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Barbara McClintock Wins Nobel Prize

Barbara A. McClintock ('23, Ph.D. '27) has won the Nobel Prize in medicine for her discovery that genes are not fixed but can jump from one spot to another on the chromosome of a plant and transform future generations of plants produced.

The discovery was made more than 30 years ago, but only in the last decade or so has its importance become widely recognized.

McClintock, who is 81, continues with her research at the Cold Spring Harbor Laboratory on Long Island.

She is the first woman to win an unshared Nobel Prize in medicine, and only the third woman to win an unshared Nobel science prize. The others, both honored for their work in chemistry, were Marie Curie in 1911 and Dorothy Hodgkin in 1964.

In its statement accompanying the award, the Nobel committee said that McClintock's experiments "were carried out with great ingenuity and intellectual stringency." The committee members, who are from Sweden's Karolinska Institute, noted that she had been "far ahead" of the tremendous developments that have taken place in genetics in the last several decades.

Since first arriving at the Cold Spring Harbor Laboratory in 1941, McClintock has been raising maize, or Indian corn, on small plots of land on the laboratory grounds, crossing varieties

Barbara McClintock at a 1982 Cornell symposium on corn genetics.

and carefully examining the results.

She noticed that parts of the leaves on some seedlings were losing their color, and other parts of the leaves were gaining color.

By 1947, she had concluded that the changes were caused when pieces of genetic material rearranged themselves in the corn seedlings. That observation contradicted one of the basic tenets of genetics: that genes were arranged on chromosomes in fixed patterns.

McClintock's discovery was "considered almost scientific heresy," says Adrian M. Srb, a Cornell professor emeritus of genetics and development and a personal friend of McClintock's.

When she reported her findings in a scientific journal in 1953, she received only three requests for reprints. "I wasn't listened to for years," she said later.

"No one else saw it," Peter J. Bruns recalls of her interpretation, "and not many people at first believed it. Bruns is professor of genetics and chairman of the section of genetics and development at Cornell.

Part of the mounting evidence in support of her theory was the discovery in the late 1960s—using modern techniques of molecular biology—that bacteria have movable genes. When bacteria develop resistance to an antibiotic, for example, the genes responsible for that resistance can be passed on—through jumping genes—to other bacteria.

Such mobile genes, called transposons, may also be involved in the transformation of normal cells to cancerous ones, in the successful avoid-

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Sharp Named Director of Biological Sciences

Geoffrey W.G. Sharp, chairman of the department of pharmacology in the College of Veterinary Medicine and a noted researcher in the fields of ion transport and insulin release, has been named director of the Division of Biological Sciences. He replaces Robert Barker, who became vice-president for research and advanced studies at Cornell in July, and Harry T. Stinson, who was the interim director for three months.

Established in 1964, the Division of Biological Sciences was the first such grouping at an American university to integrate research and teaching from a large variety of scientific disciplines. There are approximately 120 regular and joint faculty members in the division's six sections: biochemistry, molecular and cell biology; ecology and systematics; genetics and development; neurobiology and behavior; physiology; and plant biology. The L. H. Bailey Hortorium and the Shoals Marine Laboratory also are in the division.

Born and educated in England, Sharp received a Ph.D. in pharmacology from the University of Nottingham and a D.Sc. from the University of London. While at the University of Nottingham, he led physiological expeditions to Spitzenbergen in the Arctic in 1957 and 1960, where he studied the effects of activity and light on human circadian rhythms.

After two years of research at the Middlesex Hospital Medical School in London he moved to the Massachusetts General Hospital and Harvard Medical School in 1962, conducting research on the mechanisms of control of sodium transport, primarily on the actions of aldosterone and of antidiuretic hormone. He taught in the departments of pharmacology and physiology at Harvard Medical School and biochemistry at Harvard College. He was chief of the Biochemical Pharmacology Unit at Massachusetts General Hospital from 1966 until 1978.

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Hood Chosen Director of Geneva Experiment Station

Lamartine F. Hood has been named the eleventh director of the New York State Agricultural Experiment Station at Geneva by the Cornell University board of trustees.

He succeeds Donald W. Barton, director of the station since 1960, who retired last year. Alexander C. Davis had been serving as acting director since Barton's retirement.

Hood has been associate director of research for the College of Agriculture and Life Sciences and the Cornell University Agricultural Experiment Station at Ithaca since 1980. In that position, he had major responsibility for administration and coordination of research programs in food science and nutrition, animal science, horticulture, and plant protection. He has been on the Cornell faculty since 1968 as a professor of food science.

A native of Johnstown, Pa., Hood earned B.S. (1959) and Ph.D. (1968) degrees from The Pennsylvania State University, and an M.S. (1963) degree from the University of Minnesota.

In addition to the 750-acre campus at Geneva where more than 200 research projects are under way, Hood will have responsibility for laboratories in the Hudson Valley at Highland and along Lake Erie at Fredonia.

The Geneva Experiment Station is one of the oldest in the country. Established in 1882, it became a part of the College of Agriculture and Life Sciences in 1923. Today, more than 350 people, including 63 Cornell faculty members, are employed there. The budget is $9 million annually, derived from state, federal, and private sources.

—*David I. Stewart*

Cornell and China Cooperate in Biomedical Research

The National Cancer Institute has awarded $1.4 million over three years to the Division of Nutritional Sciences to work in conjunction with the Chinese Academy of Medical Sciences in the People's Republic of China to study dietary factors that may cause or prevent cancer.

The collaborative research team, part of one of the first biomedical research projects between the United States and China, will examine the dietary habits of 18,000 people in China by surveying and analyzing food and nutrient intake. This information will be supplemented with the nutritional evaluation of blood and urine samples from about 7,500 people.

Researchers will examine the relationship between selenium, a trace mineral, and cancer. There is growing evidence that this mineral plays a protective role against cancers. They will also look at the synergistic and independent effects of such nutritional factors as beta-carotene (a component of vitamin A), vitamins A, B$_2$, and E, and minerals such as zinc, molybdenum, and iodine.

They hope to study the relationship of cancer with cotinine, a metabolite of

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From the Dean

Since the last issue of the *News*, there have been many developments in the college that I would like to review for you. This certainly has been an exciting and busy summer.

The board of trustees' recent decision to turn down the architectural design for Academic I came as a bit of a surprise to all of us. Although the college was not responsible for the exterior design, we are disappointed that the project has been delayed for 18 months to two years. You should understand that the college's responsibility in a project like this is limited to the internal functioning of the building. We were satisfied that Academic I, as designed with the architect, would work quite well for the college's activities in the facility. The university is responsible for the exterior design, and that is where the problem arose. Momentarily we expect the appointment of a new architectural firm, and we will start the project from ground zero. The plan to locate on the west end of the Agricultural Quadrangle is unchanged.

Although we are disappointed with this delay on Academic I, I am pleased to report that Academic II is on schedule and should be completed within a year. As I look out my office windows, I can see that the bricklayers are up to the fourth floor and everybody is excited about what this great new facility will do for us in the areas of entomology, biology, and biology teaching. It is certainly much needed.

I never thought that as dean of the College of Agriculture and Life Sciences I would have to become a quasi-computer expert, but with the rapid advances in electronic technology it is clear that computers are going to play a major role in the future educational activities of the college. Administratively, computers and electronic technology are going to have an impact on how we conduct our business. We are looking forward to the time when offices can be networked with word processing machines or personal computers. At this point we are delayed in moving too far in that area until the university decides to put in a new phone system. Our antiquated system will not support very many networking possibilities. I look forward to the day when electronic mail will greatly reduce the paper flow among the dean's office, departments, and individual faculty and staff.

A second major area of responsibility is in ensuring that our students are computer literate. Computer literacy means different things to different people, and obviously it is not the college's responsibility to train computer design experts or even to train computer programmers. But certainly all of our students should be familiar with computer technology. They should understand the various uses of computers in decision making and be familiar enough with this form of technology that they will be able to participate in a productive way wherever their careers may take them after they leave the college. We are considering our course offerings in close conjunction with the College of Engineering and others who offer courses in computer literacy. We will determine what needs to be done in our curriculum to meet this goal.

A bigger challenge and possibly the more interesting one is the use of computers to enhance instruction in many of our courses. We have active programs under way ranging from agricultural engineering and animal science to the teaching of introductory biology. The latter is being supported by a contract with the IBM Corporation, which will be providing microcomputers and monetary support.

Over the last five years the college has attempted to address many of the hardware needs by providing a large number of remote terminals so the faculty would have access to the mainframe computer, and where appropriate, providing microcomputers for use by individual faculty members or in teaching situations. Up until this year we had one microcomputer laboratory that has been used extensively in a number of courses. Some of the other courses were taught by utilizing the mainframe through remote terminals.

With the decreasing costs of electronic technology we will be moving to a decentralized system where we will be using microcomputers much more intensively than the mainframe in the teaching and instructional area. This will necessitate the establishment of a number of microcomputer laboratories. I suppose that at one time a biological sciences laboratory was considered quite innovative, and now we have many of them. We now are in a situation where we need to establish laboratories equipped with 20 to 30 microcomputers that are fully networked and available for faculty so they can conduct classes in this type of a laboratory. At this point, we foresee five of these laboratories being established in the college. We have already started a renovation project in Mann Library for one major facility and there probably will be another one in Riley-Robb, at least two in Warren Hall, and one in the new entomology building. We are currently exploring some innovative ways of providing the equipment for these laboratories and for the faculty who wish to design curriculum materials or software packages that could be used in the teaching of their courses.

With the rapid changes in technology we are experiencing, this has been a very interesting process to work out. It seems that every time we turn around there is a new piece of equipment available with increased or enhanced capability at a lower cost.

One is tempted to hold off, waiting for a better deal or a better piece of equipment, but it is a constantly moving target so we are making some decisions now on specific equipment that should be in place within the year. These new facilities, courses, and attitudes on the part of the faculty will keep our educational offerings in the forefront.

Another exciting development this summer was in watching the admissions process and acceptances. We have probably the highest quality group of freshmen ever admitted to the college. Eighty-one percent of our entering freshmen were in the top 10 percent of their high school class. This is nine percentage points higher than the previous year and is certainly the highest that we are aware of. Let me assure you that we still have a sizable percentage of our students (upwards of 12 percent) who are farm reared, and this number has actually increased since a decade ago. In addition, it appears that at least one-third of our students have had farm experience. Our freshman class, as in the past, is well balanced with respect to upstate versus downstate and is certainly an exciting group of students who will challenge our faculty in the classroom. We also had a strong pool of transfer students, including more than 100 from the agricultural and technical colleges. This program of matriculation from the six agricultural and technical colleges continues to proceed very well.

Last year the state of New York offered an enhanced retirement program to all state employees over age 55 in an attempt to reduce the size of the state payroll. Thirty-seven of our senior faculty took advantage of this program. Combined with a few resignations and several deaths, we lost 44 senior faculty this past year. In the short run we were fortunate in being able to hire some of these people back on a part-time basis, but it has been necessary to hire temporary lecturers and others to plug some of the holes in the classroom. The state has reduced our funding, and we are hard at work figuring out how to handle this latest challenge. As you are probably aware, this is another in a series of personnel reductions that the college has been subjected to over the past decade as the state has attempted to deal with some of its fiscal crises.

Since 1979-80 we have lost 152 state-funded lines in the college (at both Ithaca and Geneva). I think the faculty in the college has adjusted well to these cutbacks—in fact, our total number of employees has remained constant as the faculty has been successful in attracting other sources of funds to replace state funds. The loss of 44 senior professors at one time presents a different sort of challenge to the college. We are not sure at this point exactly how many of those positions we will be able to refill. Eight of these faculty lines have already been filled, and there are seven searches currently under way. This leaves us with the opportunity to examine and possibly make program changes in another 20 positions.

At the Geneva Experiment Station we had seven vacancies created last year, including the retirement of Donald Barton as director. Prof. Lam Hood, the associate director of research on the Ithaca campus, has assumed the directorship of the Geneva Experiment Station. He is working closely with his faculty to outline future program thrusts for the potential new faculty members at that important institution.

As I said in the beginning, it has been an exciting six months, with new challenges presented every day. I am greatly encouraged by the quality of the students we continue to attract, the quality of the new faculty that we have been able to hire in the past year, the productivity of our continuing faculty, and the general respect with which the college is held by our colleagues throughout the nation.

The support we have received from our alumni and friends, both monetary and moral, has been most encouraging. With great students, a great faculty, and solid alumni support, it is easy to predict an excellent future for the college.

David L. Call

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In 1970, Sharp served as a consultant to the SEATO-PHS Hospital in Dacca, Bangladesh, following his studies demonstrating that cholera toxin stimulates the enzyme adenylate cyclase in its action to cause massive diarrhea. After several years of studying the toxin's mechanism of action, he began a systematic search for pharmacological agents effective in the treatment of severe diarrheal disease, research funded by the John A. Hartford Foundation and the National Institutes of Health. His current work in this area is on the control mechanisms involved in intestinal transport and the effects of pharmacologic agents.

During a year's sabbatical leave at the Institute of Clinical Biochemistry at the University of Geneva, Switzerland, in 1973, he developed a long-term interest in diabetes research. Using a blend of pharmacological, biochemical, and physiological approaches, Sharp is studying control mechanisms of hormone synthesis and release in the pancreas.

In 1978, he joined the faculty of Tufts University as professor and chairman of the department of physiology in the schools of medicine, dental medicine, and veterinary medicine. He joined the department of pharmacology at Cornell's veterinary college as professor and chairman in 1980.

—H. Roger Segelken

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A Partnership: Broadcasting and Extension

Farm broadcasting is practically as old as broadcasting itself, and America's land-grant colleges and Cooperative Extension were involved from its earliest beginnings.

That partnership was underscored in July when Cornell was host for the 1983 meeting of the National Association of Farm Broadcasters. Two hundred farm broadcasters and NAFB associate members, including government employees and professionals in related fields, attended the event.

Farm broadcasting began 62 years ago, around the time that the first commercial radio station licenses were issued. Some reports claim that KDKA in Pittsburgh, the nation's first commercial station, is the grandfather of farm broadcasting. Others say that farm broadcasting started in Tuscola, Ill., when a grain dealer put station WDZ on the air to report prices to grain elevator operators. He wanted to reduce his long-distance telephone bills.

Regardless of who did it first, radio soon reached the heartland of America with its high-power, clear-channel stations.

Many pioneers of farm broadcasting got their start in the Northeast, and Cooperative Extension and two land-grant colleges in particular were driving forces in meeting the needs of the agricultural community through the new medium of radio.

In Vermont and New York, the relationship between broadcasters and Cooperative Extension was mutually advantageous. In 1924, when Burlington's WCAX radio (now WVMT) went on the air, the call letters were chosen to represent Cooperative Agricultural Extension; programming was provided by Vermont Cooperative Extension and the University of Vermont. Three decades later when WCAX-TV 3 began beaming its signal into the Green Mountains and across Lake Champlain, one of the first local programs was the daily "Across the Fence." Its instant popularity caught on in Washington, D.C., and the USDA chose the name for one of its own television programs.

Elmer "Flip" Phillips broadcasting the "Cornell Farm and Home Program" on station WESG (now WHCU) in 1934. Phillips is professor emeritus of communication arts at Cornell.

In New York State, Cornell put its station, WESG (now WHCU), on the air in 1923. Agricultural programming was a staple of the broadcast day for many years, beginning in 1929 with Elmer S. Phillips as an early farm director. Now, Tompkins County Cooperative Extension staff members produce three programs a week on WHCU.

Also in the late 1920s, members of the Cornell Cooperative Extension staff began coordinating farm broadcasting for more than three dozen stations across the state. Later, they would do the same when television came into the picture, particularly in Buffalo, Syracuse, Schenectady, and New York City.

Radio listeners in the eastern part of the state and western New England tuned their dials to WGY in Schenectady, which began farm broadcasting in 1925 with "Farm Paper of the Air" and "Farm Forum." Both programs were directed by G. Emerson Markham, also known to listeners as "County Agent Robbins." In 1944, it was Markham who helped start the National Association of Farm Broadcasters.

Others who became popular with the farm and urban audiences in the capital district were Bill Givins, Don Tuttle, and Charles John Stevenson, all doing the "Chanticleer" program on WGY. They were up and in the studio each day long before there was a hint of crowing from the thousands of barns in that part of the state. Ed W. Mitchell, a Stuyvesant Falls fruit farmer, Cornell graduate, and frequent guest on ag programs, eventually became WGY's farm adviser.

One of WGY's farm directors was Bob Child '37, M. S. '42, a former agronomist for Cornell Cooperative Extension. It was Child who, 40 years ago, started the first weekly farm program—"Victory Garden"—on television. A sister station of WGY, WRGB-TV-6, was the first commercial television station in the country. It went on the air in 1928 as W2XB, an experimental station operated by the General Electric Company. Today, with continued help from Cornell Cooperative Extension, WRGB broadcasts a regular farm program—"RFD-6"—at 6:30 Saturday mornings.

Appearing with Child on that first farm TV program was a Cornell vegetable crops professor, Arthur J. Pratt. Child and Pratt, both retired but still active, attended the NAFB convention.

In the late 1940s, the Grange League Federation (GLF) and the Dairymen's League provided financial backing for what was considered a daring concept: a network of FM stations that provided agricultural programming to dozens of other FM and AM stations in most of upstate New York and parts of Connecticut, Massachusetts, and Pennsylvania. Bob Child of WGY was hired to direct farm-service programming for the Ithaca-based "Rural Radio Network," which lasted seven years. Some form of agricultural programming was continued on a limited basis over the years by RRN's successor, the Northeast Radio Network, until the late 1960s when ownership and programming changed considerably. Among the many Northeast Network programs popular with city-folk and farmers alike was "Weather Roundup," which featured live reports from across the state.

In the 1980s, there are hundreds of radio and television stations nationwide, but farm broadcasting is a specialized field. NAFB has 270 "voting" members, all of whom devote a major portion of their working time to over-the-air agricultural service. Another 400 associate members also help promote agriculture-related broadcast journalism.

One of the most active is Ed Slusarczyk '49 of WTLB, Utica, who heads the 54-station "Ag Radio Network," with affiliates in New York, Vermont, New Hampshire, Maine, and Massachusetts. Slusarczyk was chairman of this year's NAFB summer convention.

Among those who took part in the three-day meeting on campus were Joseph Gerace, New York State's commissioner of agriculture and markets, Kenneth Wing, associate dean of the College of Agriculture and Life Sciences, and professors from throughout the college who presented talks about biotechnology and other research at Cornell.

—David I. Stewart

Vitamin C Improves Iron Nutrition in Philippine Children

Much research has explored how food fortification might help to control iron-deficiency anemia, one of the most prevalent nutritional problems worldwide.

Attempts to include iron in cereals, sugar, salt, and other staples have seldom succeeded because of the many technical problems encountered in adding chemical forms of iron to food. But a recent Cornell study shows that increasing vitamin C intake may be a promising alternative to iron fortification.

Vitamin C, or ascorbic acid, is a well-known iron enhancer. It increases the solubility and absorption of iron and appears to reverse the effects of iron inhibitors such as tea and soy proteins. Since this ability to enhance iron's availability to the body has been documented in animal, clinical, and metabolic studies, ascorbic acid has been suggested as a way to improve iron nutrition in countries where most dietary iron is limited.

But two practical questions remained: finding a system for ascorbic acid fortification in anemic populations, and testing the feasibility and effectiveness of fortification under community conditions.

These problems were the basis of a study undertaken by Juan R. Aguilar (Ph.D. '83), in cooperation with the Cebu Institute of Medicine and Nutrition Center of the Philippines. Aguilar, who has an M.D. degree from the University of Guatemala, pursued his doctoral work in the Cornell international nutrition program with the support of a fellowship from the W. K. Kellogg Foundation. Before coming to Cornell, he was a medical officer with the Institute of Nutrition for Central America and Panama in Guatemala and chief of the department of nutrition at the Guatemala Ministry of Public Health.

Aguilar's first obstacle was finding a food for fortification that would reach a poor, subsistence population. The vitamin carrier needed to be cheap, widely consumed, and suitable chemically and physically for fortification.

He settled on monosodium glutamate (MSG), a popular condiment in the Philippines. MSG had already proved satisfactory for vitamin A fortification when tested by Cornell and Philippine researchers in a program to control vitamin A deficiency.

If MSG could be fortified with vitamin C as well, Aguilar could use it to examine whether iron status is affected by both vitamins A and C. A relationship between vitamin A deficiency and anemia has been suggested by clinical and animal studies.

Initially promising laboratory tests showed that a mixture of ascorbic acid and MSG was chemically stable. It lost less than five percent of its potency in six months, the average shelf-life of commercial MSG in the Philippines. But within a month of storage, the fortified MSG caked and turned slightly yellow. When exposed to high temperature and humidity, the kitchen conditions it would be subjected to in daily use, it also turned brown.

Further tests may yet overcome these problems, but Aguilar proceeded with his study by distributing vitamin C supplements instead.

The 10-month field study included about 200 children who showed signs of anemia, as well as their unafflicted siblings. The children's families were divided into four study groups: a control group that received unfortified MSG and three treatment groups that received an ascorbic acid supplement with plain MSG, or MSG fortified with vitamin A, or both vitamin A and vitamin C.

The children receiving the supplements consumed at least 50 mg. of additional vitamin C per meal, twice a day. This was enough to increase the absorption of iron from their diets by 10 percent.

Significant improvements in iron status were seen in all three treatment groups and especially among the anemic children from the vitamin C group who had greater iron stores and more iron-containing hemoglobin in their red blood cells by the end of the study. Children who received vitamin A alone or with vitamin C also showed marked improvement in hemoglobin levels, even if they had not been anemic.

In practical terms, the study suggests that until a successful method of iron fortification is found, measures that increase the intake of vitamins A and C are effective alternatives for improving iron status in those suffering from anemia.

Aguilar recommends that the search continue for a food that can be fortified with vitamin C, because supplementation may not be an appropriate public-health measure. He also endorses programs that encourage the consumption of vitamin C from natural sources. Although fruits and vegetables high in this vitamin are abundant in the Philippines and other tropical countries, they are not widely eaten there.

Aguilar is now a medical nutritionist with the International Nutrition Unit of the U.S Department of Health and Human Services in Rockville, Md.

—Penny A. Spingarn

Rearing Black Flies in Captivity: A Search for a River Blindness Cure

While merely a nuisance in this country, black flies cause severe health and socioeconomic problems for people living in the fertile river-basin regions of Africa and Latin America.

Black flies, which abound in the heat and humidity of the tropics, are hosts to a worm that causes river blindness (also known in Central America as Robles' disease). An estimated 40 million people are infected with this parasitic worm, *Onchocerca volvulus*, and the only available treatments are so unpleasant that they are often refused.

"The primary drug in use," says Ed W. Cupp, associate professor of medical entomology, "causes severe itching and swelling. People are driven nearly crazy by it. What happens is that the drug-killed parasites are recognized by the body as a foreign substance, and the skin—which is the main place the worms live—responds with a violent immune reaction.

"Topical preparations have been tried, but they had serious consequences: to escape, the worms burrowed deeper in the body, or migrated even more quickly into the eyes."

Cupp and his research team are the first scientists to devise a system for rearing black flies in captivity on a continuous basis, thus opening the door to a study of a safe environmental control or a vaccine. The scientists are working on the entomological aspects of river blindness and supply medical researchers with insects raised in the Schwardt Laboratory at Cornell.

There are 40 to 100 species of black fly in the United States, but none is a vector for parasites that would pose a human health hazard, Cupp notes. They are aggravating in the Northeast, however, for the approximately two months they reign over rivers and streams.

Persistent, more than willing to go inside socks and other tight clothing, the bloodsucking insects leave an unsightly bite behind. Unlike the mosquito, which drains blood neatly—similar to a syringe—the black fly tears skin open with scissorlike jaws. The result is a pool of blood beneath the skin that can take a while to heal.

In contrast to their one-generation-per-year existence in temperate climates, the flies are prolific in the tropics for five or six months of the year, particularly along rivers where they exist in dense populations.

People living in these regions are primarily farmers and are outside much of the day. With each additional bite and injection of worm larvae by the fly, the degree of illness increases. After many

Using a fine syringe attached to a microscope, research assistant Anthony Kaszewski injects black flies with the parasitic worm that causes river blindness.

bites, when both male and female larvae have been deposited into the skin, the worms mature and reproduce. Someone bitten only a few times is not likely to become ill.

The disease is transmitted as the female fly picks up the embryonic form—microfilaria—of the worms from infected blood, and then following development, deposits them into another person. The process is not a kind one for the fly, either. The worms must first perforate the fly's stomach, after which they lodge in its flight muscles and molt. When a fly infects a person or animal, it is because the worms have broken through the fly's mouthparts as it is biting.

As the disease progresses, massive nodules form as the body attempts to cordon off the adult worms; the person's skin loses elasticity and hangs in loose folds. Dermatitis and loss of pigmentation also develop.

By far the worst consequence is blindness. The microfilariae migrate to the eye, where their presence elicits a destructive immune response that over a period of time results in permanent ocular lesions.

"River blindness is also a social tragedy," Cupp states, "placing people in very hard moral dilemmas. What is to be done with young adults who have lost their vision, in a village where all who are able-bodied have to keep working in order to survive?" Others cannot take time out to care for them without hardship for all involved, and there is little or no government aid.

"You see countless people in their late 20s and early 30s being led by children, who have literally become their 'eyes'. Soon, many of these children will begin to lose their own sight and ultimately will depend on others to see for them."

Economically, he adds, the consequences are also harsh. In some villages, as many as 20 percent of the people are blind and unable to work.

In the hardest-hit areas, the main attempt at control of the black fly has been the dispensing of a larvicide, temephos, into waterways. The chemical is "safe, as far as pesticides go," Cupp says, but it is far from an ideal solution. Also, the flies have started developing resistance to it.

While there has been basic knowledge about the fly and its parasite, trying to understand the insect in detail has been hindered by the inability to mimic its habitat in the laboratory. The insects therefore had to be collected in inadequate numbers in the wild and taken back to laboratories, where they didn't live long enough for the kind of intensive, long-range research that would potentially yield solutions.

Five years ago, Cupp and graduate student Richard Brenner visited a scientist at the National Center for Disease Control in Atlanta, who had started using commercial equipment to breed black flies but discontinued the work because of the equipment's limitations. Examining the machine, called an Aqua-Lab, Cupp and Brenner decided that a workable system could be created.

To simulate the flies' habitat, Cupp and his assistants built six breeders that contain sloped channels, approximately seven by two feet, over which fast-flowing water is continually pumped. Plastic netting covers the channels, creating microcurrents and providing secure anchors for the larvae, much as they would find in streambeds. The larvae are filter-feeders, living off particles of plant matter in waterways, and food that closely simulates their diet is ground rabbit chow. A refrigerated tank next to the breeders pumps the chow through tubes into the channels.

When the larvae pupate and a few days later are ready to emerge as adults, a large black hood is lowered over the streams. A glass funnel at the top of the hood admits light and attracts the insects, which bump into each other and mate.

As with mosquitos, the adult females need a blood meal in which to deposit and nourish each batch of eggs. In the lab, animal and human blood are heated to human body temperature and are placed in dishes covered with a synthetic, skinlike membrane.

After the flies have finished feeding, they are placed in screened cages to develop their eggs, and then are transferred to a chamber with running water to lay them. The eggs are collected by hand and placed on the netting of the fast-running artificial streams, thus beginning a new cycle.

Each procedure involving adult flies has safeguards to prevent any from escaping; when they feed, for instance, they do so inside small tents.

In a triple-screened room inside the main lab, Cupp and his associates douse the flies with humidifed carbon dioxide to induce unconsciousness. Using an extremely fine syringe attached to a microscope—a device invented by former graduate student James Lok—the researchers inject 10 worms into the thorax of each fly. "We have practiced this technique to the point where we can now inject 60 to 70 flies per hour," Cupp says.

The worms are taken from skin biopsies collected from victims of river blindness. To obtain samples, Cupp and his team periodically go to Guatemala and Liberia where the disease is endemic and set up a computer-controlled freezing system that uses liquid nitrogen. The computer is programmed to freeze the skin samples at a precise fall of temperature to avoid killing the worms. Doctors and other medical personnel do the actual collecting of samples.

Back in Ithaca, the skin biopsies continue to be preserved in liquid nitrogen at a temperature of minus 272 degrees centigrade. When they are ready to be used, the samples are placed in a saline solution and are thawed to allow the worms to emerge.

Injected lab flies are kept in incubators and fed sugar water long enough for the worm larvae to develop, usually around 10 days. Then the flies are placed in liquid nitrogen, which kills them but preserves the worms indefinitely—for years if necessary.

With this huge collection of worms, Cupp's lab will be able to supply medical researchers all over the world with study material. In the near future, worms will be regularly shipped to the Armed Forces Institute of Pathology in Washington, D.C., where experiments are under way to find a suitable animal model for studying river blindness.

Cupp's research has been funded from the beginning by the U.S. Dept. of Agriculture, and more recently by the World Health Organization.

"We're very excited to be able to contribute to the cure of this disease," Cupp says. "When we started our research, I couldn't have dreamed we would be this far along in five years in our knowledge of the black fly."

(Continued from page 1)

nicotine; serum high-density lipoprotein, a measure of cholesterol status; dietary fiber; and several enzymes that reflect the functional significance of various nutrient intakes.

Stable food intake and migration patterns make the Chinese ideal subjects for a study of the relationship between cancer and dietary factors. In addition, Chinese scientists recently completed a nationwide cancer-mortality survey of 800 million people, almost 97 percent of the population.

"China is an ideal place to study the relationship of selenium and human cancer because in one geographical area, levels of selenium in the soil are known to be extraordinarily low," says T. Colin Campbell, professor of nutritional sciences at Cornell and director of the program.

"This is a research opportunity unlikely to exist anywhere else in the world," Campbell points out. "Using data from China and experimental laboratory projects to be undertaken at Cornell, we will have the opportunity to explore the effects of nutrients on carcinogenesis under controlled conditions.

"We hope to be able to determine the most important dietary risk factors, which ones are protective, and under what dietary conditions the protective factors operate."

Other Cornell investigators who will direct individual projects or consult with the research team include Robert S. Parker, assistant professor of nutritional sciences; Larry C. Clark, assistant professor of preventive veterinary medicine; Gerald F. Combs Jr., associate professor of animal nutrition; Walter T. Federer, Liberty Hyde Bailey professor of biological statistics; Daphne A. Roe, M.D., professor, and Bertha A. Lewis, associate professor, both in the Division of Nutritional Sciences, and Peter J. VanSoest, professor of animal nutrition.

Directing the Chinese component of the program is Junshi Chen, M.D., from the Chinese Academy of Medical Sciences. Dr. Chen spent eight months in the Division of Nutritional Sciences in 1980-81. Also working on the project are Richard Peto, a cancer researcher and epidemiologist at Oxford University, England, and Kenneth D. Fisher, director of the Life Sciences Research Office at the Federation of American Societies for Experimental Biology in Bethesda, Md.

—Susan S. Lang

Managing Private Forests: Protecting Investments and the Environment

Money does grow on trees, but with variable yields. For private landowners, knowledge of forest practices and market prices can spell the difference between a valuable asset and a tax burden.

"Few people know the worth of their trees or woodlots," says James P. Lassoie, associate professor in the natural resources department. With the increasing demand for firewood, he points out, people are often cutting trees prematurely, not realizing that in just a few years' time the trees would increase tremendously in value.

"It takes hardwood trees such as oaks at least 60 years to grow to a diameter of about 14 inches. However, under ideal growing conditions these trees may add an additional six inches to their diameters during the next 15–20 years, thereby increasing their saw timber values at least fivefold."

Lack of preparation also leaves owners vulnerable to sales pitches. "Often, timber buyers will go to the door of a landowner and offer a price that seems attractive but actually may be thousands of dollars below current market value. Or, there will be a financial crisis of some sort in the family, and the trees are sold in a hurry, without the kind of careful planning that such a transaction needs."

Assuming that the timber buyer is, in fact, offering a fair price, he and the landowner may nevertheless have very different ideas about what that price includes.

"If a stand of trees is at the top of a hill," Lassoie cites as an example, "it will take a lot less time for the logger to take his equipment straight up and down to drag the trees out. Based on that approach, he can offer the owner what sounds like a good deal—in the short run. However, the land probably will be depreciated, financially and environmentally, by erosion. In this case, the correct method, to have the skid trails contoured, is a more involved and costly job."

Letting woods take their natural course, instead of thinning trees to allow valuable hardwoods room to grow large and straight stems at fast rates, is a common mistake, Lassoie points out. The value of wood, particularly that used in furniture making, is dictated in part by how few knots a tree has; the more branches, the more knots, thus making it less usable.

Too much space around trees can produce so-called "wolf" trees, those that have put their energy into forming large crowns and many branches at the expense of their trunks. Solitary trees around houses would fit into this category, Lassoie says.

The goal is to have trees close enough to restrain unruly growth but not so close that there is excessive competition for sunlight and food. A fine, though unrealistic, model to keep in mind, Lassoie adds, is a huge black walnut tree that was sold in Ohio a few years ago. With a perfectly straight trunk and about 90 feet to the first branch, the tree commanded $30,000.

Because timber prices are complex, varying by grade, region, demand, site accessibility, and other factors, Lassoie advises landowners to hire professional foresters when considering a sale. In New York State, the Department of Environmental Conservation (DEC) can provide interested landowners with a list of foresters who have met professional criteria as consultants. For people who have small holdings of trees, 10 acres or less, the DEC will offer direct, free advice.

Private consulting foresters, who oversee the owner-logger transaction from start to finish, usually are paid through a set percentage of the final sale price. "I can say flatly," Lassoie states, "that the nonindustrial forest owner should always come out ahead by hiring a professional forester."

The forester will mark trees to be cut, select reputable loggers as bidders, negotiate the terms of the written contract such as route of access over creeks and who gets to keep slash for firewood, and supervise the work.

So that wildlife habitat isn't eliminated by overzealous thinning of low-value sawtimber trees, the forester also can guide the owner on which "valueless" trees to leave standing.

For information about forests and woodlots, New York State residents can obtain a free listing of publications available through Cooperative Extension by writing to Extension Secretary, Department of Natural Resources, Cornell University, Ithaca, N.Y. 14853. Those considering a sale in the near future might also want to consult *Stumpage Price Reports*, published in January and July by the DEC, which lists average prices per tree species for each region of the state, and *Marketing Bulletin*, published every two months by the SUNY College of Environmental Science and Forestry and the DEC.

Ethel Zoe Bailey Dies

Ethel Zoe Bailey, 93, botanist and editor, died July 15, 1983 in Tompkins Community Hospital following a brief illness.

She was the daughter of Liberty Hyde Bailey, the college's first dean and a famed botanist and educator, and Annette Smith Bailey.

For the first 10 years of her life, Ms. Bailey lived with her family on East Avenue, where their home was a classroom-at-large, students dropping by daily for tea and informal discussions with Dean Bailey. (Phillips Hall, which houses the School of Electrical Engineering, now stands where the Bailey home was.) She had known all of Cornell's presidents, meeting the first, Andrew Dickson White, when she was two.

Ms. Bailey was the first woman in Ithaca to receive a driver's license. The main problem with cars in those days, she once remarked to a friend, was that they frequently stalled. They had to be hand cranked to start again, and she would often find herself alone at a total halt on Ithaca's steep hills. Men would come to her rescue, but it was usually her own practiced efforts, she recalled proudly, that got the car moving again.

After graduating from Smith College in 1911, Ms. Bailey began working with her father at what is now the Bailey Hortorium. She was the editor of many of her father's books and articles and his field assistant on collecting expeditions to China, Japan, and some uncharted Latin American jungles.

One of their expeditions was to the wild jungle of Barro Colorado in the Panama Canal Zone. Disregarding warnings about disease and boa constrictors, she and her father, who was then 73, and several other botanists made their way through hip-deep water of the Mohinga Swamp in search of a rare palm.

They found it growing in the swamp, as Liberty Hyde Bailey had predicted, and photographed it in a downpour and with the camera tripod nearly submerged in water.

Ms. Bailey played a substantial role in the production of her father's publications *The Standard Cyclopedia of Horticulture* (1914–1917) and *The Manual of Cultivated Plants* (1924), was coauthor with him of *Hortus* (1930) and *Hortus Second* (1941), and served as editor of his *Genes Herbarium* through its first eight volumes.

In 1935, following the formal establishment of the L.H. Bailey Hortorium, she became its curator, serving until her retirement in 1957. It was only a technical retirement, however, because she continued to donate her services to the Hortorium several days a week, working on her monumental index to the world's cultivated plants until shortly before her death. She was self-sufficient to the end, driving herself to and from campus and maintaining the home on Sage Place where her family had lived since 1899.

Ms. Bailey's horticultural work won her the George Robert White Medal of the Massachusets Horticultural Society in 1967 and in 1970 the Smith College Medal.

She is survived by a niece, Annette Page of Ithaca, and a nephew, Samuel Sailor of Laramie, Wyo., both of whom she raised after their mother, Sara Mae Bailey Sailor, died in 1936. She is also survived by several great-nieces and great-nephews.

Ethel Zoe Bailey (front), in a family portrait taken around 1896, with Liberty Hyde Bailey, sister Sara Mae Bailey, and mother Annette Smith Bailey.

Ethel Zoe Bailey and Liberty Hyde Bailey sail on the Orinoco River in Venezuela during a 1921 collecting expedition.

Lawyer in Ag Economics Advises State Residents, Students on Legal Issues

To the uninitiated, the law can be intimidatingly obscure in its language and intent. The confusion, says lawyer and ag economics lecturer Dale Arrison Grossman, arises largely from the very precision of statements used, with qualifications nestled inside qualifications to cover all contingencies.

As part of her work, Grossman "translates" federal and state laws for New Yorkers, paying particular attention to estate planning for farm families.

Estate planning, deciding who will inherit what and how to protect as much as possible from being taxed, is "an unpleasant topic at best," she says. Kindling the desire to procrastinate indefinitely is the fact that wills can be complex.

Also, many people do not realize, Grossman points out, that a spouse is not automatically entitled to receive the bulk of the assets. In the absence of a will, "under New York State law, where there are no children, for instance, the surviving spouse receives the first $25,000. If the estate exceeds that, all the remaining assets are split 50/50 with the deceased spouse's parents."

The need for advice on estate planning increased in 1981, when federal legislation was passed that increased the amount of property that can be transferred free of estate tax. In 1983, that amount is $275,000. Starting in 1987, the first $600,000 (after deductions) can be transferred tax free. As part of the revised law, there is also an unlimited marital deduction, permitting unrestricted, tax-free transfer of property to the surviving spouse. As a result of these changes in the federal tax laws, it is important, particularly for married couples, to review their estate plans, Grossman says.

Because many legal aspects of farms are unique, workshops for lawyers interested in learning more about agricultural law were started by the college four years ago. Grossman is working with Joseph B. Bugliari, professor of agricultural economics, and other faculty at Cornell, in presenting lectures and seminars and in attempting to establish a network of lawyers knowledgeable in this field.

A farm-related legal problem that has been a difficult one for banks is that of administering a trust made up of farm assets. "For a typical family estate," Grossman explains, "assets can be handled in a straightforward way. It is mainly paperwork, contacting brokers, that sort of thing. But with a farm, what is a trust officer to do?

"In the long run, someone can probably be hired to manage the farm. In the short run, there are 200 cows that have to be milked—immediately—and the feed, veterinary services, bills, and all the rest have to be taken care of somehow.

"For that reason, many banks don't like to deal with farms held in trust. They usually just refuse to administer the trusts. And if local banks won't do it, you know Chase Manhattan won't touch it."

This issue is being studied and debated by Grossman, Bugliari, and the new Agricultural Law Committee of the state's bar association to develop mechanisms that would encourage and enable banks to become more involved as trustees.

Through extension publications, Grossman has counseled agents and

readers on issues such as social security taxes, access to personal credit records, contracts, labor laws, and how to choose a lawyer. In the last instance, she suggests that people be frank in discussing finances and professional expectations.

In evaluating fees, Grossman says, "with lawyers, you usually get what you pay for."

People should expect common courtesy from lawyers, she notes, and not be subjected to long waits in the lobby or missed appointments. In fact, some studies show that clients rate honesty and courtesy of the lawyer as being even more important than competence.

Once a lawyer is chosen, clients should be prepared to provide all the necessary information and to become working partners. "You hire a lawyer to do legal work for you. But you have to be willing to put time into it, too. You can't just dump a pile of papers on the lawyer's desk and leave. Be involved, for your own good. You'll get better service and more respect."

Grossman also teaches a communication arts course on media and the law to help prospective journalists avoid legal problems and understand First Amendment rights. "The message I try to convey is 'don't try to compromise what you're saying because of fear of litigation, but don't be too cavalier, either. Think *how* something is being said.'

"A complainant will sue sometimes even if the account is basically true, but if it's been said in a sensationalistic way or in a way ambiguous enough to allow a false meaning to be construed. More than anything else, journalists have to be fair."

Grossman is an adviser to practicing journalists as well, serving as president of the board of directors of *The Cornell Daily Sun*. She and the other university and community professionals take a decidedly backseat role in decision making, she says, and are there more as a sounding board for the student editors and managers.

"Despite the annual turnover on the paper's staff, it is a remarkably consistent and successful publication. It's really amazing to think that the *Sun* has been around for 104 years and that it has always been so independent of the university."

The writers and editors, she remarks, seem very aware of their responsibility to people they're covering and realize the importance of corroborating facts that are potentially damaging to reputations.

Her legal counsel for the paper has been called on seriously only once, Grossman says, and that was for a particularly sensitive article.

Universitywide, Grossman serves as a counselor to students contemplating a career in law. Recalling as a guide her own reaction to the first year of law school, Grossman advises students to work in a law office if possible for a summer or to take paralegal training for a year to see if they're cut out for it.

Although she grew up as the daughter of a public defender in Jamestown, N.Y., and was exposed to the law, she was nevertheless surprised by what she encountered as a student. "You have to learn to tolerate the fact that there are no clean, predictable answers. Some people can never get over that hurdle either in school or as practicing lawyers."

The image most people have of a lawyer's career is wrong, she points out. "There are few Perry Mason types of cases for an average lawyer. Many work for banks, large corporations, or legislatures" as behind-the-scenes counsel.

She says being a lawyer has taught her inductive reasoning that she finds useful in all areas of her life. "I stop to consider the different sides and interpretations of a situation before I take any precipitous action." It teaches you, Grossman says, to watch yourself in the process of thinking and to pause at each step for review.

Associate Directors and Assistant Director of Research Named

Brian F. Chabot and Robert J. Young have been named associate directors for research in the college and also will serve as associate directors of the Cornell University Agricultural Experiment Station. Mark K. Spiro has been appointed assistant director for research.

Chabot, chairman of the section of ecology and systematics in the Division of Biological Sciences for three years, will serve part time through December and then full time starting in January. He will work with faculty members in plant sciences, including agronomy, entomology, floriculture and ornamental horticulture, plant biology, plant pathology, plant breeding, pomology, vegetable crops, the Bailey Hortorium, the Cornell Plantations, and the Long Island Horticultural Research Laboratory. He also will give attention to multidisciplinary programs such as agroecosystems and integrated pest management.

Chabot earned a B.S. degree (1965) from the College of William and Mary and a Ph.D. (1971) from Duke University.

Young, recently named professor emeritus, served as chairman of the department of animal science for almost seven years and the department of poultry and avian sciences for more than 11 years. He will serve part time, concentrating in research on production agriculture and on the college's research facilities and services. Young will work with faculty members in animal science, agricultural engineering, microbiology, food science, physiology, and poultry and avian sciences. In addition, he will be involved in interdepartmental programs such as life safety and integrated reproductive management and projects with the New York State College of Veterinary Medicine at Cornell.

He received a B.S.A. (Honors) degree (1950) from the University of British Columbia and a Ph.D. degree (1953) from Cornell.

Mark Spiro will serve as the manager of financial and project records, providing administrative assistance to the directors, working with other financial managers at Cornell, and preparing ongoing reports.

Spiro earned B.A. (1972) and M.S. (1973) degrees from Ithaca College and a B.Sc. (1976) from Dalhousie University in Canada.

—David I. Stewart

Career Planning and Placement Programs Win State Awards

Three of the five awards presented this year by the State University of New York (SUNY) Career Development Organization went to two statutory colleges at Cornell.

Cited for excellence in programming by the statewide group were the colleges of Agriculture and Life Sciences and Human Ecology. The SUNY Career Development Organization includes two institutional groups—four-year colleges and two-year agricultural and technical colleges.

In the "placement" category, the College of Agriculture and Life Sciences won an excellence-in-programming award for its monthly "Job Opportunities" bulletin. The bulletin is free to graduating seniors and on a subscription basis to alumni.

Also in that category, the new on-campus recruitment program in the College of Human Ecology won an honorable mention. The 1982–83 program was the first full-year recruitment program in that college, involving 13 corporate and human-services recruiters.

In the "media presentations, advertising, and publications" category, Human Ecology's 1981 "Careers" brochure was honored. The brochure, targeted to prospective applicants and to recruiters, presents statistics on recent graduates.

The coordinator of the career development office at ALS is William N. Alberta, and the director of placement in the College of Human Ecology is Lynne M. Wiley.

—David I. Stewart

Extra

Alumni Update

Alum Develops Breakthrough Method for Treating Allergies

In a quest to solve a decade and a half of ill health, Robert W. Gardner (M.S. '60, Ph.D. '64) developed a breakthrough method of allergy testing and treatment.

An animal science professor at Brigham Young University, Gardner isolated a large array of allergenic substances, including 107 phenolic compounds—natural components and artificial additives—which color, flavor, and preserve foods, and immunized himself against his food allergies.

Since his 1979 discovery, hundreds of allergy sufferers across the country have obtained relief, in some cases dramatic, through the use of his treatment.

Gardner's own story is similar to that of many allergy victims, one of futilely going from doctor to doctor to find a correct diagnosis and help. For 15 years, he suffered from chronic nausea, headaches, diarrhea, and fatigue. When the symptoms initially appeared, he thought he had a stubborn case of the flu. But when the "flu" didn't improve, doctors told him his problems "must be due to nerves."

He later consulted a gastroenterologist who performed an exploratory operation but found only an inflamed intestine. Eventually a friend suggested he contact an allergist in Las Vegas, and the ensuing tests showed that his symptoms were the result of food allergies.

The doctor prescribed a rotation diet whereby certain classes of foods are avoided for periods of time to reduce the buildup of allergic reactions. This didn't help, and the next approach tried was the provocative-neutralization method of allergy testing and treatment, first discovered by a St. Joseph, Mo., allergist. With this method, certain dilutions of food extracts are placed under the tongue where they are quickly absorbed by the body and arrest reactions to the food just eaten. Gardner found only temporary relief with this method.

Frustrated, in 1979 Gardner decided to apply his scientific knowledge in attempting to find a cure. Knowing by then that he was allergic to phenols, widely present in foods, and salicylates, components of aspirin, some foods, and food preservatives, Gardner began researching allergenic properties of phenolic compounds in foods.

He says he found just what he was looking for in the book *Pharmacology of Plant Phenolics*, edited by J.W. Fairbairn, a plant scientist. "This was where I got the largest number of clues about which phenolic compounds I should try."

Among the phenolic compounds are vitamins, such as riboflavin. Included also is nicotine, found in foods such as tomatoes, as well as in tobacco. Another phenolic culprit, an aromatic called coumarin—which gives newly cut grass its sweet smell—is in dozens of foods, including sugar, chocolate, cinnamon, bananas, eggs, tuna, and chicken.

Gardner obtained pure chemical compounds of these substances and placed drops of the dilutions of each chemical, a dose at a time, under his tongue following meals. Although this approach was based on the existing provocative-neutralization method, it was radically different in that it did not use a broad substance such as corn syrup, for example, but isolated and tested for each component of the syrup to determine which chemicals were the offenders.

Not only was he able to provoke the allergy symptoms, he was able, by monitoring his own reactions, to achieve the correct neutralizing doses.

Six weeks after he began his experimental treatment, he recived a pleasant surprise. "I periodically challenged myself to see if I still had the right neutralizing dose. I worked with gallic acid [a phenolic extract found in nearly every food] one day, and nothing happened. I tried about three different doses and again nothing happened—no change in pulse, no symptoms, or anything."

He had expected the symptom-suppression effect of the compounds to be the limit of their usefulness. "I had no idea I would develop tolerance to these chemicals."

Since that time, Gardner has been able to immunize himself against all his food allergies. The result has been a disappearance of symptoms, an increase in weight from 128 to 150 pounds, and "an amazing improvement in vitality."

One reason the rotation diets traditionally used by allergists don't work consistently, Prof. Gardner explains, is that they are based on the premise that food allergies can be subdued by avoiding specific food families. He notes, however, that allergenic

(Continued on page 2, Extra)

Research Fellowship Started in Honor of Max Brunk

The Western New York Apple Growers Association and the New York State Cherry Growers Association have started a research fellowship in fruit marketing to honor Max E. Brunk, professor emeritus of agricultural economics.

Kenneth E. Pollard, president of the apple growers' association and vice-president of the cherry growers' association, said, "The fellowship is in recognition of Prof. Brunk's 35 years of service to the fruit industry. He carried out more than 100 research studies on marketing, and his work in developing the polethylene bag in the late 1940s made an enormous difference not only in retail sales of fruit, but in the sales of many other foods."

Brunk thought of the concept of a supple plastic bag and commissioned a manufacturer to make a model to his specifications. Shortly after a test trial in upstate New York, the bags appeared in stores thorughout the country and continue to be the primary type of package used for fruits.

Another of his achievements was devising controlled experiments in marketing, techniques which are now used extensively by producers, food manufacturers, and retailers in market-development and production research.

In 1982, Brunk was named apple man of the year by the International Apple Institute (IAI). During the ceremony, the editor of a trade magazine noted that one of the highlights of the IAI annual apple-marketing clinic is Brunk's analysis of the industry. "Perhaps his greatest accomplishment is the fact that he is an economist who is actually enjoyable to listen to," he added.

Recently, Brunk received the 1983 Golden Apple Award from the New York State Apple Growers Association. In addition, he has earned awards from the National Apple Institute, the Foundation for Floriculture, and the American Farm Bureau.

Before joining the Cornell faculty, Brunk was professor of agricultural economics at the University of Florida, where he received his undergraduate degree in 1937. While on the faculty there, he developed prototypes of vegetable-harvesting equipment and designed and supervised the construction of the first mechanical celery harvester.

Brunk earned his master's (1941) and doctoral (1947) degrees at Cornell.

Professor, Alumnus Receive USDA Awards

James E. Dewey, professor emeritus of entomology, received the 1983 USDA Superior Service Award for his educational leadership and pioneering efforts in the safe use of pesticides.

A member of the faculty since 1944, Dewey has been active in developing pesticide policies at the state and federal levels. Before his retirement last spring, he had been the program leader of Cornell's Chemicals-Pesticides Program for almost 20 years.

Darshan S. Padda (Ph.D. '68), director of Cooperative Extension at the College of the Virgin Islands, received the 1983 USDA Distinguished Service Award, the USDA's highest honor.

He was cited for his development and management of extension programs that serve as models for technology-transfer systems in the Virgin Islands, the Caribbean, and other developing countries.

Padda's graduate adviser at Cornell was Henry M. Munger, professor emeritus of vegetable crops.

News and Notes

There is at least one issue that students, faculty, and staff agree on—the pressing need for student financial aid. It is essential for attracting the most promising students, and for many, it makes a Cornell education possible.

Our college boasts a scholarship endowment fund of $200,000, and coupled with the 78 named scholarships, a financial-aid pool of more than $1.8 million. Last year, these resources were distributed to 500 students considered the most needy and deserving.

Do the students appreciate it? A recent letter from James A. Clark '84 to his donor says:

> I am the recipient of the Henry Roberts Memorial Scholarship. As a Chemung County 4-H and F.F.A. member and later a 4-H summer assistant, I treasure my friends and experiences there that helped me in pursuit of my career goal. I am now president of Cornell Collegiate F.F.A., chairman of the ALS Student Advisor Program, stockroom manager of the department of education's instructional materials service—all this while carrying a full course load here at Cornell.
>
> My major in the College of Agriculture and Life Sciences is agricultural education with the goal of teaching agriculture at the high school level. The cost of reaching my goal continues to rise with the price paid for education. Through scholarships such as the Henry Roberts Memorial Scholarship, my dreams can become realities.
>
> I appreciate your generosity and your interest in me and in all students of agriculture.

Do alumni and friends understand and appreciate the problem? An increasing number of gifts are earmarked for scholarships. In just the last three months, seven scholarships of $10,000 each have been established.

The cutback in available federal funds, along with recent trends in inflation, have compounded the need for private sources of financial aid. With all the resources combined, we may still be unable to meet the financial needs of many deserving students, but we've made progress.

There's a second point on which students, faculty, and staff agree—a big thank you is due those who remembered and made generous gifts to the college. Without your help, the opportunities offered here would be greatly reduced.

Five outstanding alumni—Jane Brody, Julian Carter, Barbara McClintock, Donald G. Robinson, and Erton W. Sipher—were recognized by the alumni association during Autumn Roundup.

Jane Brody '62 is the noted science and health columnist for *The New York Times* and the recipient of many writing awards. She is the author or coauthor of three books, including the best-selling *Jane Brody's Nutrition Book*. Recently, in appreciation of her Cornell education, she established the Jane Brody Scholarship at the college.

Julian M. Carter ('37, M.S. '54) was for many years a vocational agriculture teacher and consultant for vocational agriculture in New York and Vermont. He has been a tireless contributor to the college, serving as director, secretary, and president of the alumni association. Currently, he is the association's historian. He had an active role in the Ag Quad Beautification Project, and many of the trees are the result of his personal support and of his efforts in generating alumni support.

Barbara A. McClintock ('23, Ph. D. '27) is the internationally renowned genetics researcher who recently received the Nobel Prize in medicine. Other honors include the Lasker Award, the Louisa Gross Horwitz Prize, Israel's Wolf Prize, the Kimber Genetics Medal from the National Academy of Science, the National Medal of Science, and the MacArthur Award.

Donald G. Robinson ('41, M.S. '54) is a past president of the alumni association and is a retired vocational agriculture teacher. He is recognized for the large number of students he sent to Cornell who went on to pursue careers in farming. A participant in community organizations such as Cooperative Extension, the Wyoming County Fair Board, the Masons, and the Grange, Donald Robinson had a building on the Wyoming County fairgrounds named after him. Last year, his friends established the Donald G. Robinson Scholarship at ALS.

Erton W. Sipher '43 is the owner and operator of a 260-cow dairy farm in northern New York, in partnership with his son David '69. He has been a leader in the Eastern Artificial Insemination Co-op (currently president), the advisory board for the New York State Fair, Cooperative Extension, and the St. Lawrence National Bank. He has testified on farm issues before the New York State Assembly and the U.S. Senate. At Cornell, he has served on the Livestock Advisory Council, the ALS Advisory Council, the Agricultural Science Advisory Council, and the Review and Evaluation Committee for Cornell-Miner Institute.

Alumni association members will once again receive the *Cornell Countryman* starting this fall. In response to many requests, there will be a new feature in the Countryman highlighting news of alumni.

—*Glenn O. MacMillen*
Assistant to the Dean

(Continued from page 1, Extra)

substances are widely distributed in foods. For example, the allergenic substance malvin is responsible for the red color in watermelons, grapes, and tomatoes, all of which belong to different families of foods.

Why directly and repeatedly challenging the body with a substance it is allergic to elicits an immunity to the allergen is not fully understood. It is known that many allergy sufferers have abnormally low levels of "T" lymphocytes, a type of white blood cell that attacks invaders. The levels of these lymphocytes frequently rise—indicating enhanced immunity—in people receiving neutralizing doses of chemicals to which they are allergic.

Adding to the puzzle is the fact that this immune deficiency is selective and doesn't appear to result in a greater susceptibility to colds or other viral infections.

Improvements in allergy testing and treatment would benefit a large portion of the population. Approximately 35 million Americans have been diagnosed as having allergies, and there may be millions more whose diseases are allergy based but have been misdiagnosed.

Dr. Marshall Mandell, director of the New England Foundation for Allergic and Environmental Diseases in Norwalk, Conn., estimates that allergies may be responsible for half of the symptoms patients present to their doctors.

Mandell, who contributed several chapters to the medical textbook *Clinical Ecology* and is the author of several best-selling books about allergies, says that while nasal/bronchial or skin symptoms usually can be identified readily as allergy caused, such signs represent a fraction of the ways allergies can be expressed. He believes that allergies are overlooked factors in numerous minor chronic ailments such as headaches, and that they play a central role in multiple sclerosis and other autoimmune diseases.

Mandell regards Gardner's findings as "a tremendous breakthrough" because they permit detection and treatment of previously undiagnosable problems.

Approximately 50 doctors across the country are treating patients with Gardner's phenolic-compounds method, and 85 doctors and nurses attended a symposium at Brigham Young University last year to learn the treatment. As a result of the symposium, which will be an annual event, a group of doctors organized a foundation to raise funds for further research.

In recognition of his work, Prof. Gardner has been appointed an honorary member of the neuroallergy committee of the American College of Allergists.

Dr. Joseph J. McGovern, director of the Environmental Illness Research Foundation of California in Oakland, has applied Gardner's techniques the most extensively.

Presenting a paper to the 37th Annual Congress of the American College of Allergists in Washington, D.C., in April 1981, McGovern reported a high success rate in treating 100 patients with phenolic compounds. All of the patients, he noted, had severe allergies that had resisted traditional treatments. Of these, 40 had been able to hold jobs, but had to wear masks and required stringent environmental controls both at work and at home. Fifty-five patients were unable to work, and five were totally disabled, requiring isolation and oxygen.

After a year of treatment with Gardner's phenolic compounds, 18 of the patients reported 100 percent relief of their allergy symptoms. Of the rest, McGovern stated that 72 reported 80 to 95 percent relief; the smallest amount of relief was in one person who reported a 50 percent improvement.

In an interview, Dr. McGovern said that the most enthusiastic converts to Gardner's treatment are allergists whose own symptoms were helped after conventional therapies had failed.

"I have tested the system on hundreds of patients," McGovern said, "and the results have been remarkable. A big door has been opened because of Dr. Gardner's discoveries."

Three In
Tours for A

The ALS Alumni Association and the College of Human Ecology will cosponsor three international tours in 1984. Each will be three weeks long and focus on the culture and natural history of the countries visited. Travelers will also be able to meet with other Cornell alumni now living in these countries.

The first tour, to New Zealand and Australia in April, will include visits to three major Australian cities—Sydney, Canberra, amd Melbourne. Highlighting the trip will be a two-week tour of the North and South Islands of New Zealand.

In May, a tour group will visit some of China's most scenic areas, including Beijing (Peking), Hangzhou, Xian, Shanghai, Guilin, Suzhou, Nanjing, and Guangzhou (Canton). A feature of this trip will be a day-long cruise from

Lake Te Anau in New Zealand

Bondareff Scholarship Fund Started by Daniel N. ('35, Chem. Eng.) and Esther Schiff Bondareff '37, this general scholarship is to be awarded at the discretion of the college. Both of the Bondareffs are active in the Cornell Club of Washington; Esther Bondareff was president of the club in 1974–75 and president of the Federation of Cornell Clubs in 1972–73. Their son Richard ('63, Arts) is president of the Bondareff's chain of grocery stores, Bon Foods.

Jane Brody Scholarship Fund This scholarship was initiated by Jane Brody '62, science writer and health columnist for *The New York Times*. After graduating from Cornell, Brody attended the University of Wisconsin, where she received a master's degree in journalism in 1963. Brody, who has been with the *Times* since 1965, has received numerous writing awards, and is the

Join the

CALS Alumni

Association now!

There is no greater compliment

for an educational institution than to be rated number one in the nation by its peers. It's just one more reason for alumni of the College of Agriculture and Life Sciences to feel proud. You can express your pride, serve the college, and enjoy yourself by acting now and joining the CALS Alumni Association.

The primary purpose of the Association is to develop a broad range of programs to serve the college and its alumni. The following list provides an overview of the many dimensions of the association.

Our Benefits to Members

The Cornell Countryman

With your membership, you will receive a six-issue subscription to the award-winning *Countryman*, including an *Alumni Update* section in selected issues of the magazine. *Update* will keep you posted on the new activities and benefits that your Association provides.

Autumn Roundup

A day of September fun for alumni, sponsored by the Association. Besides the first home football game, parties, and programs of interest to all ag grads, Autumn Roundup will bring you in touch with the faculty, students, and recent college advances.

Discount Auto Rentals

A traveler's blessing! Your membership card is the key to large discounts from three national car rental firms. Displaying your card will result in substantial savings.

Discount Hotel Accommodations

The Blue Ribbon Plan gives you guaranteed corporate room rates from a worldwide hotel chain.

Annual Breakfast

Held in June during reunion, the breakfast brings old friends together to honor retiring faculty, and to hear recent news of the college and year-end reports on alumni events. This year's breakfast was the best ever, drawing a capacity crowd.

Quest International Adventures

Join other alumni and leave the beaten path, with a destination of East Africa, China, or the South Pacific. Quest International tours feature exotic lands, venturing beyond standard tourist attractions.

Outstanding Alumni Award

Many of our graduates have gone on to become leaders in their fields. The Outstanding Alumni Award recognizes the accomplishments of alumni and is presented annually at Roundup.

Alumni Locator Service

Lost touch with an old friend? As a member of the Association you can write our office, and we will send you the address you are seeking.

Services to the College

Lifetime Membership Fund

The membership fees from our 790 lifetime members are kept in a separate fund, and the interest from this is used annually to serve the college. Requests for these funds come from the faculty, students, and the dean. In its first year, the interest was used to form the new Agriculture and Life Sciences Freshman Scholarship.

Senior Barbecue

An annual May party, to bid farewell to the seniors and say hello to our newest alumni. The 1983 barbecue was a tremendous success, with more than 650 attending! Seniors are now offered a free two-year membership.

Recognition of Retiring Faculty

An annual tradition at the June breakfast, when the Association honors the educators who helped shape our lives during their distinguished Cornell careers.

Senior Service Awards

There always have been students who donate their extra time to make organizations work or events run smoother. Each year we honor the students who have put forth special efforts for the college or its organizations. These Senior Service Awards are presented each year at the Senior Barbecue.

Student Support

Support for Admissions Open House, Transfer Day, and Career Conversations Day increases opportunities for students as they enter the college and when they prepare to leave.

We want you to join us, and start enjoying our continually growing list of services and benefits.

Express your pride, join the CALS Alumni Association today.

New Dues

To improve our service to alumni and the college, the Alumni Association's board of directors reorganized the dues and membership structure.

Effective January 1, the lifetime membership fee will be $200. The regular membership dues will be $15 for a standard two-year period.

There no longer will be one-year memberships.

Please make your checks payable to: **CALS Alumni Association** and mail to:

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

If you are a lifetime member or a current annual member, you will receive a special mailing that includes your new membership card.

Membership Levels

- ☐ Lifetime $200 (after Jan. 1, 1984)
- ☐ Lifetime $70 per year, paid on 3-year plan after Jan. 1, 1984
- ☐ Lifetime $100 (until Jan. 1, 1984)
- ☐ Two-year $15

Mail-in Form for membership in the CALS Alumni Association

Name _____

Address _____

City _____

State/zip _____

Class year _____

Enclosed please find my check/money order in the amount of $ _____ in payment for:

- ☐ Lifetime membership at $200 (after Jan. 1)
- ☐ Lifetime membership at $70 per year paid on a 3-year plan (after Jan., 1, 1984)
- ☐ Lifetime membership at $100 (before Jan. 1)
- ☐ Two-year membership at $15

Express your pride . . . join us today

NEW YORK STATE COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Robert Butz '52, alumni association president, opens the program at the 1983 alumni breakfast and annual meeting.

Dean David L. Call '54 introduces award recipients, past and present, at the banquet for outstanding alumni.

Graduating seniors are guests of the Alumni Association at the annual barbecue held during senior week.

Jane Brody, health columnist for The New York Times, accepts an Outstanding Alumni Award.

The Hangovers, a part of the Cornell University Glee Club, entertain at the Outstanding Alumni Awards banquet.

Laing E. Kennedy '63, newly appointed director of athletics, speaks to alumni at Fall Roundup.

Kenneth E. Wing '38, associate dean, at the Outstanding Alumni Awards ceremonies.

Joe Pendergast '38, chairman of the College's Development Committee, reports at the alumni breakfast.

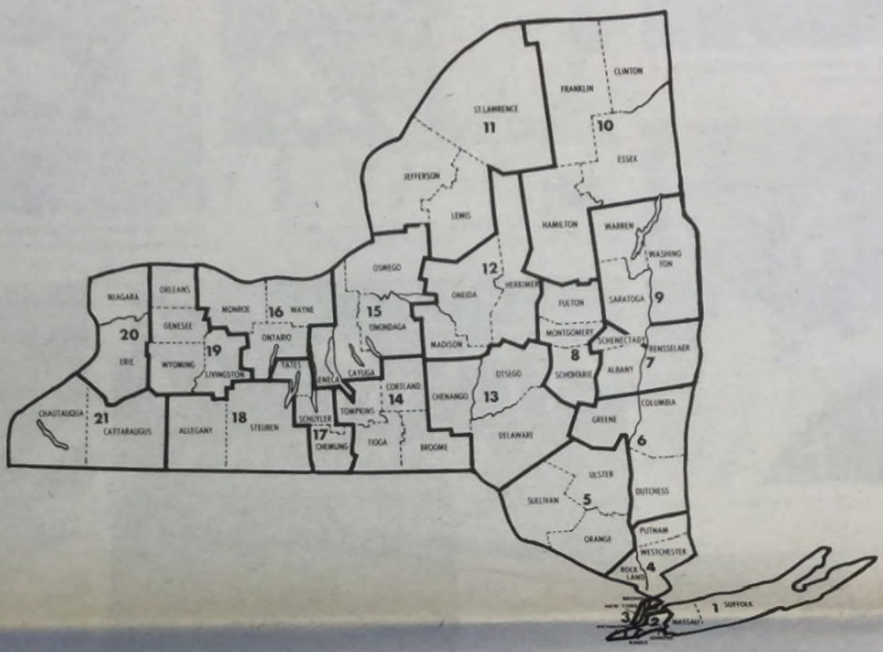
The Big Red Band performs at the Fall Roundup barbecue in Barton Hall.

Prof. Carl E. Lowe (left) receives a certificate of appreciation, presented to each retiring faculty member by Louis Matura '58 (right), former president of the Association. Gerald H. Hill, director of college alumni affairs, looks on.

Jerry Lissner '58 (left), Roundup chairman, and district director Henry Waldorff '55 pour wine at the postgame party.

Faculty and alumni enjoy conversation as well as breakfast.

CALS Alumni Association Districts
NEW YORK



CALS Alumni Association

Districts and Directors

1983-1984

District *Director*

1 Frank Wolff '53
45 Willoughby Path
East Northport, NY 11731
516/997-7813

2 Linda O'Dierno '67
441 Dunlin Plaza
Secaucus, NJ 07094
212/587-9722

3 William Meachem '48
383 Clawson Street
Staten Island, NY 10306
212/351-6395

4 George Briggs '45
Hollow House Farm
North Salem, NY 10560
914/277-4714

5 Robert Kaplan '69
Box 74, Glen Wild Road
Woodridge, NY 12789
914/434-4519

6 Philip Gellert '58
Pine Lane Poultry Farm
Hillsdale, NY 12529
518/325-3260

7 George Allen '73
R.D. #1
Schaghticoke, NY 12154
518/692-2736

8 Andrew Piscione '65
4067 Boshart Road, Box 230
Fonda, NY 12068
518/853-3986

9 Jane Adams Wait '43
658 North Broadway
Saratoga Springs, NY 12866
518/584-1406

10 Richard Winnett '73
67 N. Prospect Avenue
Plattsburgh, NY 12901
518/561-1073

11 Shirley Norton '52
R.D. #3, Box 266
Canton, NY 13617
315/386-3974

12 John McGurk '44
Stone Road
Clayville, NY 13322
315/839-5955

13 Albert Beard, Jr. '52
R.D. #1
Milford, NY 13807
607/547-8072

14 Judy Riehlman '80
R.D. #2
Homer, NY 13077
607/749-4292

15 Robert Bitz '52
7830 Plainville Road
Plainville, NY 13137
315/635-3410

16 John B. Adams '65
R.D. #1
Sodus, NY 14551
315/483-6637

17 Kermit Bossard '63
225 N. Chemung Drive
Breesport, NY 14816
607/739-0347

18 Theodore Markham '46
8076 Mitchellsville Rd., R.D. #2
Bath, NY 14810
607/776-3987

19 vacant

20 Jerry Linsner '58
42 Molnar Drive
W. Seneca, NY 14224
716/675-2763

21 Henry Walldorff '55
Temple Road
Dunkirk, NY 14048
716/366-0350

22 Jane Longley-Cook '69
100 Hoskins Road
Bloomfield, CT 06002
203/242-2927

23 Louis Matura '58
RR 5, Kemptfille
Ontario, Canada KOG 1JO
613/258-5750

24 vacant

25 John Cobey '66
524 Walnut Street
Cincinnati, OH 45202
513/421-4020

26 James Graves '52
Dept. of Ag Ec
Texas Tech. University
Lubbock, TX 79409
806/742-2812

Executive Director
Gerald H. Hill 'GR
242 Roberts Hall
Ithaca, NY 14853
607/256-7651

nternational Alumni Slated

Suzhou to Wuxi on the Grand Canal, where sampans and cement boats continue to be the homes for several generations of families.

During August, the focus will be on Kenya. Tour members will visit Nairobi and the major game reserves including Samburu, Masai Mara in the Northern Serengeti, Tsavo, and Amboseli, where there will be a stop to view Mt. Kilimanjaro.

For further information, contact Quest International, P.O. Box 245, Aurora, NY 13026 or call (315)364-7979 or (607)257-4644 collect. Quest International is owned and managed by Peggy A. Frazer, the former director of Human Ecology's International Program, which prepares students for study abroad.

Lifetime Membership Fund

Listed below is an addendum to the lists of lifetime members that appeared in the May 1982, November 1982, and May 1983 issues of *Agriculture and Life Sciences News*. The list includes members who joined between March 1 and August 15 of 1983.

William A. Abbott '73
Gerald H. Adams '73
Norman H. Agor '38
Andrew A. Amsler '76

Robert J. Bear '40
Kermit L. Bossard '63
William T. Bourke '43
Niles F. Brown '61

Aurora Calo 'GR
Lito L. Calo 'GR
Eleanor Ramp Campbell '57
Salvador L. Carlos '54
Joshua C. Chase '70
Marlin G. Cline 'FR
Fran Rosenberg Cogen '75
Gordon C. Colvin '69
Earl S. Crego '49

Glenn T. Dallas '58
Lucius A. Dickerson '39

Ted Eiben '41
Bert E. Everhart 'SP

William A. Fales '63
Sharon Flynn '57
Lawrence G. Franze '65
William F. Fuerst, Jr. '39

Joseph J. Galindo 'GR
George G. Gellert '60
Claire Gilbert '37
Philip C. Griffen '57
Roger W. Grove '61

Alfred C. Hamilton, Jr. '51
In Kyu Han 'GR
Timmy B. Hess '71
Olin E. Hotchkiss '49
John P. Hurd '81

William K. Jordan '45
Peter Jucha '82

Edward L. Kabelac '67
Linda Pearce Kabelac '69
Lafayette W. Knapp, Jr. '51
Alan J. Kopolow '71
Allen D. Kotvis '73
Uppoor Krishnamoorthy 'GR

Thomas P. McGlynn '80
George L. Merrill '74
Albert O. Meier '64
Larry F. Miller '57
Bruce B. Miner '35
Jon R. Mott '63
Richard H. Munson 'GR

Catherine Nelson '54
Christopher J. Nichols '81

Robert L. Pask '52
Lorette Picciano-Hanson '76
Raoul Pierre-Louis '75
Paul A. Pietropaolo '80
William J. Prokop '75

Richard E. Redmond '42
Cynthia Preston Rintoul '78
Judith Ritter '73
Bernard D. Roche '25
Maureen A. Rogers '81
Naomi D. Rothwell '39

Allan W. Saxby 'SP
Amy G. Schonhaut '73
A. Louis Shor '44
Margaret B. Silver '76
James A. Sleight '52
Fred W. Smith, Jr. '74
Robert D. Smith 'GR
Robert Q. Smith '42
Stanley W. Smith '20
Wilbur J. Sovocool '50
Florence Strauss '37

Paul E. Turner '40

William H. Wakefield '64
Harlan R. Wengert '49
Gregory J. Westfall '72
William R. C. White, Jr. '61
Paul B. Wigsten, Jr. '69
Kenneth E. Wing '58
Janice J. Wormington '72

Stanley W. Warren, professor emeritus of agricultural economics, was the first chairman of the lifetime membership committee. He is speaking at a former Roundup.

Seven New Scholarships Established

author or coauthor of three books on health. Preference in selecting scholarship recipients will go to students who are interested in health or biology and who plan to communicate scientific findings to the nonacademic world.

Thomas B. Bush Memorial Scholarship The fund was established by Walter M. and Elaine C. Bush in memory of their son, Thomas B. Bush '76. At the time of his death in 1981, he was an editor for a film company in California. He received his master's degree in cinematography in 1980 from the University of Southern California. The scholarship will be awarded to students with financial need, with preference given to students majoring in communication arts.

Lawrence B. Darrah Scholarship Fund A professor of agricultural economics from 1946 to 1974, Lawrence Darrah taught more than 5,000 undergraduates and supervised the thesis studies of approximately 50 graduate students. In 1955, he was named the professor of merit by the college's senior class. For excellence in teaching, he also received the American Economics Association's annual award in 1971. He is the author of approximately 200 articles and several textbooks, including *Food Marketing*, which remains an important agricultural marketing reference book. In addition to his lively lectures, Darrah was noted for his counseling ability and accessibility to students. He recently returned to Ithaca from the Philippines, where he had spent the last 10 years, two with the University of the Philippines at Los Banos and the remainder with the Ministry of Agriculture. The fund was initiated by Wendell G. Earle, professor emeritus of agricultural economics.

Henry and Ruth Herzog Graduate Research Fund The fund, started by Leslie J. Herzog '77 in honor of his parents, will provide assistance to graduate students in food science. Henry Herzog is the chief salesman for Polamer's Jams and Jellies in New Jersey, and Leslie Herzog is a food scientist for the Thomas J. Lipton Co. in Englewood, N.J. Leslie Herzog's contributions to the fellowship are being matched by the Lipton Co.

Roberta Petruzzi Memorial Scholarship Fund This was established by Guido and Guiliana Petruzzi and friends in memory of their daughter, Roberta Petruzzi, who was a communication arts major, died in a plane crash in Colombia, South America, in 1983 shortly after completing her freshman year. Having attended school in several countries while growing up, and fluent in four languages, Roberta Petruzzi planned a career in international public relations. The scholarship will be available to members of her sorority, Alpha Epsilon Phi, with second preference given to communication arts majors.

Alberta D. Shackelton Scholarship Fund Established by Horace Shackelton in honor of his late wife, Alberta, the scholarship will be available to students majoring in nutrition-related fields. Alberta Shackelton was a nutrition major ('20, M.S. '27) in the College of Home Economics at Cornell. She was the author of *Practical Nurse Nutrition Education* (1979) and *Fundamental Nutrition & Dietetics: A Workbook* (1941, 1943).

ALS Scholarship Funds

Listed below are scholarships available to ALS undergraduates. Students can obtain information and forms from the Office of Instruction, 192 Roberts. Those wishing to contribute to the scholarship funds may contact the Office of Development and Alumni Affairs, 242 Roberts, Cornell Univ., Ithaca, NY 14853, (607) 256-7651.

Scholarship	Principal Balance	Majors/Students Supported
Morton Adams Scholarship Fund	60,808.91	General
Robert M. Adams 4-H Memorial Schol.	1,310.42	4-H. General
College of Agriculture Schol. Fund	161,024.32	General
Raymond Albrectsen Mem. Schol. Fund	13,889.53	Animal science
American Greetings Corp. Schol.	30,110.48	Agricultural economics
George Arno Memorial Fund	9,426.88	Poultry science
Beatty Agricultural Schol.	6,214.52	Chenango County students
Arthur Boller Schol.	76,759.22	Fruit production/Marketing
Broome-Tioga Dairy Cattle ABC Schol. Fund	7,675.85	Dairy cattle
Robert V. Call, Sr. Schol. Fund	27,776.23	Genesee/Orleans Counties
Henry I. Christal Schol. Fund	10,200.00	General/Farm background
Walter R. Clarke Memorial Schol.	3,202.65	Hudson Valley students/Fruit production
Mr. and Mrs. J. Carlton Corwith Memorial Schol.	8,221.19	General
Cyril F. Crowe Schol. Fund	79,751.40	Agricultural economics
Leonard A. Dudley Schol.	34,481.47	Broome, adjoining counties
Wendell G. Earle Schol. Fund	30,826.64	Food distribution
Albert Flegenheimer Mem. Schol. Fund	6,026.00	Food science
Friends of Joe King Schol. Fund	69,038.38	Students in intercollegiate athletic programs
Imre Thomas Gellert Mem. Schol.	13,250.00	Taconic Hills/Columbia County students
General Foods Fund Schol. in Food Science	8,202.32	Food science
Anson W. and Dorothy Gibson Schol. Fund	11,204.00	Alpha Gamma fraternity members
Heatley Green Schol.	19,905.95	General
Hervey S. Hall Schol.	3,145.00	General/Forestry
Annie M. Hatch American Indian Schol.	10,513.32	American Indians
Glenn W. Hedlund Schol. Fund	10,178.14	General
Bertha Fleming Hess Memorial Fund	5,221.51	International agriculture
Frederick F. Horton Schol.	5,161.19	Floriculture
Alfred C. Hottes Amateur Gardening Schol.	8,934.58	Floriculture
Burton A. Jennings Memorial Endowment	3,799.51	Agricultural engineering
David Kennedy Johnston Schol.	51,967.53	Animal science
Pat King Memorial Schol. Fund	10,026.55	Animal science
Robert Krawczyk Mem. Schol. Fund	6,120.75	Agricultural economics/Food distribution
Lacy-Miller Schol. Fund	21,857.61	Animal science
Carl E. Ladd Memorial Schol. Fund	107,130.45	General
George Lamont Schol.	11,623.95	Orleans County students
John W. Layer Memorial Schol.	6,087.47	Agricultural engineering
Max and Ida Lelchook Memorial Schol.	7,500.00	Israeli student majoring in food science
Wilhelmine Lind Memorial Schol.	21,081.05	Floriculture
Marvin L. Lindner Schol. Fund	91,156.55	General
Robert N. Marshall Memorial Poultry Schol.	5,361.67	Poultry science
Frank W. Mason Agriculture Schol.	4,697.35	Orleans County students/Fruit production
Wessels S. and W. Stephen Middaugh Alpha Zeta Memorial Fund	11,424.66	Agricultural economics/Alpha Zeta
Henry and Marcelle Morgenthau Schol.	101,745.41	Junior or senior/General
Frank B. Morrison Memorial Schol.	17,458.16	Animal science
Robert R. and Betty T. Morrow Schol. Fund	10,000.00	Natural resources
H.B. Munger Memorial Endowment	17,734.70	General
New York State Grange Schol. Fund	5,405.47	Transfer students
Richard G. Price Schol. Fund	5,692.00	Animal science/Communication arts
Prof. A.M.S. and Mrs. Alice Read Pridham Schol.	7,000.00	Floriculture
Charles H. Roberts Schol.	33,972.49	General/Rural students
Henry W. Roberts Memorial Schol. Fund	7,957.46	Chemung, Westchester Counties students
Don Robinson Schol. Fund	5,328.00	Education, Vocational agriculture
James E. and Velva L. Rose Family Schol. Fund	9,413.00	Agricultural economics
Rural Development Schol. Fund	107,772.21	Rural students
C.W. Sadd Memorial Schol. Fund	14,201.58	Food industry management
E. Dwight Sanderson Memorial Schol.	19,350.00	Rural sociology
John A. Scribner Schol. Fund	72,895.76	General
Seneca-Wayne Eastern A.I. Coop. Schol.	5,132.04	Seneca, Wayne Counties students
E.R. Smith Memorial Schol. Fund	5,000.00	Students whose parents are members of the Eastern Milk Producers Coop. Assoc.
Favor R. Smith Schol. Fund	11,187.50	Dairy science/North Country
O.W. Smith Memorial Schol. Fund	6,603.75	For students with emergency needs
Prof. Robert M. Smock Schol. Fund	8,804.55	International students/Pomology
Leland Spencer Dairy Market Research Fund	10,994.87	Dairy marketing
Ward W. Stevens Schol.	15,913.48	Dairy science
Szadek and Bingham Schol. Fund	37,133.25	General
Homer C. and Clara Thompson Schol. Fund	64,545.00	Plant science/Farm background
George W. Trimberger Schol. Fund	6,470.00	Animal science
Ullman Schol. Fund	22,832.00	Forestry
George F. Warren Schol.	4,947.71	Agricultural economics
Alan J. Westheimer Memorial Award Fund	10,108.00	Study term in Israel
W. Robert C. White Schol. Fund	10,000.00	Genesee County students
John Zuelzer Memorial Schol. Fund	5,346.80	Plant breeding/Agronomy

Scientists Unravel a Tangled Web of Spiders' Secrets

This article first appeared in The Ithaca Journal *and is reprinted with permission.*

The intricate and irresistible webs spun by orb spiders have long seemed like woven wonders to humankind. Two Cornell researchers have helped show that they are woven warnings as well.

For years, biologists have pondered the function of the conspicuous white patches of fibers at the centers of spider webs, called stabilimenta. Professor of neurobiology and behavior Thomas Eisner and graduate student Stephen Nowicki believe they have solved the puzzle.

The stabilimenta are warning signs, they say, for the birds and mammals that might blunder into the web and destroy it.

The idea first occurred to Eisner after casual observation on Barro Colorado Island, Panama, and Islamorado Key, Florida. He noticed that birds about to collide with a spider web would seem to stop in midair—then fly around or above the web.

"What is most obvious to us," says Eisner, "is that the markings are obvious to us." While most insects would not be deterred from flying into the web, larger animals would be warned in time.

Another clue was that stabilimenta are produced by spiders of the two major families of orb weavers, Aranciidae and Uloboridae, but only by species that spin durable webs that last through the daytime. Spiders that spin in the evening and take their webs down at dawn do not add stabilimenta to the orbs, say the scientists. This suggests that the markings, apparent only in daytime, are deterrents to visually oriented animals such as birds, which might otherwise tear through the webs in flight.

Spiderweb studies are part of the insect research being done by graduate student Stephen Nowicki, left, and Prof. Thomas Eisner, both in the section of neurobiology and behavior.

The dazzling circular stabilimentum of a young Argiope aurantia, a common garden spider.

To test the theory, the biologists used 30 webs without stabilimenta as the control group and 30 comparable webs specially adorned by the scientists with artificial stabilimenta, made of paper strips.

After a period of time had elapsed, 60 percent of the webs with the markings survived collisions with birds, while only 8 percent of the unmarked control webs escaped accidental ravages by birds.

Eisner and Nowicki say a spider invests a great deal in its web—in time, spinning energy, and in the silk that the spider ingests when it takes its web down. "Putting the webs in the path of avian rockets is a real risk," they say. While the marked webs might occasionally ward off a would-be meal as well, the scientists postulate that the loss is less severe than total web destruction.

Unlike most research where the data can be interpreted in many ways, in the case of the spider web studies, "the results were clear-cut," says Eisner. And gathering the data involved only a minimum of discomfort—getting up at 2 a.m. and sitting secluded for two-hour shifts to observe the spider webs.

Their paper on the role of the stabilimenta appeared in the Jan. 14 issue of *Science*, and from there, it took off. "The amount of correspondence we got was amazing," exclaims Nowicki. Many magazines abstracted their article, including the Time/Life publication *Discover*.

"People are fascinated with spiders. I think it's a combination of fear, awe, and love," Eisner says. The interest in spiders is part of a wider interest in natural history, evident in Ithaca and around the country, he notes. Eisner cites the popularity of the television program NOVA, the packed-house audiences of last spring's Bailey Hall nature film series, and enthusiasm for a recent proposal to create a natural history garden somewhere near Ithaca.

As news of the scientists' research spread, they received correspondence from some remote places, and with some out-of-the-ordinary requests. A doctor in Sweden telephoned Eisner because a patient had been bitten by a poisonous spider. Such spiders are rare in Sweden, and the doctor said he didn't know what to do. Eisner just happened to have a friend in Arizona who is an authority on venomous animals. He put the two in touch.

Spider web research is only one small area of inquiry for the two scientists. Eisner's specialty is the chemical language of insects, including courtship and defense habits. Nowicki's specialty is bird vocalization—how birds physically produce sound and how they use signals to communicate with others in the flock. "I guess communication is the common thread throughout our research," Eisner and Nowicki say.

Often working in the Archbold Biological Station, in a disappearing habitat of Florida scrubland, Eisner and Nowicki have singled out many fascinating insects. Eisner describes a stinkbug that wards off spiders by spraying them with a chemical. When the spider moves off, the bug salivates and frees itself from the web that has entrapped him and escapes.

Moths, reports Eisner, tend not to stick to webs because of the detachable scales that cover their wings and body. They bounce off. After a warm night when moths abound, Eisner says you can see the scars left by them in webs.

There's another type of moth, that if caught in a web, will not flutter. It closes its wings and waits for the spider to free it. The moth is full of a toxin that it has acquired by feeding on a poisonous plant when it was a caterpillar. The spider is only too glad to release such an inedible captive.

And in still another project, a former associate of Eisner, David Hill, tried to determine how spiders do math. A spider can look at a far-off landing spot just once, figure the distance, angle, and trajectory, and make a perfect landing.

Nature is filled with unexplained phenomena and a few ironies, Eisner and Nowicki have discovered. For instance, they came upon a horsefly larva that lures a tadpole into its muddy home and devours it. When the larva matures into a horsefly, the tables may be turned as a toad enjoys the fly as a tasty meal.

"Discoveries like that," says Eisner, "are what drew us into biology in the first place. I love to find new things in areas where people say there's nothing left to discover. There's more to discover in inner space. People shouldn't train their eyes on outer space alone."

Eisner, who says he's been a Cornell faculty member long enough to be "part of the plumbing," has taught there for 25 years. When not in the lab, he's the man on the podium for twice-monthly rehearsals of the ad hoc orchestra called BRAHMS—the Biweekly Rehearsal of Honorary Musical Scientists. Eisner has also collaborated with the BBC to make a film about the research he does with his associates. The program is slated to be shown on PBS on November 13.

To appreciate nature to its fullest, the scientist recommends spending two hours a week looking around the backyard. "Notice what's different each week. It's a calendar full of unfolding events."

Eisner and Nowicki seek to convince Ithacans to donate small patches of land to the public domain. They call it the "Ithaca greenbelt." Even a small plot can be important, they say. "We'll all be grateful in the long run if civilization in our growing communities is interspersed with green patches."

—Lee Scott

Cook Is New Director of Cornell Plantations

Robert E. Cook, program director for population biology and physiological ecology at the National Science Foundation, has been named the Elizabeth Newman Wilds Director of the Cornell Plantations. Prof. John M. Kingsbury had served as director for the preceding two years, succeeding Richard M. Lewis, who retired after holding the position for 20 years.

A field biologist who taught at Harvard University from 1975 to 1982 and served as a visiting associate professor and senior research associate in Cornell's section of ecology and systematics from 1981 to 1982, Cook specializes in the ecology of wild plants.

Cornell Plantations is a 2,800-acre living museum of natural and horticultural resources for the Cornell community and the general public. In addition to developing and maintaining botanical gardens, specialized collections of woody plants, and the E.R. Newman Arboretum, the Plantations staff supervises 11 off-campus natural areas, offers courses in a year-round education program, and provides guided tours for visiting groups.

Cook received an A.B. degree from Harvard College in 1968 and a Ph.D. in biology from Yale University in 1973.

He was a Cabot Fellow at Harvard in 1974 and 1975 and was named assistant professor of biology at Harvard in 1975. He assumed the position of program director at the National Science Foundation in 1982.

He has recently focused his research on the variability of clonal and nonclonal populations of violets, and he maintains an interest in the history of 20th-century ecology.

—H. Roger Segelken

McIntosh Apples Can Stay Crunchy Longer

Prof. Frank Liu extracts ethylene gas from random samples of freshly harvested apples to see whether they are at the right stage of maturity for storage. The ethylene will be injected into the gas chromatograph machine at rear, which will give a reading indicating the amount of ethylene present.

There's good news for apple lovers who are disappointed when out-of-season McIntosh lose their crunch. Frank F. W. Liu, associate professor of pomology, has discovered how to keep "Macs" fresh and firm from September through May.

The research breakthrough is an invaluable contribution to the apple industry, which grosses almost $104 million for growers in New York State, the second-ranking apple state in the nation. McIntosh, an important variety throughout the Northeast, represents 26 percent of New York's apple crop.

"We can keep Macs crisp and firm with no change in sugar by harvesting them when they are mature but not yet ripe, and then storing them in a controlled atmosphere (CA) chamber where most of the ethylene—a gas that ripening apples release—is removed," Liu explains.

Apples kept in low-ethylene, long-term CA storage are slightly less acidic and have a little less aroma than freshly harvested, tree-ripened fruit.

Ethylene scrubbing materials would cost growers less than 25 cents a bushel, which would be insignificant in the price of apples, Liu says.

Year-round fresh apples have been available to consumers for many years, thanks to CA storage where apples are "put to sleep" in airtight rooms in which levels of oxygen and carbon dioxide are carefully controlled.

Liu began researching McIntosh breakdown in 1974. After a series of experiments, he found that harvesting the apples before they ripen and preventing ethylene accumulation in storage rooms are essential steps in maintaining freshness.

"Timing of the harvest is critical, because there is only a 10- day period when the apples can be harvested for optimal results," he says.

Liu's technique to prevent ethylene buildup involves purifying the air with potassium permanganate, a simple chemical that absorbs the gas. In most CA storage, the ethylene accumulation is 500 or more parts per million, but in low-ethylene storage, researchers keep the level to less than 1 ppm.

Liu's methods have kept the fruit firm successfully in the laboratory for up to eight months. Fourteen hundred bushels from University storage were first made available to local consumers last spring.

"This year, with the help of field specialists from Cornell Cooperative Extension, we are working with a group of growers who are adopting our methods," Liu notes. "Next spring, crisp McIntosh apples should be available to some consumers outside the Ithaca area."

—Susan S. Lang

Dairy Farm Management Program Begun This Fall

To give undergraduate students practical experience, the Dairy Farm Management Fellows' Program was started this fall by the animal science department.

Five progressive dairy farms are used as case studies, and faculty members from animal science, agricultural engineering, and veterinary medicine give lectures on site. After the visits, students present their analyses of the farms' efficiency to the owners and to professors in seminars.

Students meet with representatives of marketing cooperatives to become more familiar with the organizations' functions and with officials of the state's Department of Agriculture and Markets.

They also tour various research facilities for discussions with scientists about how specific research areas are chosen.

David M. Galton, assistant professor of animal science, is the program's director.

Chickens Lay as Many Eggs with Fewer Hours of Light

Chickens lay as many eggs with 10 hours of "daylight" daily as they do with the 16 to 17 hours of light they normally get.

Based on this finding by Cornell researchers, a lighting program is ready for adoption by poultry farmers to reduce energy costs, reports Ari van Tienhoven, one of it developers. Van Tienhoven is a professor of physiology.

When it comes to egg production, the chicken is an extraordinary bird. The modern hen lays an average of 250 to 270 eggs a year—a feat no other bird except certain breeds of ducks can rival.

Evolved over the centuries from a jungle fowl, chickens were not productive until several decades ago when scientists learned that the length of daylight played a critical role in egg production.

If left to nature's own devices, chickens would lay well in summer but poorly in winter. In commercial production, this problem has been solved by mimicking long summer days in winter through artificial illumination.

About 285 million birds are maintained annually for egg production in the United States. Most of these birds are housed in windowless structures that are lit for 14 to 17 hours a day. In contrast, the Cornell method calls for 8 hours of light, followed by 10 hours of dark, two hours of light, and four hours of dark in a 24-hour cycle.

"This lighting program can be set into motion at any time of the day to suit the farmer's daily work schedule," van Tienhoven says. "Obviously, it's an energy saver."

The lighting procedure was worked out in a series of experiments by van Tienhoven and Charles E. Ostrander, professor emeritus of poultry science, both in the department of poultry and avian sciences.

One major difference between the Cornell and conventional methods is that the poultry house must be lit for two hours in the middle of the night, breaking up the dark period.

Describing the system as "skeleton photoperiod," van Tienhoven says that interrupting the dark period at the right time triggers egg production.

Precisely how the light spurs the chicken to lay more eggs still remains a scientific puzzle. According to van Tienhoven, light somehow stimulates the hypothalamus, located at the base of the chicken's brain. The hypothalamus signals the pituitary gland to produce and release various hormones. These hormones, in turn, influence other organs such as the thyroid, adrenals, and ovaries, all of which affect egg production, egg size, feed efficiency, and growth, among other life processes.

Following the discovery in the 1970s that hens did just as well with 10 hours of illumination, the Cornell researchers tested their method under large-scale commercial conditions.

Results from a three-year study just completed at Cornell and a similar test conducted by Agway, Inc. at its research facility in Fabius, N.Y., showed that the 10-hour program is practical for commercial use.

Based on these results, Danis L. Cunningham, assistant professor of poultry science, says that the Cornell method is now ready for use by poultry operators throughout the United States.

If all commercial egg operations in the country switched to the 10-hour system, energy savings could amount to more than 106 million kilowatt-hours of electricity annually. In New York State, the savings could be about 2.8 million kilowatt-hours.

"This isn't a huge savings in terms of the national total energy use, but it's a help to farmers trying to make ends meet in these times of sluggish economy," Cunningham says.

—Yong H. Kim

Electronic Devices Identify Cows, Monitor Milk Yields

Knowing exactly how much milk each cow is producing daily is the key to better management on dairy farms, but such monitoring—especially in large herds—has been virtually impossible. Now researchers have developed electronic devices that can accomplish this with relative ease and economy.

Tested successfully since the fall of 1982, the "pulsed transponder" and "weight transducer" are ready for commercialization.

They were developed by a team of researchers led by Prof. Norman R. Scott, chairman of the department of agricultural engineering. Nick A. Sigrimis, a graduate student, was instrumental in the design of the transponder.

By precisely monitoring milk yields, a farmer can remove low-producing animals from herds or feed less expensive grain to them, Scott points out. In addition, if a cow's milk production suddenly declines, the farmer would be alerted early to a potential health problem.

The cow-identification device, the transponder, is an electronic "dog tag" that is attached to the cow's neck chain. Weighing only a few ounces, it is programmed with the animal's identification code.

"It works well for both small and large operations," Scott says. "Up to 5,000 cows can be identified with the current experimental transponder."

As cows move single file into the milking parlor, the gadget is activated and sends signals to a nearby receiver, which in turn relays the cow-identification numbers to a microcomputer.

The transducer, which measures milk output, also is linked to the computer; the records are then made available on a printout.

"There is no need for the farmer to interact with this system," Scott notes. "Everything is done automatically."

All the necessary electronic components needed for the transponder cost less than $5 per cow and therefore should be affordable to most farmers, Scott says.

—Yong H. Kim

Warning 'Signals' May Replace Expiration Dates on Food

Supermarket shelves soon may bear thousands of color-coded signals, similar to tiny traffic lights, if the food industry adopts a new method for communicating freshness.

Two Cornell researchers have tested commercially produced time–temperature monitors that change color as perishable products age or are exposed to unsatisfactory temperatures. These chameleonlike monitors may replace "sell-by" dates stamped on packages.

Test results with milk are promising, and food scientists say such indicators are practical for dairy products and have potential for meat, fish, frozen foods, pharmaceuticals, chemicals, film, and even human blood.

Developed about a decade ago by commercial firms for other purposes, these Band-Aid sized indicators contain an enzyme and a chemical substrate separated by a thin seal. When a product is packaged, the seal is automatically broken, activating the enzyme. As the combined effects of time and temperature accumulate, a reaction, preset for specific environmental conditions, leads to a pH-induced color change.

The monitor begins at green, indicating freshness; changes to yellow, signaling that conditions are favorable for spoilage; and changes to red, indicating spoilage. Food science professor Frank V. Kosikowski and graduate student Vikram Mistry tested indicators for pasteurized milk because it deteriorates easily when not stored properly. Its life-span at different temperatures and the sensitivity of the monitors to those temperatures were determined.

They found that pasteurized milk remained acceptable for 10 days at 40°F (4.4°C) and four days if stored at 50°F (10°C). The quality monitors accurately illustrated the milk's deterioration.

"Although milk is of very high quality when it leaves the farm, consumers have no assurance of proper handling before it reaches their home," Kosikowski says. "Milk sometimes may be kept in a warm truck, or perhaps is not cooled adequately in a supermarket, or is left too long on a kitchen table."

Although the time-temperature monitors that would be used on milk now cost up to 15 cents each, manufacturers are trying to reduce the cost to about a penny.

These indicators could be substantial money savers, Kosikowski points out. "If retailers, for example, noticed the indicator window turning yellow, they could return the milk to the supplier, who would ascertain its quality and, if acceptable, use it in other products that receive a higher heat treatment than pasteurized fluid milk."

—Susan S. Lang

Students Carry Out Sophisticated Genetics Research at Lab

Cornell's Laboratory for Ecological and Evolutionary Genetics (CLEEG), started in 1981, provides undergraduate and graduate students with instruction and specialized equipment necessary for carrying out electrophoretic research.

Electrophoresis—a process whereby proteins are separated in an electric field—has become an important tool in biological research during the past decade.

By looking at protein differences in and among individual animals and plants, fundamental genetic differences can be identified. The technique is useful in answering such questions as what the evolutionary relationships are among particular groups of organisms, the amounts of inbreeding in endangered species, and whether disease-resistant genes of certain crops can be marked and then incorporated into commercially important varieties.

In one project, the genetics of the gray tree frog *(Hyla versicolor)* is being studied by Ellen Marsden, a graduate student in the section of ecology and systematics. This frog is distinctive in having become isolated from its parent species through an evolutionary event known as polyploidy, in which the normal number of chromosomes is doubled. All individuals in the species therefore have a duplicate set of genetic material. In this state, nonlethal mutations can occur, leading to rapid evolutionary change.

Polyploidy occurs frequently in plants but is rare among animals, occurring only in amphibians and fish. The gray tree frog is a particularly good subject for studying this process because it underwent polyploidization "recently"—half a million years ago—and therefore exhibits the early and more identifiable stages of evolutionary change.

Marsden is exploring the extent to which the frogs have undergone genetic, physiological, and behavioral changes since the polyploid event, by comparing the frogs with their parent species, *Hyla chrysoscelis*.

A broader issue that interests her is why this genetic event doesn't happen more often, and especially why it never occurs in higher animals. One hypothesis is that polyploidy is limited to fish and amphibians because their eggs are laid externally and, as a result, are vulnerable to sudden extremes of temperature, as can happen in shallow waters. Such changes could cause mutations; in fact, laboratory simulations of rapid temperature changes have induced genetic alterations, such as polyploidy, in fish and amphibian eggs.

Some other organisms on which electrophoretic research is currently being conducted by students at CLEEG include birds, catfish, blackflies, honeybees, spiders, squash, and butterflies.

A free pamphlet describing graduate student projects at CLEEG is available by writing to Bernard P. May, Section of Ecology and Systematics, Cornell University, Ithaca, NY 14853.

(Continued from page 1)

ance by parasites of the body's immune defenses, and in a range of evolutionary processes.

Despite the fact that the full meaning of her discovery took a long time to become appreciated, McClintock "has been a leader in genetics all her life," notes Prof. William D. Pardee, chairman of the plant breeding and biometry department at Cornell. Pardee helped organize a symposium on corn genetics in the summer of 1982, at which McClintock gave the keynote address on the potential of plant genetics.

McClintock was chosen as an Andrew D. White Professor-at-Large in 1965, when the practice of the six-year appointments of nonresident professors was revived. Asked to serve longer, she visited the campus annually for nine years to lecture and serve as a consultant.

She is the third Cornell graduate to win a Nobel in the last five years. The others are 1954 graduates Sheldon Slashow and Steven Weinberg, who shared the physics prize in 1979.

In addition, Cornell professors Kenneth G. Wilson received a Nobel for physics in 1982 and Roald Hoffmann for chemistry in 1981.

David L. Call, dean of the College of Agriculture and Life Sciences, said, "We at the college, and the entire Cornell community, are tremendously proud of Dr. McClintock. She is one of this century's foremost geneticists, and her pioneering work is certain to have broad applications for years to come."

Barbara McClintock was born June 16, 1902 in Hartford, Conn., and grew up in Brooklyn, where she attended Erasmus Hall High School. As an undergraduate at Cornell, she majored in botany and then for her doctoral work concentrated in plant genetics.

She carried out her graduate studies with Rollins A. Emerson, a professor of plant breeding for whom Emerson Hall is named. Three of his other students, Charles R. Burnham, George W. Beadle—also a Nobel Prize winner—and Marcus M. Rhoades, would also go on to become famous geneticists.

Although she taught and did research at various institutions, including Cornell, McClintock was considered too much of a maverick for academic life. When she found herself out of a job in 1941, she received encouragement from her former fellow student Marcus Rhoades, who was then at Columbia University. He helped her win a research position at the Carnegie Institution's department of genetics, located at Cold Spring Harbor. The laboratory has since become an autonomous institution involved in basic biological research.

McClintock continues her work at the lab seven days a week, arriving early in the morning and staying often until 8:30 p.m. and lives in an apartment on the grounds.

After she heard she had received the Nobel Prize, McClintock, donned in dungarees, went out to gather walnuts along a wooded path near her home.

When she returned, she issued a statement that said, "The prize is such an extraordinary honor. It might seem unfair, however, to reward a person for having so much pleasure over the years, asking the maize plant to solve specific problems and then watching its responses."

During a news conference later that day, she was asked what advice she had for young people starting out in science. McClintock replied that she thought it was "a very difficult time" for young scientists, because modern approaches do not sufficiently emphasize knowing a plant or animal exhaustively. The implication is that clues, not to mention intellectual excitement, might be missed as a result. "We need now to have a lot of naturalists, people who know organisms. Because organisms can do fantastic things."

In alluding to the increasing abstraction in biological research, McClintock was contrasting it to her own experience. She personally carried out every step of her research, starting with the planting of the corn in plots to painstakingly studying individual kernels to trace their genetic pathways. Describing to unauthorized biographer Evelyn Fox Keller how such total immersion in an organism feels, McClintock referred to the "real affection" one gets for the pieces that "go together." She added, "As you look at these things, they become part of you."

The momentum of public acclaim has brought McClintock many honors, including the Lasker Award—the most prestigious American prize for medical research—the Lewis S. Rosenstiel Award, and the Wolf Prize in medicine. In 1981, she was chosen by the MacArthur Foundation to be its first Prize Fellow Laureate, which provides her a tax-free annual income of $60,000 for life.

Confessing once that she finds "applause crushing," McClintock resists the attentions of fame. Television cameras peering into her lab in the hail of publicity surrounding the prize did not come away with much footage. An unruffled but determined McClintock pulled down the blinds so that she could get back to work.

Research Looks at How Bacteria Adapt to New Environments

Without bacteria, the earth would be buried in a sea of undecomposed wastes. In their 3.5 billion-year existence, these simple, one-celled organisms have had to adapt to continually changing environments to carry out their tasks.

Little is known about how they mutate in order to gain the metabolic pathways that allow them to use new substrates, or growth substances. Robert P. Mortlock, chairman of the microbiology department, is one of approximately 10 people in the world studying this issue.

Because of the rapid reproduction of bacteria and their potentially large numbers—10 billion per milliliter, roughly one-quarter teaspoon—under laboratory conditions, numerous mutations can be observed by researchers.

To induce mutations, the organisms are placed in a novel substance and then are "challenged" to use it. The mutant bacteria, those that have been able to alter their genes and enzyme activities successfully to thrive on the new fare, are then studied to see how they differ from the original strain.

If the mechanisms of these mutations could be understood and predicted, it might be possible to produce bacteria that could degrade toxic wastes, for example, or to modify those that have become antibiotic resistant.

The research is funded by the National Institute of Allergy and Infectious Diseases.

Goodrich Receives 1983 "Professor of Merit Award"

Dana C. Goodrich, professor of marketing in the department of agricultural economics, received the 1983 "Professor of Merit Award."

The award is presented annually by Ho-Nun-De-Kah, the agricultural honorary society, on behalf of the senior class.

A member of the Cornell faculty since 1958, Goodrich teaches introductory marketing and marketing management courses and is responsible for marketing research in horticulture and fish.

He received a B.S. degree (1954) from Rutgers University and M.S. (1956) and Ph.D. (1958) degrees from Cornell.

Gardening with Herbs

Valued since ancient times for their culinary, medicinal, and ornamental uses, herbs have enjoyed a revival with the upsurge of interest in natural foods and remedies.

The publication *Gardening with Herbs* presents basic cultural and drying information on 63 of the most popular herbs. Many varieties, such as lemon verbena, rosemary, and parsley, can be grown successfully as pot plants.

Accompanied by photographs, the descriptions of the herbs include their reported uses as remedies for common ailments, such as angelica tea for colds and indigestion, marjoram as a liniment, and summer savory to relieve bee stings.

National sources of seeds and plants, references for further reading, and a glossary of terms used are included.

Gardening with Herbs was written by Harriet B. Flannery, a former graduate research associate, and Richard G. Mower, a professor of floriculture and ornamental horticulture.

Copies are available for $1.25 from the Cornell Distribution Center, 7-H Research Park, Ithaca, NY 14850, and at many county extension offices.

Moth Lures its Mate with 'Queen of Aromas'

Methyl jasmonate, the "queen of aromas," is important not only in perfumes, but as a sex attractant to insects.

Scientists at Cornell's New York State Agricultural Experiment Station have for the past four years been researching the alluring scent produced by the male Oriental fruit moth at mating time. This moth is a damaging insect to fruits, particularly apples.

Working on the project were Wendell L. Roelofs, professor of biochemistry in the department of entomology, and Terry E. Acree, professor of biochemistry in the department of food science and technology, both at the experiment station at Geneva, and Ritsuo Nishida of Kyoto University in Japan.

Originally, they wanted to learn more about the method used by the fruit moth to lure its mate. Many female insects attract males by emitting an odorous substance from the tip of their abdomens, which is also true of the female Oriental fruit moth. But the male fruit moth departs from traditional courtship behavior by producing sex attractants of its own.

After being attracted to the female, the male stops near his potential mate, turns his back on her, vibrates his wings vigorously, and rhythmically everts and retracts a special pair of organs at the tip of his abdomen called "hairpencils" or "scent brushes." These hairpencils emit an aromatic compound that the female finds irresistible.

The male attractant includes the compounds methyl jasmonate—found also in jasmine and pumpkin seeds—and methyl epijasmonate.

Lemons, the scientists discovered, have the same scent as the moth hairpencils and also contain methyl epijasmonate.

After preparing all isomers (substances with the same molecular formula) of these two methyl compounds, the researchers showed that all odor activity is found in only one isomer of methyl epijasmonate—the same odor-active component in lemons. This isomer has 10,000 times the aroma of the other three. Methyl jasmonate is essentially odorless except for the 3 percent impurity of the fragrant epijasmonate.

The findings help entomologists understand the chemical communication of insects and will provide shortcuts to the perfume industry in producing a more potent version of the intoxicating aroma.

—*Roscoe E. Krauss*

Timing of Meals and Exercise Important in Weight Loss

The adage, "Eat breakfast like a king, lunch like a prince, and dinner like a pauper" has been given credence by a Cornell nutrition study.

Concentrating meals during the most active times of the day enables calories to be spent at a higher rate than during the lethargic evening hours, found David A. Levitsky, professor of nutrition and psychology, and graduate student Eva Obarzanek.

Nutritionists and frustrated dieters have long observed how some people are able to stuff themselves without becoming overweight. More than eight decades ago, researchers proposed the still controversial idea that overeating may in some cases trigger a speedup in metabolism. The Cornell study confirms this, and supplies the missing information that it is when overeating is combined with exercise soon afterwards that calorie burnoff is accelerated.

For the study, Levitsky and Obarzanek used lean college students as volunteers. The major variation in the experiment took place in the 24 hours preceding the testing. One time the students fasted, another time they ate three normal meals, and in the final round they gorged.

Energy consumption—indicated by the rate of thermogenesis or production of heat—was measured in the students while they walked on a treadmill 45 minutes after eating a typical 750-calorie meal, at rest following a meal, and during exercise on an empty stomach. The volunteers exercised moderately during the treadmill test, walking for 20 minutes at three miles per hour.

Calorie burnoff increased about 10 to 15 percent during exercise that was performed after eating a meal. This occurred whether the subjects had eaten normally the day before or fasted.

When the students had substantially overeaten the day before, however, the number of calories burned off during exercise nearly doubled.

"This accounts for how the body rids itself of some calories consumed when you overeat," Levitsky notes. "And it underscores how important exercise is to any weight-loss diet. Without exercise, these calories don't have any way to burn up."

He adds, "Dieting alone won't work."

Levitsky and Obarzanek next plan to investigate specifically how the body alters its metabolic rate to purge itself of excess calories. They will be running the eating and exercise tests on obese subjects to see if the same patterns of energy expenditure found in the lean students hold true.

John Seeley Receives Edgerton Teaching Award

John G. Seeley, professor emeritus of floricultural science, received the 1983 Edgerton Career Teaching Award, presented at the alumni reunion breakfast. Recipients of the award are chosen by faculty members and students.

Known internationally, Seeley, who retired in May, is currently serving as president of the American Society for Horticultural Science. Over the years, he has garnered numerous prestigious awards for his contributions to the advancement of horticultural science and the industry.

Seeley served as a faculty member at Cornell from 1941 to 1948 and at The Pennsylvania State University from 1949 to 1956, after which he returned to Cornell as head of the department of floriculture and ornamental horticulture.

A native of North Bergen, N.J., Seeley received B.S. (1937) and M.S. (1940) degrees from Rutgers University and a Ph.D. (1948) from Cornell.

Detection of Viroids in Potatoes Made Easier and Faster

Using techniques of molecular biology, Cornell scientists have improved the procedure for detection of viroids, the smallest known agents of infectious disease in plants.

Viroids affect a variety of crops, including potatoes, cucumbers, hops, avocados, and citrus fruits. They also are capable of killing huge coconut palm trees. No cure has yet been found.

Much more sensitive than existing screening methods, the Cornell procedure will be invaluable to the nation's potato industry in the drive to eliminate viroid-infected breeding and seed stocks. The viroid is the cause of the potato spindle tuber disease, so named because infected plants often produce small, cracked tubers shaped like spindles.

The Cornell procedure is a modified and improved version of a technique adapted earlier by USDA scientists. It was developed by Milton Zaitlin, a virologist and professor of plant pathology, and Peter Palukaitis, a research associate in plant pathology.

Already in use at Cornell for viroid detection in potatoes used for breeding and foundation-seed production, the method will be employed to screen samples from 10,000 lots of "true" potato seed produced by the U. S. Department of Agriculture for breeding purposes. The USDA will fund the program.

Explaining the Cornell procedure, Zaitlin says that the method is an adaptation of the technique called "dot-blot" hybridization.

One of the key steps required in this procedure is making complementary copies of viroids using an enzyme isolated from certain animal viruses. These copies are labeled with radioactive phosphorous for use as a probe to pinpoint the viroid in a sample that is bound on a special type of membrane paper. Test samples can be taken from suspected tubers, leaves, or seeds.

If the samples contain viroids, the probe will bind to them and this reaction shows up as a dark spot on an x-ray film, Zaitlin notes.

"With our method, it takes only three to five days to determine whether a sample has the potato spindle tuber viroid," he explains. "The test is as much as 1,000 times more sensitive than some other methods in use." Once identified, the infected specimens are removed from the seed pool.

Based on results obtained thus far, the researchers feel confident that their method can be used to detect viroids affecting other food and ornamental crops.

—Yong H. Kim

Three Animal Scientists Win National Awards

John K. Loosli, a retired professor of animal science, is the recipient of the 1983 Award of Honor, the highest award of the American Dairy Science Association.

Loosli, who served for one term as president of the association, retired in 1974 after 36 years with the department of animal science. Since his retirement, he has been associated with the University of Florida.

Known internationally for his expertise as an animal nutritionist, Loosli previously won several national honors, including the American Feed Manufacturers's Association Award (1950), the Borden Award in Dairy Production (1951), and the Morrison Award (1958).

Peter J. Van Soest received the 1983 American Feed Manufacturers' Association Award from the American Society of Animal Science for his research accomplishments in the field of animal nutrition.

A faculty member at Cornell since 1968, Van Soest has an international reputation for pioneering work that led to new procedures for determining the nutritional value of feedstuffs.

He won a similar award in 1967 from the American Dairy Science Association; in 1968, with another scientist, he shared the Hoblitzelle National Award, one of the most prestigious awards of agriculture.

L. Dale Van Vleck was honored with the 1983 J.L. Lush Award from the American Dairy Science Association for his research contributions in animal breeding and genetics. The award is sponsored by the American Breeders' Service.

Van Vleck, a faculty member at Cornell since 1962, is known nationally for his expertise in animal genetics and its application in evaluating dairy cattle. His work has led to many changes in dairy cattle selection methods.

Previously, his research accomplishments were recognized by two prestigious national honors—the 1972 Animal Breeding and Genetics Award from the American Society of Animal Science and the 1974 National Association of Animal Breeders Research Award.

Two Receive Senior Service Award

Sue E. Merrill of Silver Springs, and Cynthia J. Peck of Schuylerville, received the Outstanding Senior Service Award of the ALS Alumni Association. The award, presented each year at the Senior Barbecue, is determined by a committee of students, faculty, and alumni.

Merrill, an agricultural education major at Cornell, was active in the student organization AgPAC, the college's admissions committee, the alumni association, and the collegiate branch of Future Farmers of America. She also tutored high school students in math and English through CIVITAS at Cornell, was vice-president of the Triphammer Women's Cooperative, and helped screen applicants in the transfer center at Cornell. A dean's list student while at Cornell, Merrill was a transfer student from the State University of New York (SUNY) Agricultural and Technical College at Alfred.

Peck, an animal science major, transferred from the SUNY Agricultural and Technical College at Cobleskill. At Cornell, she was active in the dairy science club and helped plan the first Cornell Classic livestock sale. She chaired the transfer committee of Ag Ambassadors, a student organization assisting the college's admissions office. Peck also initiated a dairy club in Tompkins County, tutored a learning-disabled student at Dryden High School, and was a member of Alpha Zeta.

—David I. Stewart

Susan Merrill (left) and Cynthia Peck receive senior service awards from George J. Conneman, director of instruction at the college and professor of agricultural economics.

Kenneth Turk Honored with Distinguished Award

Kenneth L. Turk, the first director of International Agriculture Programs at Cornell, has been honored by the Association of U.S. University Directors of International Agricultural Programs (AUSUDIAP) with its first award for distinguished service.

A founder and former president of AUSUDIAP in the mid 1960s, Turk continues to be active in the organization which encourages development of scientific and educational programs directed at modernization of world agriculture. Membership provides liaison on international agricultural education, research, and public service among U.S. colleges of agriculture and government agencies, Congress, private industry groups, foundations, and international agencies.

Turk retired from the College of Agriculture and Life Sciences in 1974 after four decades here, first as a student, then as a teacher, researcher, and administrator. A professor emeritus of animal science, he was head of the animal science department at Cornell from 1945 to 1963, and director of International Agriculture Programs from 1963 to 1974. He is the author of three books on agricultural production in underdeveloped countries and of more than 370 articles.

A native of Mt. Vernon, Mo., Turk holds a B.S. degree (1930) from the University of Missouri and M.S. (1931) and Ph.D. (1934) degrees from Cornell.

—David I. Stewart

James H. Ferreira '84, left, receives an award for a research paper from William F. Passannante, speaker pro tem of the New York State Assembly. The paper was a background briefing for a proposed bill to allow cameras into courtrooms and was written as part of the New York State Assembly Intern Program. More than 1,200 students from 95 colleges have taken part in the program since its start in 1971. It gives undergraduate and graduate students knowledge about the legislative process, and the legislature in turn benefits from staff help and fresh perspectives. Students carry out research for bills, answer constituents' letters, and work on press releases and other media presentations. "The experience was great," Ferreira says. "I learned a great deal about how to work effectively with people and about negotiation. I'd recommend it to any student." Steven LaFever, a senior at ALS, was also an intern during the spring '83 semester.

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Middle-Aged Farmers Are Most Efficient, Study Finds

When it comes to efficiency, young farmers may have the latest equipment and more technical training, but middle-aged farmers make up for that in experience and resources.

In general, farmers between 35 and 44 years old are more efficient than farmers younger than 25 and those older than 55, according to studies by Loren W. Tauer, an assistant professor of agricultural economics.

He based his conclusions on an examination of the 1978 Census of Agriculture and information about 340 farmers from Cornell's New York State Farm Business Summary.

Middle-aged farmers were most efficient in crop production and use of machinery, according to Tauer. Farmers younger than 25, on the other hand, were most effective when it came to hired labor and return on energy expenditures.

"That's probably because young, inexperienced farmers benefit the most by renting equipment and using hired, experienced labor," Tauer points out.

Their energy use, he adds, reflects their use of new, energy-conserving equipment.

Young farmers in the national sample also rated highest for grass crop yields, but were lowest in livestock production, probably because it is generally more difficult to raise animals than crops.

"In general, the youngest farmers are the least efficient because they tend to have too much machinery relative to land ownership," Tauer notes.

In the New York data set, Tauer found that the average number of cows per farm rises to 74 at age 50 and then falls to 63 for farmers 65 years old.

Another finding was that older farmers continue to make substantial machinery purchases even as they approach retirement. Also, surprisingly, those who do not have children planning to take over the farm continue to manage and maintain their farms as well as those who do have children preparing to succeed them.

—Susan S. Lang

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New Cheese Process Lowers Sodium, Retains Taste

A membrane-separation technology developed by Cornell food scientists has produced a reduced sodium cheese that retains flavor and good body.

"By supplementing cheese milk with a concentrate of protein, fat, and insoluble salts retained from ultrafiltered whole milk, we've produced a lower sodium cheddar cheese of excellent quality," says Frank V. Kosikowski, professor of food science.

Although Cornell's work has been with cheddar cheese, Kosikowski considers the technology applicable to hundreds of ripened cheeses, including Swiss, Italian, brick, blue, and mozzarella.

In addition to creating a tasty product, the process increases the efficiency and economy of cheese making by almost doubling the yield from the cheese-milk mixture.

"Salt is an important ingredient of cheese because it favorably influences flavor, color, and moisture, and prevents the growth of microbes that can spoil cheese," Kosikowski points out.

In the ultrafiltration process, whole milk is passed through a molecular sieve that separates its components. Water, lactose, sodium, potassium, and free amino acids pass through the sieve. Fat, protein, and insoluble salts that are major components of the cheese remain and become more concentrated. However, lactose—a major component of cheese milk—does not concentrate.

The result, known as the retentate, is a selectively concentrated liquid with five times more fat and protein than ordinary milk. When it is added to cheese milk in a certain proportion, there is almost twice as much fat and protein than normal.

Adding the fat- and protein-rich retentate to the cheese milk produces more cheese, yet the end product does not have a greater amount of fat or protein than it does normally.

Cornell's experimental cheddar cheese is only about 1 percent sodium chloride (salt), compared with the average of 1.8 percent in commercial cheeses. That's an average of about 423 milligrams/100 grams, instead of the 700 mg/100 grams in standard cheese.

This places the cheese in a proposed class of foods being considered by the U.S. Food and Drug Administration called "intermediate sodium foods," a designation to help consumers select products with lower sodium content.

—Susan S. Lang

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