meet their financial needs."

Cornell's increase in student enrollment did not affect the quality of its applicants. "We accepted 38 percent of the 2,607 applicants for the current freshman class, compared to 33 percent of 2,709 last year, but the average SAT score did not reflect a corresponding drop in quality," Conneman says.

The college was ranked number one in quality among the country's agricultural colleges in the last such evaluation (1979) conducted by Ladd and Lipset. It was also ranked number one in 1977 in the Gourman report, issued by National Standards, Inc.

—David I. Stewart

System Sharply Reduces Heating Costs in Greenhouses



Anthony J. Donohoe (left), design engineer, and Louis E. Albright, professor of agricultural engineering, stretch a thermal curtain over and around plants in an experimental passive-solar greenhouse.

Researchers here have devised an energy-conservation system that will dramatically reduce fuel costs for commercial greenhouses.

Now ready for adoption by the industry, the Cornell system, which uses a "thermal curtain," reduces heating needs by at least 60 percent in an average commercial greenhouse.

"This system can pay for itself within two to three years, depending on the type of fuel used," says researcher Louis D. Albright. Albright is a professor of agricultural engineering and the leader of the research project.

The project, which has been under way since the mid-1970s, is the collaborative effort of Albright and Robert W. Langhans, professor of floriculture, an expert on greenhouse management. Other participating researchers are Anthony J. Donohoe, design engineer, and Lori E. Marsh, research support specialist, both in the department of agricultural engineering.

When energy became a national concern nearly a decade ago, the greenhouse industry was one of the first to feel the pinch. Today, depending on the type of fuel used, heating bills per acre of greenhouse space are $40,000 to $80,000, compared to $10,000 before the energy crisis.

An estimated 10,000 acres are under glass in the United States, resulting in an enormous annual fuel cost.

New York State, one of the nation's leading producers of greenhouse crops, has approximately 500 acres of greenhouse space. The new system could result in a potential savings of $14 million to $20 million annually here and in other parts of the country with similar climatic conditions.

A unique insulation cover, which is drawn over the plants at night, accounts for most of the savings gained from the system. The thermal curtain, which has been tested successfully under commercial conditions in Elmira, N.Y., reduces nighttime heating requirements by at least 85 percent.

The night cover consists of five layers of foil-covered cloth, each separated by air. It has an insulation R-value of 8 to 9, the equivalent of a two-to-three-inch fiberglass batt.

When it is stretched over and around the plants along the length of the greenhouse, the curtain prevents heat from escaping through the roof and walls. During the day the cover is rolled up like a window shade.

Another device, now undergoing testing, automatically opens and closes the curtain depending on the amount of light outdoors. If light levels are too low for plant growth, as on cloudy mid-winter days, the cover automatically closes.

The researchers are also experimenting with such energy-conservation measures as leaving greenhouses unheated during the night. Traditionally, commercial greenhouses are maintained at prescribed temperatures on a 24-hour basis.

In tests with lettuce and chrysanthemums, the scientists have found that gradually lowering the temperature during the night does not affect plant growth or quality. The effects on plants of gradually raising the temperature during the day, instead of the prevailing, heat-intensive practice of raising it abruptly in the morning, are also being studied in the project.

—Yong H. Kim

Study Finds Excessive Contamination in Rural Water

Nearly 39 million rural Americans are drinking water that is excessively contaminated, according to a recently completed national study by Cornell researchers done for the U.S. Environmental Protection Agency (EPA).

The study found that the water in almost 29 percent of rural homes had excessive bacterial contamination; 25 percent had unsatisfactory mercury levels; almost 17 percent had too much lead; 17 percent had too much cadmium; and 14 percent had more selenium than is permitted by current standards.

The good news is that virtually none of the rural households had detectable radioactivity or pesticide/herbicide residues in their water.

The $5 million, five-year National Statistical Assessment of Rural Water Conditions surveyed the water supplies of 2,654 households, which were carefully selected to represent the 22 million households—approximately one-third of the U.S. population—in rural areas.

In this first national study on rural water, the Cornell researchers analyzed 43 separate microbial, physical, organic, inorganic, and radioactive substances, many of which are dangers to health. Although they found that the water in the majority of the households was acceptable by most of the quality indicators used in the study, about two-thirds had some contaminants above the permitted levels.

Almost 64 percent, about 14 million homes, had high concentrations of at least one contaminant; more than 30 percent had high levels of two or more; and about 10 percent—more than 2 million households—had three or more contaminants in excessive amounts.

"Too many of us have assumed that rural water was clean and pure. Our results indicate that many homes in rural areas are unprotected and therefore vulnerable to further and increasingly serious contamination," says Joe D. Francis, the principal investigator for the Cornell team of researchers.

Homes in the north-central region of the United States were found to have the

(continued on page 3)

Water *(continued from page 2)*

worst water, followed by those in the West. Households in the Northeast tended to have the best water, although approximately one-half had at least one contaminant over the Environmental Protection Agency's "maximum contaminant levels."

"Although these findings are startling, they must be kept in perspective," emphasizes Francis, a professor of rural sociology. "Even though there were 'high' levels of particular substances, certainly higher than we expected, we did not witness correspondingly widespread water-related medical problems."

"Long-term effects of low levels of a toxic chemical are not known, however, and there is no way to correlate general health and illnesses with drinking water except in some outbreaks," adds Bruce Brower, also on the Cornell team of researchers.

About 29 percent of the households studied had a high level of coliforms—bacterial microorganisms. The problem was most common in the South and West. Nationwide, more than 40 percent of the homes served by intermediate-sized and individual water systems had unacceptable coliform counts, whereas only 15 percent of those served by community systems had such problems.

Coliform counts are used as an indicator of pathogenic contamination, Brower explains, usually from human and animal feces entering the water supply. In general, the more coliforms, the greater likelihood of disease-causing pathogens.

In more than 500,000 homes, the bacterial levels in the drinking water were greater than that permitted for public beaches.

The study also found that homes that used small water systems—those serving 2 to 14 households—had the greatest number of problems.

"Homes with two to four connections on their systems were the worst," Brower says. Often, these systems were built for a single household, but because of increased building and economic restraints, inexpensive connections frequently were made instead of drilling new wells.

"Many wells are being strained beyond their design capacity. This results in greater 'contamination potential' of drinking water from sources such as septic systems or polluted surface water," Brower explains. Because of economic restraints, he notes, consumers are likely to increase the stress on healthy wells.

—*Susan S. Lang*

A Different Variety of Beetlemania

"Lepidoptera and Neuroptera for little folks; and Coleoptera for men, sir!" reads the bumper sticker above the desk of beetle specialist E. Richard Hoebeke, an Extension associate in the department of entomology.

"Of course, this sign should not be taken too seriously," Hoebeke says. "All the major groups of insects provide just as many challenges for the entomologist as do the beetles. It just so happens I'm a little biased." He has been collecting insects of all kinds since he was six years old, but beetles are his favorites.

As a taxonomist, he busies himself with the tasks of identifying and classifying insects for the Cornell University Insect Collection, housed on the fourth floor of Comstock Hall. The collection includes everything from beetles (order *Coleoptera*), grasshoppers and cockroaches, moths, bees and wasps, to Vladamir Nabokov's personal collection of butterflies (order *Lepidoptera*).

Beetles represent the largest of any group of insects; more than 300,000 species have been described from virtually every corner of the globe. Some are extremely large, weighing as much as several grams and measuring half a foot; others are smaller than the head of a pin.

Opening one of many tall storage cabinets, Hoebeke pulls out an insect drawer, smelling faintly of mothballs, and points to a huge beetle almost 5 inches long. "This is the Goliath beetle, one of the largest of all beetle species in the world," he says. "It is found in Africa."

The Cornell University Insect Collection, used primarily in teaching, research, and Extension, includes specimens from North and South America, Europe, Asia, and Africa.

John Henry Comstock, one of the founders of entomology in North America and responsible for building the first department of entomology in the country, provided the "seed" for Cornell's large insect collection with his own personal collection.

From its modest beginnings in the late 1860s, the collection now includes 4 to 5 million specimens and more than 200,000 species. Ranking among the seven largest in the nation, it has the added distinction of being the second largest university collection in the country. Some specimens have been personal gifts of faculty and staff members, students, and alumni; others have been purchased.

Beetles, in sizes tiny to unforgettably large, displayed here by Richard Hoebecke, are part of the Cornell University Insect Collection in Comstock Hall.

Hoebeke has collected about 15,000 beetles in the past 15 years, including unusual and rarely encountered species. The secret of his success? Being a skillful and careful observer or simply lucky, he says.

He collects beetles in any place at any time, frequently using a sweep net or a black light and malaise traps. "One never knows where interesting insects can be found—on the sidewalk, on a window sill, in a store, practically anywhere."

His research focuses on a group of very small beetles (about 4 millimeters long) known as rove beetles, of the family *Staphylinidae*. With the aid of a microscope, he is closely examining and dissecting many hundreds of specimens to learn about the group's biology, morphology, diagnostic characteristics, and evolution.

In addition to taxonomic research, Hoebeke has been involved in insect detection and surveying. While participating in a federal pest survey program a few years ago, he identified eight insect species in the northeastern United States that proved to be new to this country. These species are common in their native Europe. "Many of our major economic pests are from Europe," he notes, citing the European corn borer, the alfalfa weevil, and the cereal leaf beetle.

Detection and survey activities are essential to entomologists working in applied fields, he explains, because information from such programs may help in designing strategies for pest control. Hoebeke favors using natural means of control, such as predators and parasites, rather than agrichemicals.

—*Michele R. Gilbert*

Academic I and II on Schedule

Construction on the 102,000-square-foot Academic II building, which began last summer, is about 20 percent complete. Groundbreaking on Academic I is scheduled for the spring of 1984.

Academic II is expected to be ready for occupancy in 1985, its original target date. It will house the entomology department, biological sciences classrooms, and Media Services.

The six-story building, which has been budgeted at $17.7 million (including design costs, furniture, and equipment), will have a number of energy-conserving features. Recirculated air will be used to warm the offices, and heat-transfer equipment in the laboratories will extract heat from the air before it is expelled. The windows will be made of insulated glass, with tinted exterior panes, to conserve heat in the winter and reduce it in the summer.

The building will have more than a dozen environmentally controlled rooms for raising animals, insects, and plants.

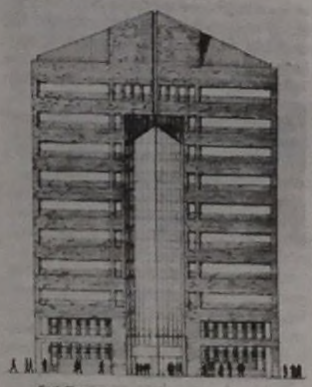
Designed by the Ithaca architectural firm of Hoffman O'Brien Levatich & Taube, Academic II is located next to Teagle Hall and across from Barton.

Academic II, now under construction, is expected to be ready for occupancy in 1985.

Academic I, in the early stages of design, will be 11 stories high in front (west), on Garden Avenue and 10 stories on the side (east) that faces the Ag Quad, making it the second tallest building on the Cornell campus. (Bradfield Hall, at 12 stories, is the tallest.) The building will provide 92,000 square feet of interior space.

Both its front and back sides will have a vertical column of glass that will yield a nine-story view of its central staircase. It will also have a pitched roof, not commonly seen in modern buildings. Budgeted at a total cost of $13.6 million, the building is being designed by the Eggers Group of New York City.

Academic I will house offices of the college's administration, Cooperative Extension, the Cornell agricultural experiment station, international agriculture, the landscape architecture program, and the departments of education and communication arts.



Groundbreaking for Academic I, to be located on the west end of the Ag Quad, is scheduled for the spring of 1984.

James Sumner's Revolutionary Discovery: A Look Back

When James B. Sumner won the Nobel Prize in 1946 for his crystallization of the enzyme urease, it was the zenith of a career that had required unusual perseverance. His discovery was to provide information indispensable to modern biochemistry and medicine.

Sumner joined the staff of the Cornell Medical School in 1914 as assistant professor of biochemistry and remained on the faculty until his retirement in 1955. (Until 1938, the medical school program included training on the Ithaca campus.) In 1940, Sumner became a professor in the College of Agriculture.

Professor Sumner began his research on the isolation of urease in 1917, challenged by a teacher at Harvard Medical School, where Sumner received his doctorate. The professor had stated that no enzyme could ever be isolated unless there was a revolutionary change in laboratory methods. This statement aroused Sumner's interest, he said later, and he set out to devise new enzyme assays. In 1926, after working on the problem for nine years, he crystallized urease, confirming, as he had thought, that it was a pure protein.

This finding ran counter to the prevailing doctrine of the day, and years of controversy passed before his work was generally accepted.

For a substance to be crystallized, it has to be a discrete molecule and not part of a mixture. The idea that a protein could be crystallized was itself nothing new. Several types of hemoglobin had been crystallized before 1850, as had plant-seed globulins and egg and serum albumins. Likewise, the notion that enzymes might be distinct proteins had been in fashion at the turn of the century. But because there was no way to prove this theory, it had fallen from favor.

During the early 1920s, the views of Richard Willstätter, a prestigious organic chemist, held the ear of the scientific community. Willstätter, who won the Nobel Prize in 1915 for his research on chlorophyll, was working on a systematic program of enzyme purification. He and his research team concluded that enzymes belonged to no known class of chemical compounds, but that active enzymes might attach themselves to some carrier, such as a protein or a sugar. Willstätter repeatedly challenged Sumner's claims, contending that his protein-preparation method was flawed.

Years later, while trying to duplicate Willstätter's steps, researchers discovered that the solutions he had been using were too dilute to detect that urease was in fact a pure protein.

In the meantime, Sumner attracted few believers. On one occasion, in the late 1920s, he was reminded of just how bizarre his research finding appeared. Arriving at the office of a chemist in Sweden who had recently won the Nobel Prize for his work on proteins, Sumner introduced himself, saying, "My name is James Sumner. I have crystallized an enzyme." The chemist, concluding that Sumner was crazy, replied, "Yes, one moment," shut the door, and locked it.

A few people, however, had started to pay attention. Sumner's research got a hard second look when John H. Northrup of the Rockefeller Institute crystallized the enzyme pepsin in 1930, modeled on Sumner's work. Then, between 1931 and 1933, Moses Kunitz crystallized the enzymes trypsin, chymotrypsin, and their inactive precursors.

In explaining enzymes, the proteins that act as catalysts in stimulating activity in the body, Sumner once said: "Together with genes, which determine the inherited characteristics of all plants and animals, enzymes are the agents that are responsible for nearly all the phenomena of life. All living things, whether man or yeast cell, are collections of enzymes, and there are thousands of them. At least 60 are involved when a person just bends his arm."

Sumner's beliefs were vindicated long before his death in 1955, but he did not gain full acceptance by the scientific community until December 1946, when King Gustav of Sweden presented him with the Nobel Prize in chemistry. He shared the prize with Northrup, who had crystallized pepsin, and Wendell Stanley, who had crystallized the tobacco mosaic virus, a nucleoprotein that proved important in subsequent research on polio and other viral diseases.

Sumner perservered not only in the face of resistance from the scientific community, but in spite of a physical handicap. When he was 17, during a hunting trip, a friend accidentally shot him in his left arm, which had to be amputated above the elbow. The loss was compounded because Sumner was left-handed. His teachers tried to convince him that a person with one arm could not perform laboratory experiments. While Sumner was at Harvard, one professor suggested that he take up law instead. But he continued with his chosen career, and regularly played tennis, skiied, and swam.

To honor Sumner and his work, the Division of Biological Sciences is initiating a lecture series. Each year an outstanding scientist will be invited to lecture on some aspect of innovative biochemical research and to meet with researchers and students.

Development Project Trying Novel Approach

Money and technology, the major components of agricultural programs designed to help developing nations, are not always enough to achieve solutions.

Such is the case in the eastern Visayas of the Philippines, one of that country's most impoverished areas. The climate and land do not easily lend themselves to the modern monoculture technology that has been used successfully in other regions of the Philippines.

In hopes of improving the livelihood of farmers there, Cornell researchers are trying a bold, experimental approach. Still in an early phase, the project will use a comprehensive farming-systems research method, but, unlike more traditional projects, will involve the farmers at each stage of its development.

The five-year trial program faces novel obstacles, points out Randolph Barker. Barker, a professor of agricultural economics and Asian studies, spent 14 years in the Philippines creating and implementing development projects. He is co-coordinator of the project with Milton R. Barnett, professor of rural sociology and Asian studies, and W. Ronnie Coffman, professor of plant breeding.

Specialization will be deemphasized in the program, explains Barker, in favor of a more holistic approach. Scientists from a dozen or so fields will work together from the start, he notes, and will incorporate the farmers' ideas and ways of life into project plans.

A Visayan farmer (foreground) talks with a Visaya College of Agriculture agronomist (middle) and a site-team leader (standing) about new varieties of corn being tested in his field.

Initially, the project will identify constraints—independent of technological considerations—to economic development and issues relating to marketing, government policies, the environment, and resource management.

A primary goal is to evaluate the characteristics of subregions before implementing plans, Barker says. Each area will be treated individually rather than following a predetermined plan. Development will be diverse to correspond to diverse conditions; for example, one subregion might benefit from developing livestock rather than crops.

Funded by the U.S. Agency for International Development, the project will involve professors in rural sociology, Asian studies, plant breeding, vegetable crops, nutrition, agronomy, communication arts, Extension education, international agriculture, animal science, agricultural economics, entomology, and plant pathology.

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. 14853.

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Concept Mapping: Learning to Produce Learning

"It comes as a surprise to many students—and teachers—that knowledge is produced like automobiles or clothes and not discovered like iron ore or oil." For knowledge to be meaningful and permanent, continues Joseph D. Novak, professor of science education, the learner must see relationships between the characteristics that define a concept.

He quotes educational psychologist David Ausubel: "The most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly." Novak adds that "how he or she feels about this knowledge" is equally important.

In schools, however, Novak maintains, teachers put the cart before the horse. Students are asked, for instance, to memorize the names of state capitols before they know what a capitol is. As a result, the facts appear detached, unrelated to "what the learner already knows" or cares about.

One solution, Novak believes, is simple, yet, he says, it flies in the face of tradition and therefore is not readily accepted. It is "concept mapping," in which students draw diagrams to reveal their understanding of a concept. One young student, for example, who was asked to draw a map for the concept "animals," showed that she understood that snakes and lizards belong to the group of animals called reptiles and that cats and dogs are mammals. The traditional approach would be to have the children simply learn the animals' names. *Older students' maps generally are more detailed, indicating a sophisticated understanding of the relationship between objects and events.*

Concept mapping not only reinforces what a child knows, Novak notes, but also reveals the workings of his or her mind. Using this information, a teacher can tailor and monitor learning to the child's needs.

Concept mapping also helps students appreciate how theories develop and discoveries are made.

"Students come to understand that scientists produce new knowledge by building on known concepts and relationships among concepts—principles or theories—and that these determine the events or objects they choose to observe, the records they make, and the new 'knowledge claims' they produce. These new knowledge claims point to regularities represented by a concept or to a new concept or principle."

By pointing out the logical steps involved in scientific discoveries, Novak says, teachers can provide models for thinking and help demystify science.

By and large, Novak says, the great scientists have been rebels who have refused to accept the constraints imposed by schools. "Men, because of societal expectations about how they should behave, have been in a much better position to resist than women," he notes. As a result, "a tragedy of acquiescence has been imposed on women." A belief in the power of one's mind and the right to have dissenting opinions, he says, precedes the ability to create at the genius level.

In addition to squelching creativity, rote learning—verbatim memorization of facts—is not retained, Novak says, and can leave the learner "stranded" later in life. Math, for instance, which is the most abstract field, is generally taught aconceptually. As a result, it is widely disliked, and even students who are seemingly proficient in it are often unable to use it outside the classroom. This problem was brought out in tests given last summer to a group of Denison University students who had scored high on the math portion of the SATs. In concept maps, they revealed a lack of knowledge about the most fundamental principles of calculus. These same students also expressed a fear of mathematics.

Novak believes that the negative effects of rote learning are evident throughout society. Rote learning, he explains, turns young children away from actively attempting to determine the "whys" of the world toward passively memorizing disconnected facts. As a result, they begin to distrust their abilities and an adversary relationship develops between them and teachers. Teachers, Novak notes, are also harmed by this approach to learning. Reduced to being "dispensers" of facts, they may become repetitious and dull, and discipline problems may result from consequent boredom.

Rote learning, he says, leads to a lifelong pattern of performing below capacity. Much of medical malpractice, for example, stems not only from a failure to retain memorized facts, he says, but from an inability to think innovatively when faced with a nontextbook case. People have been out of touch so long with how to tap and trust their minds, Novak contends, that they often do not know how to respond when faced with a small problem. This inability can lead to poor communication in everyday life. For instance, he says, someone who calls a utility company to straighten out a billing error is apt to get a stock answer that does not address the problem at hand.

In emphasizing memorization, schools are ignoring "an enormous spectrum of what counts in the real world—human relations, compassion, the ability to arbitrate fairly." He adds, "People aren't being taught how to see the 'big picture,' the overarching concepts necessary in dealing with complex problems."

Schools have never been more important in the socialization process than they are today, he says. Yet, because of the alienation and hostility they engender in many students, he believes, schools are failing in this role. They should, therefore, evaluate whether "they are giving students the means to integrate life experiences."

Schools are in a tough, but not intractable, situation, Novak maintains. A basic change in educational philosophy, he believes, would produce happier, more flexible, creative people.

Concept mapping is being tried with success in Australian primary schools, Novak says, and several of his former graduate students are beginning to use it in American classrooms.

Is there a place for the rote method? "Yes, in learning phone numbers."

Soy and High-Tech Foods among Staples of Future

Families in the 1950s could hardly have imagined such food fare as pizza from a box, frozen tacos, yogurt pops, tofu, instant iced tea, piecrust sticks, or freeze-dried coffee. Will consumers of tomorrow eat several colored pills for supper or trays filled with processed, nutritionally balanced puddings, each one a separate course?

Certainly not, says food scientist Robert Gravani. Instead, he says, "intermediate-moisture," compressed, and possibly irradiated foods, more soy products, farm-raised fish and shellfish, and currently underused fish will be available to 21st-century American consumers.

Genetic engineering techniques probably will be used to supplement human and animal foods and to produce sugar and alcohol for food (or fuel) from waste products, and someday to develop perennial varieties of corn and other grains.

"The food industry is working in many areas to suit tomorrow's average consumer, who will have to cope with shrinking dollars, expensive energy, and dwindling world resources," says Gravani, an assistant professor of food science.

"Consumers will have the final say, though, whether new products are successful or not," he notes. "As new foods or technological innovations become available, it is the consumer's choice to buy them or not. If the foods aren't popular, manufacturers will not continue to produce them."

Consumers probably will have the opportunity to try a variety of new food items in the years to come, including intermediate-moisture foods (IMF), which have much of their water "tied up" with other ingredients to prevent bacterial growth. Already-popular IMF products include toaster tarts, spreadable frosting, beef sticks, and some dried fruits. They have a long shelf life, require no refrigeration or thermal processing, and can be eaten without rehydration.

Compressed foods will also increase in popularity, predicts Gravani. They require less space and handling and weigh less than traditional packaged foods, making them practical to the food service industry and to campers and travelers.

Irradiated fruits, vegetables, and spices, which are already legal in more than 20 countries, may become legal in the United States in the future. Irradiating foods by exposing them to radioactive materials delays decay by up to several weeks but does not affect the food's taste or appearance. If irradiated foods become legal in the United States, consumers could expect to see more tropical fruits, vegetables, and other highly perishable items from distant places.

Farm-raised, grain-fed fish, which are low in calories and high in protein, will be available in abundant supply. Trout, lobster, shrimp, catfish, clams, and oysters are already being raised on farms, and work on other fish is under way.

There are more than 2,300 types of fin fish, of which 500 are harvested, yet most consumers eat only about 12 to 15 varieties, Gravani notes. Although some of these fish are already being used in packaged fishsticks and chowders, they may be available in even more versatile forms in the future.

Soybeans, already used as a supplement in many products, are highly nutritious and easy to grow. Soy products such as tofu (coagulated soy milk) and spun soy for meatlike foods, as well as soy burgers, milk, and cheese, will become more common, he says.

In the more distant future, genetic engineering may revolutionize agriculture and food industries by developing crops that "fix" their own nitrogen, which would dramatically reduce fertilizer and related costs.

Other genetic-engineering advances, including fresh produce with a longer shelf life, vegetables that are easier to digest, and fruits and vegetables that are resistant to insects and diseases, will provide consumers with greater options and an expanded food supply.

—*Susan S. Lang*

Diet May Affect the Course of Lupus, M.S., and Rheumatoid Arthritis

Diet has been found to have profound effects on such serious illnesses as cardiovascular disease, diabetes, and cancer. Researchers are now hopeful that it may affect the course of several major autoimmune diseases, including multiple sclerosis (M.S.), lupus, and perhaps rheumatoid arthritis.

"There is a lot of enthusiasm in the press for the possibility that diets high in polyunsaturated fats may help alleviate problems associated with these diseases, but because there have been so few studies, we must proceed with caution in advising diet modifications," says Virginia Utermohlen, M.D., who has been conducting research on the role of polyunsaturated fats in the immune system. Utermohlen is an associate professor in the Division of Nutritional Sciences, a joint unit of this college and the College of Human Ecology.

M.S., lupus (systemic lupus erythematosus), and rheumatoid arthritis are chronic illnesses that affect women significantly more often than men. Multiple sclerosis and lupus usually strike people under 40; rheumatoid arthritis afflicts people of a range of ages and has an exclusively juvenile component (Still's disease).

"In each of these illnesses, the immune system malfunctions and the body seems to be attacking itself," Utermohlen explains.

In M.S., the body's immune system attacks the central nervous system; in lupus, the body produces antibodies against its own tissues; and in rheumatoid arthritis, immune system cells attack and destroy joints.

Studies have shown that polyunsaturated fats are precursors of prostaglandins, small hormonelike molecules that appear to regulate the immune system.

Although no studies have yet been done on human lupus and diet, research with animals suffering from a disease similar to human lupus has been encouraging. Diets abundant in vegetable and fish oils, which are high in polyunsatured fats, were found to be effective in preventing the development of disease in animals. The treated subjects survived longer and had the disease less severely than the controls.

Unfortunately, polyunsaturated fats also appear to promote cancerous tumors, at least in experimental animals.

"This is an example of how some dietary change seems to help but can't be recommended before all the long-term effects from it are known," explains Utermohlen.

Dr. Utermohlen's research with M.S. patients also has been encouraging. She found that some, though not all, felt better when they were taking daily doses of safflower oil (high in polyunsaturates) than when they were taking olive oil (low in polyunsaturates), or no oil at all.

"Patients often have spells of improvement, though, regardless of diet," Utermohlen points out. "In fact, it has been found that any treatment, no matter what it is, may appear to be beneficial in M.S. patients who have mild cases or have had the disease for a short time."

In studies with rats that were given a disease similar to multiple sclerosis, those fed corn oil, which is polyunsaturated, developed much less severe cases of the disease and improved sooner than the controls that were not given polyunsaturates.

Research on rheumatoid arthritis and diet has been much more limited. In the one study done, however, patients on diets extremely low in fats improved significantly.

"All three of these diseases are influenced by emotions, which also can alter the immune system," Utermohlen notes. "In some cases, patients who expected to get better by eating a modified diet actually did feel better. Often, though, these improvements were only temporary."

Utermohlen recommends seeking medical advice before trying any diet-related therapy.

"If you have faith that it will work, try it, but be certain you know the precautions first," she stresses.

—Susan S. Lang

Dairy Farmer and Former Head of Agway Honored

A central New York dairy farmer, Bernard W. Potter '43 of Truxton, N.Y., and a former president of Agway, Inc., Ronald N. Goddard of Syracuse, have been honored with awards of merit from the college for their contributions to the state's dairy industry and to programs in the department of animal science.

Robert J. Young, chairman of the department, presented the awards during the Cornell-sponsored Dairy Days, held in January. The event attracted some 300 dairy farmers from across the state.

Potter is the owner of Moo-tel Farm, which has 217 animals, including 112 milking cows, and 540 acres of land. He has been in the dairy business for 40 years and served as deputy commissioner of the State Department of Agriculture and Markets from 1972 to 1975. He is currently president of the New York State Agricultural Society and a Cornell trustee.

A prominent figure in the industry, Potter is active in numerous farm organizations, including the Dairy Herd Improvement Cooperative, Eastern Artificial Insemination Cooperative, Holstein-Friesian Association of America, Farm Bureau, Grange, American Agriculturist Foundation, and Cortland Bulk Milk Producers Cooperative.

Goddard, former president and chief executive officer of Agway, Inc., headed the cooperative from 1969 until his retirement in 1981. Born and raised on a farm near Truxton, Goddard joined G.L.F. Agway's predecessor, in 1937. Following his retirement, he served as chairman of the Development Council for the Greater Syracuse Program, a four-year economic development program for central New York.

He is a director of the New York Telephone Company, Lincoln First Banks, Crouse-Irving Memorial Foundation, and Carrols Development Corporation; a trustee of Syracuse University; a member of the Syracuse University School of Management Advisory Council; and a past chairman of the National Council for Farmer Cooperatives and the Greater Syracuse Chamber of Commerce. He has also served on the ALS Advisory Council.

—Yong H. Kim

Career Development Office Gives Job Seekers a Boost

Confronted by a distressed economy and tight job market, increasing numbers of alumni are turning to the Career Development Office for assistance.

One of its most popular services is the Candidates-Available Listing, which matches employers with job-seeking alumni and students. Candidates submit capsulized resumes, which are compiled and grouped by the Career Development Office according to academic background and then mailed to more than 500 employers once each term.

Alumni who would prefer direct referral to employers can submit an Alumni Personnel Record form and 10 or more copies of their resume to the office. Resumes are forwarded to employers at the discretion of the coordinator, based on a candidate's education, experience, and career objectives for a specific job listing.

Job Opportunities, a monthly bulletin, lists a variety of agriculture- and nonagriculture-related positions in both the public and private sector. The listings are compiled from faculty members, friends of the college, government announcements, professional associations, and corporate recruiters. The subscription rate, to cover postage and handling, is $12 per year.

For more information contact the Career Development Office, 16 Roberts Hall, Cornell University, Ithaca, N.Y. 14853.

Cornellians on Presidential Task Force to Liberia

Cornellians were well represented on the Presidential Agricultural Task Force to Liberia, which returned recently from the African nation.

The seven-member team included Harold Capener, a professor of rural sociology in the college; Robert Chandler, who was a professor of forest soils at Cornell from 1935 to 1947; and task-force leader E. T. York, who earned his doctorate in agronomy ('49) at Cornell. Chandler is the former director of the International Rice Institute in the Philippines, and York is the chancellor emeritus of the state university system of Florida.

Almost three-quarters of the population of Liberia survive by wresting a subsistence livelihood from small farms, using traditional, primitive farming methods. The task force, which was commissioned in early 1982 by President Reagan, was established to develop policy recommendations on ways to modernize Liberian agriculture, an aim consistent with Cornell's commitment to improving agriculture in Third World countries.

"We offer ways that farmers could break their cycle of slash-and-burn agriculture, where forests are cut and planted for only one or two years at a time, and develop an awareness in the youth of Liberia of the potential of appropriate technology," explains Harold Capener. "These changes would occur in the context of a total farming-systems approach to improve food production at the village level."

Capener spent two years in Liberia, where he served as director of the Rural Development Institute at Cuttington University College. Established in 1978 under a U.S. Agency for International Development (USAID) grant, it is the primary extension training center in Liberia.

Capener resumed his duties at Cornell in July 1982 but visited Liberia again late last year as a member of the task force.

Capener was largely responsible for developing strategies to strengthen the institutional structure and performance of an existing college of agriculture, a national agricultural research station, and the national extension service, including plans to provide Liberian youth with educational training and agricultural activities at local school sites and in villages. As in the United States, extension workers provide farmers with information and technical assistance.

The task force was the fifth team sent from the United States to a developing country, but the first sent to Africa. According to their preliminary report, which offers a comprehensive set of long-term strategies, their recommendations could launch a Liberian agricultural revolution. The report emphasizes the need for an infrastructure to provide supplies, credit, marketing, and transportation to the subsistence-level farmers.

Members of the task force delivered the preliminary report and discussed policy implications with Liberia's head of state, Samuel Kanyon Doe; members of the Liberian Agricultural Commission, including Cabinet-level ministers; USAID mission leaders; the U.S. ambassador, William I. Swing; and representatives of such major international donor agencies as the World Bank, the European Economic Community, and the Food and Agriculture Organization.

The final report, now nearing completion, is expected to provide a policy framework for Liberian national agricultural development.

—Susan S. Lang

Extra

Alumni Update

'Tradition,' a Unique Financial Aid Program

In committing more than $7 million to be donated over the next five years, a group of university alumni and friends has created a program that Cornell President Frank H. J. Rhodes described as "a unique response to the increasing costs of financing higher education."

The Cornell Tradition, named by the anonymous supporters who created the program, will make available through an alumni network approximately 500 summer jobs for Cornell undergraduates and reduce the loan burden for students with financial need by providing summer stipends and academic-year fellowships. The program will begin this summer.

Rhodes noted that the Cornell Tradition is the only financial assistance program of its kind to use private funds to subsidize student employment in both the public and private sectors.

The program reflects Ezra Cornell's philosophy that students should have an opportunity to work to ease the financial burden of an education.

In establishing the program, the contributors noted that ever-increasing education costs and resulting student indebtedness might threaten the quality and diversity of Cornell's students.

As the program expands and the financial need of Cornell students increases, its continuance will depend on broad-based alumni support.

The program has three major components—freshman transfer fellowships, academic-year work fellowships, and summer fellowships.

Freshman transfer fellowships

Freshman transfer fellowships will reduce first-year loans for students identified in the admissions process as demonstrating unusual enterprise and the motivation to take responsibility for meeting the cost of their educations. Selection will be based on achievement, initiative, leadership, and scholarship.

Academic-year work fellowships

The academic-year work fellowships will assist students who have made a serious commitment to financing some or all of their educations through employment during the academic year and who exhibit the qualities expected of a Tradition participant.

Summer fellowships

Summer is the time of year when students can do the most to help finance their educations through employment and is also a chance for career exploration and development. Frequently, however, job searches are frustrated by a lack of opportunities. The summer fellowship program has been designed to stimulate the development of new jobs for undergraduates, regardless of financial need.

The program has two main features. First, for student financial-aid recipients, living expense stipends will be offered when necessary to supplement their summer earnings. Second, funds will be provided to create jobs in the public sector and in private industry.

Alumni who would like to participate in making jobs available to students through the program can write to Carolyn A. Nesbit, Office of Student Employment, 203 Day Hall, Cornell University, Ithaca, N.Y. 14853. Those who wish to make a financial contribution to the program can contact Glenn O. MacMillen, Office of Development and Alumni Affairs, 242 Roberts, (607) 256-7651.

Recent Gifts to the College

Tree digger, donated by Romer Holleran of Greenwich, Ct.

An insect collection and a 32-foot houseboat were two of the more unusual gifts presented to the college in recent months.

Laverne L. Pechuman '35, M.S. '37, Ph.D. '39, professor emeritus of entomology and for many years curator of the Cornell University Insect Collection, donated an exotic array of specimens. The insects, which are in the *Diptera* and *Tabanidae* families, are from Africa, Australia, New Guinea, New Zealand, and the Pacific Islands. Because the insects survive by drawing blood from animals and, in some cases, people, they are valuable to veterinary and medical entomologists for identification purposes. In previous years, Pechuman has donated many specimens from his personal collection, including species from the Neotropics, Europe, Asia, and the Orient.

A 32-foot houseboat donated to the section of ecology and systematics by Stanley and Jean Zamiara of Spencerport, N.Y., will be used for class field trips and research projects on Cayuga Lake. Classes in limnology (the study of fresh waters) and ichthyology (the branch of zoology dealing with fish) will participate in the trips.

Ted R. Rounsaville, M.S. '71, Ph.D. '76, head of computer facilities in the animal science department, presented the department with a surprise gift of a microcomputer. The system includes a TRS-80 Model III computer, a printer and cable, and many other components. Rounsaville is the primary staff programmer for the department's teaching, research, and Extension activities.

Another computer-related donation came from George Vander Woude in the form of 20 acres of land. Proceeds from the sale of the land are to be used to upgrade computer facilities.

A tree digger, donated by Romer Holleran of Greenwich, Ct., will be put to extensive use as the college proceeds with plans to transplant about 1,000 trees. The Vermeer tractor-tree spade will also be used in floriculture and horticulture classes to demonstrate transplanting techniques and for other landscaping needs.

Beef Producers Fund Gets Major Gift

Could New York become a commercially competitive beef-producing state? John, Jr. and Gerald Bisgrove of Cayuga County in New York think so. Their generous gift to the university has established the Cornell Beef Producers and Research Fund.

The Bisgroves are co-owners of Red Star Express Lines, a regional trucking firm started by their father in 1934, and cotrustees of the John Bisgrove Trust.

Provided by funds from the trust, the gift is intended to generate producer support for research and Extension programs aimed at developing a viable beef cattle industry in the state. Several million acres of land are suitable for permanent and rotational forages, and beef cow and calf production could add an estimated $250 million to the state's annual agricultural income.

Gifts from beef producers and others interested in the beef industry may be earmarked for the endowment or for immediate use. The funds will be used to identify beef-cattle management practices and systems that optimize feed resources, to test these procedures on New York farms, and to conduct a Cooperative Extension program for producers on the use of the systems.

The fund will make possible the development of computer systems, based on data already available, that beef producers could use in making management decisions. Faculty and staff members from several disciplines in the college, including nutrition, biochemistry, agronomy, and economics, will be involved in this project.

Danny G. Fox, associate professor of animal science, and William M. Greene, Extension associate in animal science, will be the directors of the beef cattle program at Cornell.

In the past five years, Cornell researchers have made notable gains toward making New York more competitive with other beef-producing regions of the country. Researchers have found, for example, that with proper management the number of acres of hillside pasture required for each beef cow and calf can be reduced by more than 50 percent. In addition, techniques to evaluate the true profitability of a part-time beef cow and calf enterprise have been developed.

Cornell's bull-test program, started in the late 1970s, evaluates more than 80 potential sires each year, providing breeders with an assessment of their programs and herd owners with a place to buy certified sires. The weight gains of bulls in the Cornell test program have been equal to those in the best bull tests elsewhere in the United States.

Some of the test programs to be developed will be carried out at Sunrise Farms, a beef operation in Cayuga County owned by John Bisgrove, Jr.

For further information about the Beef Cattle Producers Extension and Research Fund, contact Fox or Greene at 110 Morrison Hall, Cornell University, Ithaca, N.Y. 14853.

—David I. Stewart

Roundup '83

Roundup '83, sponsored by the ALS Alumni Association, will be held on Saturday, September 24, at 9:00 a.m. in Bailey Hall. The program will include recognition of graduates of the classes of 1934 and 1959 and outstanding alumni.

There will be a chicken barbecue in Barton Hall at noon and a football game between Cornell and Colgate at 1:30, followed by a postgame party in Barton. A tour of the campus and the Cornell Plantations will also be offered at 1:30.

All alumni and friends are invited to attend.

Details on Roundup '83 will be available in August from the Office of Development and Alumni Affairs. Anyone who would like information sooner can contact the office at 242 Roberts Hall, Cornell University, Ithaca, N.Y. 14853, (607) 256-7651.

Special Programs in Action

Professor William Keeton with a biology class in 1975.

William T. Keeton Professorship Fund This is a memorial to Professor Keeton, the internationally renowned researcher, educator, and author whose affection for the natural world inspired professional and amateur biologists alike. His classic textbook *Biological Science* is widely acclaimed for its lucid, succinct style. The fund will establish the William T. Keeton chair, to be awarded to an outstanding professor of biology. Gifts totaling $81,425, toward a goal of $100,000, have been received from friends, colleagues, and former students.

Mann Library Book Endowment Fund The fund provides an opportunity for tributes and/or memorials; a contribution of as little as $25 will purchase a book for the library. A bookmark with the donor's name and the person being honored is placed on the inside cover, providing a lasting expression of respect. The fund, which has a balance of $5,665, recently reached endowment level.

Max E. Brunk Graduate Research Fund Presented to Professor Max Brunk of the agricultural economics department on his retirement, the fund provides financial aid for graduate students. Initiated by the New York State Cherry Growers Association and the Western New York Apple Growers Association, it now totals $5,565.

Cornell Beef Producers Extension and Research Fund This fund supports research aimed at making beef production in New York State competitive with other areas of the country. The initial gift came from John Jr., and Gerald Bisgrove. Additional contributions have come from the beef industry.

Larry and Dorothy Bayern Fund Started with a gift from Larry ('49) and Dorothy ('51) Bayern, this book-endowment fund is being used to purchase books on animal science and agricultural economics for Mann Library.

Max and Ida Lelchook Scholarship Fund Established by Hyman M. Lockwood ('40) and his family, the fund now totals $5,000; its goal is $25,000. Contributions will be used to establish a program that would enable undergraduates to study in Israel.

Marvin D. Glock Reading Research Award Professor Marvin Glock is retiring after 34 years in the department of education. His colleagues, friends, and former students are establishing this endowment fund as a tribute to his dedication and contributions to education.

Harrison-Trimberger-Slack Dairy Evaluation and Selection Fund Initiated by former members of the dairy-judging team, the fund provides resources for Professor David M. Galton of the animal science department to enhance his research and teaching programs. Last year it provided travel funds for his first dairy-judging team. So far, $45,074 is available for the program and another $9,000 is pledged.

Friends of Joe King Scholarship Fund Established in the past year, this is a tribute to one of our college's most dedicated and illustrious alumni. Proceeds are to be used for scholarships for students with financial need who are participating in a Cornell intercollegiate athletic program. Contributions and pledges total $164,534 toward a goal of $250,000. Memorial gifts from friends of Russell M. Cary '36, who died in December 1982, have also been designated for the fund. Cary and his wife, Marion, who survives him, were for many years close friends of Joe and Ethel King.

Reproductive Physiology Endowment Fund Applied Genetics, Inc. and an anonymous donor started this fund to encourage technological development in the field of reproduction. Proceeds will go to the reproductive physiology programs in the animal science department. The total to date is $20,000.

Teachers of Agriculture Scholarship Fund The fund was established to encourage and assist students with financial need who are pursuing careers as teachers of agriculture. It has a balance of $1,875; an additional $3,125 is required to reach the endowment level.

Arthur Boller Research Memorial Fund Initiated by members of Arthur Boller's family, this is a memorial to his service to the western New York fruit industry. Boller for many years was the owner of Boller Farm and the manager of Cohn Farm, both fruit farms outside Rochester, N.Y. Proceeds from the endowment are earmarked for research programs in pomology, entomology, and plant pathology. The balance is $9,032.

Frank Pearson Memorial Fund Recently established as a memorial to Frank Pearson, professor emeritus of agricultural economics, the endowment will be used to purchase books and journals in the field of agricultural economics for Mann Library. Its current balance is $5,955.

Favor Smith Scholarship Fund This endowment was established to honor Favor Smith, the manager of Heaven Hill Farm in Lake Placid, N.Y., by his longtime friend and employer, Henry Uihlein II. Proceeds will be used for scholarships for youths in the North Country of New York State who are pursuing careers in the dairy industry. The balance is $11,187.

George Arno Memorial Scholarship Fund Started by the State Poultry Industry Coordinated Effort (SPICE), the fund will go toward scholarships for undergraduates or graduate students pursuing careers in the poultry industry. Gifts, now totaling $9,426, have been contributed by friends and colleagues of George Arno, who was for a number of years affiliated with the poultry industry in New York.

Arthur Thomas Memorial Fund A memorial to an alumnus who was a leader in the merchandising of flowers and floral products, this fund, initiated by his family, will promote research and teaching programs in the department of floriculture and ornamental horticulture.

Willman 4-H Dairy and Livestock Fund In recognition of Harold A. Willman's contributions to the youth and agriculture of New York State, more than 500 of his friends, colleagues, and former 4-H members have contributed gifts totaling $34,000 to benefit the state's 4-H programs. Willman is a professor emeritus of animal science at Cornell. Proceeds and gifts from last fall's Cornell Classic livestock auction, totaling more than $6,000, went to the fund.

Gifts to these funds can be made by check, payable to Cornell University. Be sure to include the name of the fund you are supporting. Alumni and friends interested in learning more about these and other programs should contact Glenn O. MacMillen, Office of Development and Alumni Affairs, 242 Roberts Hall, Cornell University, Ithaca, N.Y. 14853, (607) 256-7651.

Joe King '36 (left) and Keith Kennedy, former ALS dean and now Cornell University provost.

News and Notes

One of the nicest letters I've ever read was recently forwarded to me by Robert Horn, Cornell's treasurer. It came from Diane Rockcastle Wiessinger, who received a bachelor's degree from ALS in 1972 and a master's in biology in 1975. She writes:

In 1975, I received a National Science Foundation grant for my master's degree work in biology at Cornell. I was very flattered to receive it. I decided at that time that I would like to consider the money a loan, rather than a grant, to be paid back out of my future earnings.

Last year, I contacted NSF about returning the money in installments. I was told that it would probably best be returned to the institution where I received my degree.

I have had fun deciding where I would like to see this first installment of $1,000 used. I spent many happy hours in the stacks at Mann Library. I know that the libraries are in constant need of funds and would like $500 to be used by Mann Library in any way needed.

During my tenth reunion last summer, I took Dr. J. M. Kingsbury's bus tour of the new Plantations property. He is an enthusiastic and persuasive man (as I remember from my summer at the Isles of Shoals in 1972). I would like $400 to be used by the Plantations.

Finally, I came to Cornell as an undergraduate because I had listened to Glee Club concerts for years [Wiessinger grew up in Ithaca], teary-eyed at the Cornell songs directed by Thomas Sokol. I decided in high school that I just couldn't go somewhere else and sing another college's songs. The clincher was a young man who sang "Annie Lyle," the tune from which our alma mater was taken, when I was a high school junior. Not the best reason for selecting a university, perhaps, but I have certainly never regretted the decision. In any case, I'd like $100 to be used by the Cornell Glee Club.

I hope that you can direct the enclosed checks wherever they should go.

□

Damon Boynton, (left), professor emeritus of pomology and former dean of the Cornell graduate school, interviews Lawrence H. MacDaniels, professor emeritus of pomology, as part of the university archives' oral history of the college. Boynton '31, Ph.D. '37, and MacDaniels, Ph.D. '17, are also working together on a publication about the history of horticulture at Cornell.

The Ag Quad Beautification Project is on hold until 1985, when construction on the Academic II building will be complete. All gifts to the project are being held in an interest-bearing account until then. As part of the beautification project, eight benches were installed late last fall, four each in front of Warren and Plant Science.

□

Since its initiation more than a decade ago, the Ag College Fund has been the beneficiary of generous alumni support, as evidenced by its current balance of $213,304. It has been renamed the College Advancement Fund, and all gifts designated to the College of Agriculture and Life Sciences or the Ag College Fund will now go into this fund. This change makes it possible for the dean to apply funds to the most pressing needs of the college and to those areas not covered by traditional funding sources. In addition, gifts may be made to a specific fund or program, such as the ALS Scholarship Fund or the Innovative Teaching Fund.

In recent months, allocations from the College Advancement Fund have helped sponsor student debate team activities; a visiting lecture series as part of the American Indian Program; the Cornell Classic livestock show, run by students; an oral history documentation of the college, carried out by the Cornell Archives; and scholarships that enabled students to attend national conferences.

□

Reunion Weekend is special for many alumni. This year, reunion classes include those that end in 3 or 8—'43, '63, '78, and so on. The traditional Alumni Association reunion breakfast will be held Saturday, June 11, 7:45 a.m., at the North Campus Union. It's a terrific time to renew acquaintances and reminisce about your college days.

Glenn O. MacMillen
Assistant to the Dean

Lowell C. Cunningham, Professor Emeritus of Farm Management, Dies

Lowell C. Cunningham, professor emeritus of farm management, died in Cockeysville, Md., on Feb. 20, 1983. He was 79.

Professor Cunningham was a member of the Cornell faculty from 1934 until his retirement in 1969. Throughout his career, in which he concentrated on the economic problems of dairy farmers, his major concern was to reduce the time lag between funding of research and the dissemination of findings to the public.

He made numerous studies of the costs of milk production and related farm-management problems, including labor and commercial feeds.

In 1954, he received a Superior Service Award from the U.S. Department of Agriculture for the development of an outstanding educational program on the economics of dairy farming.

Professor Cunningham was the co-author of a textbook on farm management and marketing and wrote many Cornell bulletins on topics related to this field.

Following his retirement, he organized conferences with college staff members, through the Office of International Agriculture, and conducted tours of farm organizations for foreign visitors at Cornell. He was also involved in farm management projects for public agencies in

Trinidad, Brazil, Colombia, Paraguay, and Canada.

He received a bachelor's degree in 1926 from the University of Illinois and a doctorate in agricultural economics from Cornell in 1934.

Lowell Cunningham is survived by his wife, Marie C. Cunningham, of Cockeysville, Md.; and three sons, Jay, of Berkeley, Calif., Robert, of Savannah, Ga., and Lynn, of Washington, D.C.; and four grandchildren.

Memorial donations may be made to the William I. Myers Professorship Fund, Office of Development and Alumni Affairs, 242 Roberts Hall, Cornell University, Ithaca, N.Y. 14853.

Alumni Breakfast to Be Held June 11

The annual reunion breakfast, sponsored by the ALS Alumni Association, will be held Saturday, June 11, 7:45 a.m., at the North Campus Student Union. All alumni and friends are invited to attend.

Reservations are necessary, and the reserved tickets will be available at the door. No tickets will be issued in advance.

Please return reservations by June 1 to:

Office of Development and Alumni Affairs
242 Roberts Hall
Cornell University
Ithaca, N.Y. 14853

RESERVATION

( ) Enclosed is my check for _____ reservations @ $5 each for the ALS reunion breakfast and annual meeting on Saturday, June 11, 1983.

Please make checks payable to ALS ALUMNI ASSOCIATION.

Name _____ Class _____

Address _____

Lifetime Membership Fund

The Lifetime Membership Fund was started in 1982, with a goal of $100,000, to ensure a strong base for student aid and innovative academic programs.

Recently, the executive committee of the ALS Alumni Association designated $4,000 in interest from the Lifetime Membership Fund for freshman scholarships, to be matched by both the dean's office and the Office of Resident Instruction. This first decision is representative of future plans for the fund.

In just a year, 715 alumni have become lifetime members, an indication not only of their depth of loyalty to the college, but also their commitment to future generations.

Listed below is an addendum to the lists of lifetime members that appeared in the May 1982 and November 1982 issues of *Agriculture and Life Sciences News*. The list includes members who joined between August 31, 1982, and February 28, 1983.

Mary M. Lindsay Abbott 'GR
Bo Adlerbert '35
Celia Alfalla '81
John L. Alger '81
John C. Allen-Crawford 'GR
Brian D. Andersen '74
Ross H. Arnett, Jr. '42
David R. Atkinson '60

Jay L. Baldwin '79
David K. Bandler '55
David D. Bathrick 'GR
Martin G. Beck '20
Craig A. Bishop '78
Susan J. Bittker '66
Jeffrey C. Bodington 'GR
Jacqueline P. Bower '73
Robert C. Bradley '34
Herbert D. Brewer '52
Robert M. Briggs '77
Robert T. Brooks '68
Gregory K. Busby '82

Charles W. Cameron 'GR
Peter M. Castellano '81
Terence J. Centner '72
Stella A. Chu 'GR
John M. Clark '80
John L. Colbert '74
William J. Copeland '48
Gerald M. Coyne '57
Richard T. Coyne 'GR

Joseph J. Davis '35
Linda Davis '53
Lynn P. Deuschle '69
William K. Doerler '55
Bradley Donahoe '51
G. Eugene Durham '19
J. Peter Dygert '61
John S. Dyson '65

Wendell Earle 'GR
Glenn E. Edick '40
John H. Eriksen '61
Richard E. Eschler '52
Howard E. Evans '44
Richard B. Evans '65

Daniel B. Fabian '78
Kenneth W. Fletcher '72
Gerald G. Frost, Jr. '55

Paul A. Garrett '57
Allison J. Gay '79
Robert S. Gellert '63
Dalton K. Gray '52
Lalana J. Green '77
Joyce Greene 'GR
Laine I. Gurley 'GR

Stephen E. Hadcock '82
Bradford Hardie '77
Evan B. Hazard '51
Charles W. Hebblethwaite '49
Douglas W. Hedges '73
Gary L. Hellinger '62
Larry K. Hiller 'GR
Helen K. Hoffman 'GR
Melvin B. Hoffman 'GR
Robert F. Holland '36
David R. Hopson '41
Paul N. Horton '42
Thomas L. Hoy '70
Charles A. Huckins 'GR
Gary S. Hyman '64

Laurence E. Ide '32
Carol D. Ingold '76

Dale R. Jackson '54
Cornelius C. Jones '53
Gordon E. Jones '43
Pilju K. Joo 'GR
Suzanne S. Katz '78
John G. Kellett, Jr. '72
Laurene M. Kelly '80
Ronald Komsa '81
John A. Krasuski '76
Alfred H. Krautter '58

Ruth B. Langer '60
Richard O. Langworthy '66
Gerald P. Linsner '58
Renata C. Lipok '82
James H. Lovering 'GR
Jerome A. Lowe '34
Scott Luckow '75
Ronald P. Lynch '58

Hugh S. MacNeil '51
Theodore W. Markham '44
George M. Markle '62
Frank E. Martin '43
Roland G. Masters '50
Lester G. McCarthy '66
Robert P. McCombs '51
John C. McLaughlin 'GR
Charles Putnam Mead '32
James J. Miller '38
John E. Miller, Jr. '62
Barbara A. Minor '81
Dixie L. Morrow 'GR
Fredric G. Mouncer 'GR

H. Bryan Neel III '62
Margaret A. Nelson '82
Calvin R. Nesbitt '54
Donald J. Newman '54
Fred Eugene Nichols '59
Beatrice Novidor '37

Charles O. Oaks 'SP
Francis J. O'Connell '65
Robert A. Oles '79

James C. Preston '50
Ann E. Prezyna '73
Joan Groskin Promin '55
David M. Purshall '63

Joseph L. Randles, Jr. '41
Dwight O. Rath '56
William C. Rath '70
Tommie R. Rhoades 'SP
Robert H. Robinson '50
Carlos M. Rojas II '62
Harvey J. Rothschild III '63
Carol S. Rougelot '55
Edward R. Rowehl '54

Richard E. Saltz '73
Everett A. Sargent '39
Richard W. Saville '45
Thomas J. Scaglione '50
David A. Schallenberg 'SP
William A. Schiek '82
Mitchell I. Schwartz '80
Gordon E. Selden '38
Carolyn A. Shaw '81
Francis G. Shepardson '40
Francis A. Simpson '53
Dubois T. Smith '67
William T. Smith II '38
Richard J. Stein '75
Ernest L. Stern '56
Eugene L. Stillions, Jr. 'GR
Terry L. Strawn '82
Daniel T. Stutzman '57
Stephen M. Sundheimer '61
Stephen A. Szadek '70

Stephen E. Teele '72
James Thorp '63
Laurie J. Truesdell '82

Mary Cary Vernik '75

Donald P. Wagner '50
Robert Walsh '82
James R. Wandling '37
Robert L. Wanner '43
Kerry W. Washburn '57
Stefani W. Weiss '66
Steven R. Whaley '78
Gerald C. Wheelock 'GR
Walter H. Wietgrefe '54
Meredith C. Wilson, Jr. '39
William E. Worth '52
Dennis W. Wright '69
Leon E. Wright, Jr. '60
Paul M. Wright '53
Robert E. Wunderle 'GR

Robert M. Zemel '66

Yes, I would like to become a lifetime member of the ALS Alumni Association.

Name _____

Address _____

_____

☐ $100 Lifetime membership
☐ $35 First installment of a three-year commitment to a lifetime membership

Please make checks payable to the ALS Alumni Association and mail to Office of Development and Alumni Affairs, 242 Roberts Hall, College of Agriculture and Life Sciences, Cornell University, Ithaca, N.Y. 14853.

Fully paid lifetime members will receive a certificate suitable for framing and an ALS decal.

North Country Is Cultivating Its Future

The future of North Country agriculture is more promising today than it once appeared, largely because of the combined efforts of this college, the SUNY Agricultural and Technical College at Canton, and the W. H. Miner Agricultural Research Institute at Chazy.

No area in the state is more economically dependent on agriculture than the six-county region known as the North Country, equal in size to Vermont and Rhode Island combined. Clinton, Essex, Franklin, Jefferson, Lewis, and St. Lawrence counties make up the area, which extends from Lake Ontario and the St. Lawrence River to the Canadian border and Lake Champlain. Although the region makes up 20 percent of the land area of the state, it is one of the most sparsely populated regions in the country.

Northern New York climate, soil conditions, and transportation to markets present special challenges to farming. Much has been done in recent years to solve some of these problems, but scientists at the three institutions are working to improve further the economic health of the region. Funding provided by the state legislature, totaling $175,000, has expanded the existing Northern New York Agricultural Development Program, a cooperative research and Extension project.

Approximately 890,000 acres of the region are currently used as cropland. Dairy farming dominates, with milk production making up 75 percent of the region's total agricultural income. Milk from the North Country's 3,300 dairy farms helps place New York second to Wisconsin in the number of milk cows and third in production, trailing only Wisconsin and California. Seventeen percent of the state's milk comes from these six counties.

Potatoes are grown on approximately 1,700 acres in northern New York, including 500 acres of the best certified seed potatoes in the state, and account for about one-third of the state's total production.

Apples on some 4,200 acres in the Champlain Valley of Clinton and Essex counties produce revenues of $6.5 million annually.

Certified birdsfoot trefoil seed is also grown in Essex County. A forage important for poorly drained, hilly soil, birdsfoot trefoil is a vital cash crop for the area's farmers.

Another cash crop produced in late winter is the popular natural sweetener maple syrup. Farmers in the North Country produce about one-third of New York's output.

The region already boasts the second largest spinach farm in the nation, near Malone, but vegetables as a group could become a more important crop.

Today, alfalfa, corn, apples, and potatoes are being grown where just a decade ago such crops were not possible. Since 1970 an estimated 30,000 acres of rotation cropland have been drained to make growth of these crops feasible. Researchers estimate that 1.3 million acres of soil could be cultivated for agricultural use.

It is the goal of the program to improve the productivity of the land through research in breeding and testing field crops; dairy management and the marketing of dairy and beef cattle, sheep, and hogs; soil and water management; and research in weather and soils.

Twelve dairy farms from Jefferson County on the west to Essex County on the east are taking part in the program by serving as sites for intensive dairy-herd management demonstrations.

An advisory committee, including farm producers and agribusiness people from throughout the region, has been named by David L. Call, dean of the college.

A steering committee representing the participating institutions and the New York State Department of Agriculture and Markets is coordinating the research efforts.

—David I. Stewart

The Rank and File of Baboon Society

Just north of Kenya's Mt. Kilimanjaro, which is covered by perpetual rainshadows—obstructed, condensed clouds—lies the Amboseli National Park. A land of abrupt contrasts, pockets of desert exist alongside lush channels of tropical trees and shrubs fed by the mountain's runoff.

The preserve contains short-grass savannas and acacias, such as fever and umbrella trees, providing enough food to support a rich diversity of wildlife.

Yellow baboons *(Papio cynocephalus)*, one of the few primate species to have made the evolutionary transition from tropical rain forests to open savannas, spend their days drinking at the park's water holes, feeding, grooming, chiding one another, and, in the mornings, sunning themselves. At night, they shelter in one of several groves of tall acacias, safe from lions and other large cats.

For 12 years, Glenn Hausfater, with two zoologists from the University of Chicago and, more recently, several Cornell graduate students, has been studying a host of behavioral and ecological questions relating to the baboons. Hausfater, who began the research while a graduate student at the University of Chicago, is an associate professor of neurobiology and behavior at Cornell.

The animals have a rigidly structured society in which the high-ranking, dominant members have privileges that extend from small social amenities to favored priorities in feeding, drinking, and mating.

One of the most surprising of the researchers' discoveries was how quickly and permanently female infants are imprinted with the social rank of their mothers. "Daughters of dominant females are themselves dominant to their peers when they're a year old," Hausfater says, "and remain so even if their mothers die at that young stage of their development." It is not an ongoing role model, therefore, but the earliest of impressions that dictate rank.

Lower-ranking members are diffident to dominant ones in almost every respect—yielding at feeding time, letting their infants be held but not being given reciprocal rights, acting cautious when approaching to groom, averting their gaze when passing by.

In one part of the study, the researchers are trying to understand the connection that exists between rank and the gender of offspring. High-ranking females produce a higher-than-average number of daughters, Hausfater notes, while low-ranking ones give birth mainly to sons. Several hypotheses are being explored, including that low- and high-ranking females mate at different stages in their reproductive cycles. Gender would thus be determined by the level of certain hormones at the time of conception.

The project has also studied host-parasite ecology and how parasites influence baboon behavior. Ticks, major parasites of the animals, are attracted to carbon dioxide, their cue that a living host is nearby. By releasing carbon dioxide from cylinders and dragging a sheet of flannel through the grass, the researchers collected ticks to estimate seasonal changes in populations and to study their habitats. They found that during the dry season, the insects are densest under acacia trees; following the two annual rainy periods, they're abundant practically everywhere.

These ticks serve as a focal point of the baboons' interactions, Hausfater points out. After passing through infested areas, baboons spend hours methodically removing the insects from one another's fur. "Such grooming is the main affiliative, or friendly, activity of the animals," he notes.

Carol Saunders, a graduate student in neurobiology and behavior, takes notes on baboon behavior by a water hole in the Amboseli National Park in Kenya.

Adult baboons busy themselves feeding and socializing while two infants look around for some livelier action.

Baboons and internal parasites such as roundworms have hormonally governed host-parasite relationships, the researchers have found. Immediately after a baboon gives birth, egg production by intestinal parasites increases sharply, apparently in response to a series of rapid pre- and postpartum changes in the baboon's level of the hormone progesterone.

These and similar studies relating hormones to behavior can be carried out fairly easily with baboons, Hausfater says, because adult females have an anatomical structure, unique to baboons and certain other Old World monkeys and apes, that swells and deflates in response to hormonal changes during the animals' reproductive cycle. By keeping daily records of these changes, researchers can monitor hormonal fluctuations and correlate these with changes in the animals' parasites and in mating and social behaviors.

The reproductive cycles of parasites are also synchronized with hormonal changes—specifically, in the level of testosterone—in male baboons. Further, the level of this hormone fluctuates frequently in response to changes in a male baboon's rank.

Hausfater will be traveling soon to East Africa, Brazil, Israel, and India to continue his research. The project, which has been funded by the National Institute of Child Health and Human Development, the National Science Foundation, and this college, is expected to continue for several years.

The Unexpectedly Diverse World of Hormones

Until a decade or so ago, it was believed that hormones were manufactured exclusively by the endocrine glands (the pituitary, pancreas, thyroid, adrenal). Then evidence began accumulating that cancer cells and nerve cells, for instance, also produce hormone molecules.

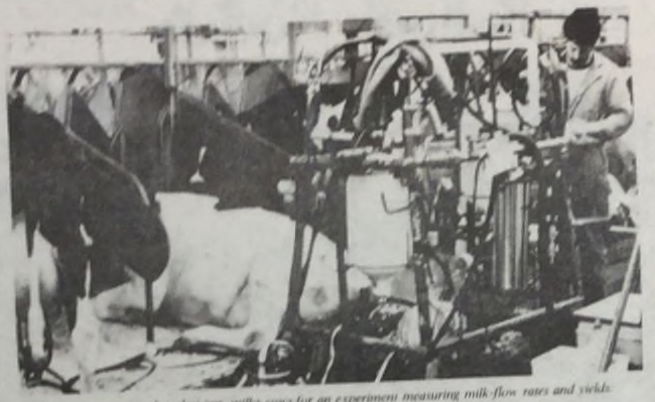
These early findings were followed by a mass of fascinating data and theories. For example, endocrinologists at the National Institutes of Health (NIH) in the last several years have determined that fruitflies, earthworms, protozoa, and the bacterium *Escherichia coli* manufacture a hormone almost indistinguishable from insulin. It had been thought that only higher mammals produce this substance and that it was manufactured solely in the pancreas. The NIH researchers also learned, contrary to earlier thoughts, that primitive unicellular organisms produce the hormones beta-endorphin, the body's natural pain killer, and ACTH (adrenocorticotropin), which stimulates the adrenal glands to manufacture essential steroids.

Recent experimental evidence now suggests that plants and animals may have shared common hormones in the earliest stages of their evolution. Both groups continue to have some of these hormones today. Plants, for instance, have neuropeptide hormones similar to those found in humans and animals. In addition, plants contain certain alkaloids that, although they do not have the same molecular structure as hormones, bind well to animal hormone receptors. An example is the alkaloid glycyrrhetenitic acid in licorice, which can cause high blood pressure by mimicking the sodium-retaining hormone aldosterone. Even the commonest of foods and plants, therefore, may have a myriad of health consequences.

How the environment and foods influence hormones involved in metabolism and milk production is a primary research interest of Ronald C. Gorewit, an associate professor of animal science at Cornell. Gorewit is a lactation physiologist and endocrinologist.

A family of plant alkaloids known as the ergots, found in mushrooms and other fungi, is capable of suppressing the pituitary's production of the hormone prolactin, Gorewit explains, which is essential in stimulating lactation in humans and animals.

Similarly, he says, the hormone phytoestrogen, which animals can consume in excess quantities while foraging on some grasses, binds with estrogen sites in the animals' bodies, causing imbalances in hormones supplied to the ovaries and testes. This problem can cause havoc in the animals' reproductive systems, particularly of those such as sheep in Australia that obtain most of their food from grazing.



Al Stammers, a research technician, milks cows for an experiment measuring milk-flow rates and yields.

Gorewit recently studied the effects of ferulic acid, a constituent of corn and wheat germ, on the endocrine hormones of Holstein heifers. The acid did not affect luteinizing hormone or the thyroid hormones but raised the levels of prolactin and, to a lesser extent, growth hormone. Both prolactin and growth hormone stimulate and help maintain lactation in cattle.

Dairy farmers have long known that stress can interfere with lactation and that gently treated, unharried cows produce optimal yields of milk. Likewise, anxiety is often the underlying obstacle to successful breastfeeding in humans.

The effect of stress on lactation became evident several years ago when electric utility companies began getting reports that cows were receiving mild but continuous shocks from milking and watering equipment. Cows respond to a voltage one-tenth the level humans notice. Furthermore, they become powerful conductors of stray electricity because they usually stand on wet barn floors. Low-level currents may cause adverse reactions that affect the cows' health and milk production, including incomplete milk release, increased incidences of mastitis, violent reactions during milking, and reduced water and feed intake.

Surveys in Minnesota and Washington have found that stray voltage accounted for production losses on more than 20 percent of the nation's dairy farms. In a Nebraska survey, 58 out of 100 farms had voltages in excess of levels considered potentially harmful. There are as yet, however, no clear standards for danger levels.

Gorewit, Professor Norman R. Scott of agricultural engineering at Cornell, and scientists from Michigan State University and the University of Minnesota are assessing this problem. While Gorewit and Scott are concentrating on the biological aspects of voltage in cows, the

Ronald Gorewit, associate professor of animal science, places test tubes in an instrument that determines hormonal levels in blood or milk samples.

other researchers are examining the engineering issues involved; the Minnesota group will make recommendations on improved grounding systems that are expected to be adopted nationally.

In studying the metabolic and endocrine changes induced by low electrical current, Gorewit has found that prolactin levels are not significantly altered, but cortisol levels are. Cortisol, which is produced in the adrenal glands, aids in the metabolism of glucose, protein, and fat. When subjected to stress, cows release ACTH from the anterior pituitary. The primary function of ACTH is to stimulate the adrenal glands to secrete cortisol and corticosterone, both corticosteroids. Corticosteroids, which affect all organs and tissues, maintain homeostatis, or stability, in the body during resting and emergency conditions.

Over time, excess levels of cortisol may adversely affect metabolism, immunity, and blood sugar. The study will next examine the long-range effects of electricity-induced changes on hormone levels and health.

Gorewit and several of his graduate students are trying to identify specific receptors for oxytocin and thyroid hormones in the mammary tissue of lactating cows. Oxytocin, which regulates milk ejection, is produced by the hypothalamus and is stored and released by the posterior pituitary. Gorewit and the students are using a radioimmunoassay that he developed to measure oxytocin in both blood samples and milk and are examining behavioral and genetic factors controlling oxytocin release. He also recently did collaborative work on this hormone with the genetics and management division of the USDA in Beltsville, Md.

Gorewit believes that the rapidly unfolding revelations in endocrinology may make possible far more precise medications and therapies in which the body's own defenses will be summoned into action.

Most drugs interfere widely with the body's biochemical processes; the results, potentially severe, can be both immediate and long-term side effects. The tranquilizer Valium, for example, attaches itself to five brain receptor sites, although binding at only one such site is necessary to achieve the desired effect. Among the consequences of this diffuse infiltration, one which occurs with other tranquilizers as well, is a drug-induced Parkinsonlike disease.

Another drug, Clonidine, which is used to control high blood pressure, causes significant changes in hormone production: growth hormone is increased, cortisol increased, and prolactin decreased. In administering this drug to cows, Gorewit has observed these same hormonal alterations.

Recombinant DNA, Gorewit predicts, may well be the key to achieving the specificity current drugs lack. Recombinant biology takes a simple organism such as *E. coli*, inserts a gene from another organism, then allows the modified *E. coli* to reproduce. To make the hormone insulin by this method, for instance, a gene responsible for producing insulin is extracted from pancreatic tissue and inserted into the *E. coli*, which are then fermented and allowed to reproduce in large numbers. The proteins are then harvested and purified.

A deficiency of growth hormone can cause such severe disorders as pituitary dwarfism in children. Currently, one shot of this hormone costs $1,500 to $2,500 and requires hundreds of human pituitaries for each injection. A recombinant-derived growth hormone is under clinical trial by several pharmaceutical companies, Gorewit says. When the recombinant technique is perfected, the cost will be reduced tremendously.

A better understanding of hormones, coupled with recombinant DNA technologies, Gorewit notes, will make possible more such advances. It may also, he says, produce cures for chronic diseases, thereby eliminating the risky, merely maintenance regimes of today.

Adirondack Fishery Research Fund Established

As a result of acid rain, more than 200 of the approximately 2,800 lakes and ponds in the Adirondacks are too acidic to support fish. Another 400 are considered endangered.

Although the technology exists to reduce the industrial emissions that cause acid rain, there is no immediate, politically viable solution. Interim approaches are focusing on developing a hardier breed of fish and on lessening toxic conditions in selected lakes by adding powdered limestone.

Dwight D. Webster, professor of natural resources, has devoted 30 years to developing measures to counteract the decline of trout. Under his and his associates' direction, the Adirondack Fishery Research Program has conducted detailed investigations into the habitat requirements and life history of recreational fishes in the region, as well as management options.

Recently, a $100,000 gift from the Prescott Foundation was used to establish the Adirondack Fishery Research Fund. Income from the endowment fund will provide continuing partial support for the research program.

For decades, trout have been inbred at hatcheries. Consequently, they are poorly adapted for survival under natural conditions. Comparative studies on domesticated and wild strains of trout stocked in the same lakes have consistently demonstrated much better performance by the wild strains.

The Cornell researchers have developed a hardier, hatchery-reared fish: a cross between long-living Canadian brook trout, the Temiscamie strains, and the New York domesticated brook. This combination has increased vigor and survives as well as wild fish.

The Cornell researchers are currently evaluating the hybrid produced from parents selected after exposure to acid stress. It is hoped that the crosses will be hardier in marginally or periodically acidified waters.

Tax-deductible contributions to the fund can be made payable to Cornell University, care of the Adirondack Fishery Research Fund. For information about alternative ways of giving, such as bequests, securities, and income-producing trusts, write or telephone Glenn O. MacMillen, Office of Development and Alumni Affairs, 242 Roberts Hall, Cornell University, Ithaca, N.Y. 14853, (607) 256-7651.

Ear Rings of Fish Are Clues to Their Past

Ear rings of a tuna.

Strikingly similar to the bands in the trunks of trees, rings in a fish's ears also reveal details about its past.

Under ideal conditions, these rings indicate when the fish hatched, when it migrated, how quickly it grew, daily temperature variations in surrounding waters, behavioral changes over its lifetime, and clues to the day and hour of its death.

"All bony fish have these 'ear stones' or otoliths that are used by them for hearing and orientation," explains Edward Brothers, a Cornell ichthyologist and marine biologist. In more than a decade of studying otoliths, he has examined thousands of ears from more than 500 kinds of fish.

Scientists in the late 1800s discovered a correlation between seasonal rings in otoliths, which are made of the same substance as sea shells, and the age of fish. But not until a decade ago did they realize that these rings grow daily.

Since then, Brothers and his colleagues have refined techniques for establishing the age of fish. "Using these techniques, we have been able to determine which features of the daily increments are affected by environmental factors and which by intrinsic changes in the fish," Brothers explains.

In his laboratory in the section of ecology and systematics in the Division of Biological Sciences, Brothers tries to simulate light, weather, and food conditions of fish in the wild. In this way, he tries to produce otoliths in laboratory-reared fish that match those found in fish caught in the wild.

"Changes that affect a fish's life will be reflected in the daily rings by differences in thickness, density, and protein content," Brothers says. "Each day's band is clearly distinguishable from the next because of the variations between day and night accretions and even between parts of the day or night."

Brothers explains that age and growth information is "essential not only to learn about the biology and ecology of fishes, but for management of fisheries. It can reflect the health and origins of a particular stock. And learning how quickly a fish grows helps scientists determine how many of a particular fish can be harvested."

He has been working with other marine biologists, studying, for example, the endangered bluefin tuna. "If we can figure out how long it took the tuna to grow to its 1,000-pound size, we can calculate what the species' recovery time is from being overfished and decide how long it is necessary to protect it."

Understanding otoliths can also help marine biologists trace the movements of fish stocks. They can determine, for instance, whether the salmon caught in a particular area are from the same stream and, if so, whether harvesting should be limited to prevent depletion.

Otoliths also reveal information about the denizens of tropical reefs—how the reef is organized, whether all the fish that come to it are from the same area, whether they arrive at the same time.

In addition, because they reflect changes in the water's temperature caused by industry, otoliths can be used to monitor the environment. Many even pick up some of the pollutants, such as heavy metals, that contaminate aquatic environments.

"Analysis of otolith microstructure allows us to obtain detailed information about patterns of growth and activity of fishes which otherwise would probably not be available," concludes Brothers. "Modern techniques for understanding otoliths provide us with a powerful new tool for the study and understanding of fish ecology."

—*Susan S. Lang*

Gift of Computer to Aid Agricultural Engineering Courses

Norman R. Scott (seated), professor and chairman of agricultural engineering, tries out a microcomputer donated by the Carrier Corporation of Syracuse. Looking on are two of the firm's representatives, Jon E. Flem (left), sales manager, and Lloyd Knecht, territory manager. The computer will be used in several agricultural engineering courses and for special projects.

The Carrier Corporation of Syracuse, N.Y., has donated a microcomputer and a set of programs to Cornell to bolster the teaching program in agricultural engineering.

The gift, consisting of a TRS-80 model III microcomputer and a E20-II HAVAC software package, will be used in such courses as environmental control of animals and plants, processing and handling of agricultural materials, energy technology, and instrumentation. According to Norman R. Scott, chairman of the department of agricultural engineering, the computer will also be used in a number of engineering design projects.

At the presentation of the gift, Scott said, "Support of educational institutions from industry in these times of economic difficulty is important for the maintenance of strong university programs."

—*Yong H. Kim*

Cure Developed for Lead-Contaminated Gardens

Scientists at Cornell have developed a cure for gardens that contain high concentrations of lead, a heavy metal that can find its way into vegetables.

The remedy is effective in preventing lead from moving into vegetables grown in soils near busy roadways or in cities where rubble-strewn vacant lots are being transformed into gardens.

It calls for adding large amounts of organic matter such as compost or well-decomposed animal manure to soils and at the same time maintaining the soil pH near neutral.

"Any home gardener can take these steps easily," says Nina L. Bassuk, assistant professor of floriculture and ornamental horticulture. She is the program director of Cornell's Urban Horticultural Institute, which is studying problems associated with growing plants in urban environments. New York City is its primary base of field research.

Bassuk developed these corrective measures in greenhouse experiments using lead-contaminated soils from New York City, as well as artificially polluted soils.

Unless these measures are taken, leafy and root crops such as lettuce, spinach, potatoes, and beets are likely to absorb lead. Crops such as tomatoes, corn, beans, squash, eggplant, and peppers normally do not absorb lead from soil in any appreciable amount, Bassuk points out.

In soils containing large amounts of lead, organic matter, representing at least 25 percent of the total volume, should be added to prevent lead uptake by plant roots. The soil pH should be between 6.5 and 7.0. When pH readings drop below 6.0, the level of lead uptake increases.

The Cornell scientist found that adjusting the soil pH to levels above 6.5 is also effective against cadmium, a heavy metal highly toxic to animals and humans.

Bassuk says that adding a large amount of phosphorus to the soil is effective against lead uptake, but much more phosphorus is needed than plants normally use for growth. Thus this remedial step is not practical.

"The most important factor influencing lead uptake by plants turned out to be the amount of organic matter in the soil," she notes.

In her experiments, Bassuk found that lettuce grown in soils with low levels of organic matter absorbed much more lead than lettuce grown in soils high in organic matter.

"In soils containing large quantities of organic matter (40–50 percent or greater by volume), the lead uptake was zero, even though lead concentrations were as high as 3,000 parts per million," she explains.

The more decomposed the organic matter, the better, she says. Muck soil, which is composed entirely of decayed plant material, or well-rotted manure does a better job of preventing lead uptake than do soils such as fibrous peat moss or uncomposted, ground-up leaves.

Adding organic matter to garden soils provides additional benefits because it improves the soil structure as well as the soil's water-holding capacity.

Lead often finds it way into urban gardens in large amounts when lead-based paint from demolished buildings remains in the rubble on a potential garden site.

Another major source of lead affecting garden vegetables is automobile emissions. Airborne lead can adhere to plant parts as well as pollute the soil.

To determine if airborne lead is a problem, the researchers periodically, throughout the season, blew emissions from a gasoline engine over lettuce growing in clean soil.

"Gassed" plants, as expected, contained significantly more lead than control plants. The lead adhered to the leaves, rather than being absorbed by the plants.

"Water alone removes only a small amount of lead from the leaves," Bassuk points out. "On the other hand, wash water containing a little vinegar (1 percent) or dishwashing liquid (0.5 percent) removes it effectively."

Based on the findings, Bassuk advises against growing vegetables near a busy road. If this approach is not feasible, a fence or hedge should be erected as a shield.

"In any case, washing all vegetables meticulously, preferably with a little vinegar or soap in the wash water, is a must."

—*Yong H. Kim*

Gypsy Moths Will Be More Pervasive Than Ever

Hillside in the background shows gypsy moth defoliation of a predominantly oak stand.

Gypsy moth caterpillar.

Gypsy moths may be out of sight for the time being, but they should not be out of mind.

"Don't forget about them," advises Cornell entomology professor Warren T. Johnson. Autumn and early spring are ideal times to scrape or hose egg masses off trees because many more are visible when trees are bare, he says.

These voracious insects defoliated almost 8.2 million acres in the Northeast in 1982. Eventually, all the continental states will have some gypsy moths, and every county in New York will have a cyclical gypsy moth problem.

These infestations will permanently affect forest compositions, according to Johnson, resulting in significantly fewer oak trees and, to a lesser extent, reduced populations of other hardwoods.

The somewhat good news is that the caterpillar populations in many areas of the Northeast have peaked and, in a few locations, have crashed because they were susceptible to a virus and lacked food.

"These areas probably won't confront overwhelming gypsy moth populations again for several years," predicts Johnson.

Michael Birmingham, an associate forester in the Bureau of Forest Resource Management of the New York State Department of Environmental Conservation, notes that by last year, the caterpillars were starving in many areas where the trees no longer could support the burgeoning populations.

"These caterpillars produced undersized egg masses that were very susceptible to a virus. As a result, defoliation last year was down about 60 percent from the previous year, although it still was the second worst year in history."

Americans have been plagued by the gypsy moth since 1868, when some escaped in Massachusetts while a French naturalist was trying to find a substitute for the silkworm. Less than a century later about 50,000 acres were infested. By 1977, 1.6 million acres in the Northeast were defoliated, but a population collapse occurred because of a lack of food, and by 1979, only 643,000 acres were seriously affected.

In 1980, the number of defoliated acres mushroomed to 5.1 million, and then to a whopping 12.9 million the following year. Last year's reduced losses were largely the result of a nucleopolyhedrosis virus (NPV) that is present in many gypsy moth populations in the Northeast but that does not normally take a toll on pest numbers until the population is stressed, says Johnson.

"Even if there are localized population crashes, gypsy moths will continue to migrate, threatening oaks and other hardwoods; we just don't know at what rate."

So far, the ravenous caterpillars have been found in 32 states, nine more than in 1981, according to Gary Moorehead, who is on the staff of the U.S. Department of Agriculture's Plant and Animal Health Inspection Service (APHIS).

The 12 New England and Eastern seaboard states—as far south as Virginia—are considered heavily infested; the other nine states that have been infested are California, Illinois, Indiana, Michigan, Minnesota, Ohio, South Carolina, Washington, and Wisconsin. In Arkansas, Florida, Georgia, Iowa, Kansas, Kentucky, Missouri, North Carolina, Oregon, Tennessee, and West Virginia, gypsy moths have been found in traps.

Federal programs are under way to suppress any new populations, says Moorehead.

"But even though measures are being taken to eradicate gypsy moths wherever they are in small numbers, they keep spreading by attaching to vehicles and blowing in the wind. Every April, for example, cars from the North bring gypsy moths to Florida."

Although few experts are willing to predict what this summer's attack will be like, they agree that areas that were on the fringe of infestation last year are likely to be the most seriously affected in the future, until there are population crashes.

Professor Johnson fears that significant tree mortality is inevitable, even in areas that experience relief for a few years.

"Many trees have been weakened by the moths and have become vulnerable and susceptible to other insects and diseases," he points out. "As a result, they will die within two to four years from causes other than the moths—most of which never would have occurred if gypsy moths had not attacked the trees in the first place."

Oak trees won't become rare in the Northeast, he says, although he does expect their numbers to be significantly reduced. The moths, which can feed on more than 300 plant species, prefer oaks and other hardwoods.

—Susan S. Lang

Link Found between Selenium and Immune Response in Poultry

Research in the department of poultry and avian sciences has yielded important findings on the relationship between selenium and immune response.

Male chicks, the researchers found, are much more sensitive than female chicks to excessive levels of selenium, a nutrient essential in the development of optimal immune function and thereby disease resistance.

Selenium in slight excess of the level required for protection from nutritional-deficiency diseases produced significant reductions in the number of antibodies in male but not female chicks. Studies have shown that male rats also exhibit a gender-related sensitivity to selenium.

In addition, the Cornell studies found that at two weeks of age, chicks need both vitamin E and selenium for optimal function. In those three weeks old, however, selenium—even if there is a deficiency of vitamin E—is sufficient to maintain an adequate immune response.

When they are two to four weeks old, chicks are at a particularly vulnerable stage of their development. Their own immune systems have not fully matured, yet they no longer have as many maternal antibodies as they did when they were born. It is in this period that they are the most susceptible to a host of diseases, especially a genetically linked viral cancer (Marek's disease) that is usually fatal.

The role of selenium in immune development and how it is metabolized differently in male and female chicks is currently under investigation by the scientists.

The research was carried out by James A. Marsh, assistant professor of animal physiology, Rodney R. Dietert, assistant professor of immunogenetics, and Gerald F. Combs, associate professor of nutrition, all in the department of poultry and avian sciences.

Publication on Gypsy Moths Available

The comprehensive publication *Gypsy Moth* provides information on the hosts and behavior of the insect, natural factors affecting its population, and strategies for its control.

Written by Carolyn Klass, senior Extension associate in entomology at Cornell, and Lawrence Abrahamson, senior research associate at the SUNY (Syracuse) College of Environmental Science and Forestry, the publication contains close-up color photographs of the moth's life cycle and explains how to control the pest at each stage of its development.

The publication is available for $2.00 from county Extension offices or from the Cornell University Distribution Center, 7 Research Park, Ithaca, N.Y. 14850.

Researchers Discover Insect with a Temperature-Controlled Dormancy

Despite the unusually warm weather last fall and winter, insects weren't fooled into coming out of dormancy.

Because their dormancy is regulated primarily by day length and only secondarily by temperature, insects do not mistake unseasonal weather for spring, and thus protect themselves from being killed by an imminent autumn frost.

But now Cornell researchers have discovered that the dormancy of at least one insect, a fly called the alfalfa blotch leafminer, which attacks alfalfa, is influenced primarily by temperature rather than the amount of daylight.

Collaborating on the research were Maurice J. Tauber, professor and chair of entomology, Catherine A. Tauber, senior research associate in entomology, James R. Nechols, Ph.D. '81, now at the University of Guam, and Robert G. Helgeson, formerly an associate professor in entomology and currently at Kansas State University.

Because the dormancy of the leafminer is regulated mainly by temperature, explains Catherine Tauber, it can "take advantage of late but favorable growing conditions and produce a late-season generation."

The alfalfa blotch leafminer is the first insect in the temperate zone that has been found to have a reversible dormancy, or diapause, under favorable environmental conditions. One insect in the tropical zone is known to have this trait.

"This malleable diapause, which could evolve only in species with short life cycles, allows the leafminer to produce as many as four or five generations, rather than just three, in years with warm autumns," Catherine Tauber points out.

The research contradicts the common view that certain physiological changes associated with diapause can occur only when it is cold.

"In fact, our results show that low temperatures can delay, rather than hasten, the completion of diapause in the temperate zone," she says.

These findings will enable scientists involved in integrated pest management to predict much more accurately the number and timing of late-season generations of the alfalfa blotch leafminer and the timing of vernal emergence and activity.

"Our research," Catherine Tauber notes, "also shows how studying pests experimentally may greatly improve predictions for growth, development, reproduction, and survival under field conditions."

—Susan S. Lang

Student Profile: Ivanka Maglich

Changes in women's roles is a subject Ivanka Maglich '83 can speak about from an unusual vantage point.

For nearly four years, Maglich has been the head varsity football manager at Cornell. Each year from August until Thanksgiving, she has juggled academic life with a hectic schedule of coordinating the team's activities, including, for about six hours each day, monitoring the condition of the playing fields, ordering uniforms, making travel arrangements, and handling miscellaneous problems.

She's put off by "macho" attitudes, she says, which are prevalent in many sports. "But Cornell players aren't guilty of that. They're intelligent and well-rounded, a lot more whole than their professional counterparts." This is more than a casual observation.

During the summer of her freshman year, Maglich was the assistant training camp manager for the San Francisco 49ers, which involved coordinating their daily activities. She became friends with two of the players, Joe Montana and Steve Deberg, who, she says, were "really down to earth."

Being a woman wasn't a problem in either job, she says, in part because she followed strong personal guidelines. "You have to decide what image you're trying to project. You can't wear a lot of makeup and superfeminine clothes and then not expect men to look at you mainly as a woman. So it's a matter of not just acting professional but looking professional."

One might guess that Maglich's father was a football coach who spurred her into these jobs. But her father, Bogdan, a well-known high-energy nuclear physicist and the owner of *Science Transfer Associates*, is in no way involved with football.

It was while Maglich was at a preparatory school (Northfield-Mt. Hermon) that the world of football opened up to her. Peter Noyes, the assistant football coach at Cornell, heard about Maglich, who was the manager of the ski team, from the football coach at the school. On his recommendation, Noyes offered her the job as manager of the Cornell football team. Maglich visited Cornell shortly afterward and was accepted almost immediately as an early-admissions student.

An ag economics major, she plans to have a career in business, probably as an investment banker. She is vice president of the college's Business Opportunities Club, which invites alumni business executives to talk about their jobs to students. "These informal sessions are a big help to students in trying to decide whether they are compatible with a certain career," she says. "They can also ask a lot of questions that they would feel too uncomfortable asking once they were in a job."

With unemployment high now, Maglich says she is worried about the future for women. "There may be more reluctance to give women a chance. I was talking to an otherwise bright man the other day, for instance, who said, 'You women have everything—sensitivity, the ability to express your feelings, a lot of roles you can choose from—we men have just our jobs. And now you want to take those away.' In some ways, that's a dumb statement, but it has some truth and is how a lot of people feel. Men have traditionally clamped down on what they can be and how they can act, and they think of their jobs as their main identity. More competition, especially from women, which they're not used to, is upsetting. It's a real issue everyone has to face."

Her grandmother, Maglich recalls, foresaw a revolution in women's roles, but one interrupted by setbacks if the changes were too rapid. Lasting gains, she used to say, would be made only after people had time to adjust their behavior and expectations. Maglich feels that much of her grandmother's prophecy has been borne out.

Maglich has an unsentimental view of women and business. "I don't think women will necessarily bring a stronger moral viewpoint to business. Women, just like men, vary in how ethical they are; it's an individual matter.

"The corporate structure is very set in its ways and rules. I'm not sure, when profits are the whole point, how much difference anyone can make in something so big and established."

Feminists and others have emphasized the need for women to give one another support and to band together. "This is based on the idea that men have a lot of camaraderie, that they have networks to pull themselves up through the ranks. I think it's a myth," she says. "We're really, all of us, alone in this world."

Before she enters a career in business, Maglich would like to travel for a few years, possibly as part of the Foreign Service. She has already traveled to many countries, including India, Saudi Arabia, and Greece, and she lived in Switzerland as a child. Yugoslavia, her father's native country, is her favorite, she says. "Yugoslavians are family oriented. It would be unthinkable to them to put an elderly relative in a nursing home or to turn out an 18-year-old child. When offspring get married, additions are built onto the parents' house for them. Sometimes I think the West emphasizes the individual to an extreme, causing loneliness."

When she travels, it's with the spirit more of an anthropologist than a tourist. "I'm not interested in seeing just the pretty or obvious places. When I was in India, I walked down the back, narrow streets of villages, where I could see people carrying on their lives, hanging out their laundry, setting tables on the streets for meals. I wanted to know how they interact, how they think. I try not to dump my own ways on them, but to blend in and learn."

This open-minded attitude is probably an outcome of being raised in a household where her mother, Philadelphia actress Elowyn Castle, had many colorful friends. "They always lived on the brink, often just barely subsisting at low-paying jobs to be able to stay in their passion, the theater."

Such intense emotion, she remarks, can often be found in nonindustrialized countries, where people tend to be more guileless and expressive. Visting other countries, Maglich says, underscores that there is no one right way to live or think. It reduces cultural arrogance, she notes, and leads to a more unified perspective on the world.

Adirondacks Project Undertaken

New York State, home of one of the most sophisticated cities in the world and a booming agricultural industry, is also blessed with the Adirondacks, one of the most beautiful mountain regions in the country.

Although the charm and natural resources of the Adirondacks have been well publicized, there is no comprehensive set of data to form a social and economic profile of the region, essential for setting public policies.

To develop such a data base, Cornell has undertaken an eight-part, 17-month study to help local governments and agencies in the area make decisions concerning development and environmental protection.

"Our goal is to provide a better basis for those whose job it is to assess the economic and social consequences of environmental regulations and land-use management, and to structure this information so it may be used efficiently by state and local officials in development planning in the future," says David Allee, professor of agricultural economics and director of the study.

The project, "The Social and Economic Characteristics of the Adirondack Park," will focus on eight research topics including community structures and public policy, local fiscal conditions, tourism, water supply and sewer services, trends in land values and transactions, public responses to policies, the role of agriculture, and property tax policies.

The objective of the section on community structure and public policy, to be

carried out by Warren Brown, former Cooperative Extension associate in the Cornell Population Information Program, and Paul Eberts, associate professor of rural sociology, is to develop a profile of the social, economic, and demographic characteristics of the towns and villages in the region.

The study of the fiscal conditions of the municipalities will establish a financial and historical data base of revenues, expenditures, and debts for the region's towns and villages. Conducted by researchers in the Cornell Local Government Program, it will compare the financial status of local governments.

Senior research associate Tommy Brown in the department of natural resources will attempt to characterize tourism in the region, determine who visits and why, and compare the growth rates of the tourist industry, both in and outside the region.

Joe Francis, associate professor of rural sociology at Cornell, will investigate the water situation and its relationship to community infrastructure, environment, and services to gain an understanding of the relationship between water and sewer systems and development.

Using questionnaires completed by land owners, Allee and rural sociologist Charles Geisler will try to determine trends and overall patterns in land use and sales in the area.

Geisler will also examine changes in land-ownership patterns and attitudes toward public policy resulting from demographic changes in the area.

A study on the role of agriculture in the Adirondacks, to be carried out by researchers in the department of agricultural economics, will examine the extent to which the area's resources are used for agricultural pursuits, including maple syrup production, woodlot management, cedar oil production, saw mill enterprises, and cropping, livestock, and orchards.

Finally, associate professor of agricultural economics Richard Boisvert will develop property-tax computer simulations to project the effect changes in tax policies would have on the area's economy.

The researchers will compile their data from questionnaires and census and statistical information from state and government agencies.

—*Susan S. Lang*

Cornell University
Agriculture and Life Sciences
news
New York State College of Agriculture and Life Sciences, Cornell University, Ithaca, N.Y. 14853

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May 1983

ALS Alumni Calendar

May 27	Senior barbecue, sponsored by the ALS Alumni Association
May 29	Graduation
June 11	Reunion breakfast/annual meeting of ALS Alumni Association
9–12	Cornell reunion weekend
Aug. 9–11	ALS exhibit, Empire Farm Days
Sept. 24	Roundup '83 (with special recognition of the classes of '34 and '59)
Nov. 5	Cornell homecoming weekend

Agronomy at Cornell

A 385-page publication, *Agronomy at Cornell* chronicles the struggles and challenges of the agronomy department from its turbulent beginnings, when the university was also young and in flux, until today.

Written by Marlin G. Cline, professor emeritus, the publication includes information on changes in academic philosophy and courses, departmental involvement with government agencies and private organizations, and research interests of professors.

The publication is available for $15 from Jean S. Trenchard, Department of Agronomy, 231 Emerson, Cornell University, Ithaca, N.Y. 14853.

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Field lab in "Soils 2" class in the fall of 1907.

College buildings in 1907, a year after they were occupied. The Agronomy Building, now Stone Hall, is at far left. In the foreground, agronomy students examine exposed subsoil on the athletic field. (This photograph and the one above are from Agronomy at Cornell.)