College of Veterinary Medicine

Annual Report
1988–1989

CORNELL
UNIVERSITY

The College of Veterinary Medicine at Cornell University, Ithaca, New York, is the primary health resource for the state's animal population.

The college's mission, mandated by the citizens of New York State through their elected representatives, is to advance animal and human health through education, research, and public service.

This report is a summary of the activities during the 1988–89 year of the students, faculty, and staff who worked to accomplish that mission and, by doing so, to justify the public's trust.

OFFICE OF THE DEAN

College of Veterinary Medicine
A Statutory College of the State
University at Cornell

September 1, 1989

Frank H. T. Rhodes
President
Cornell University

Dear President Rhodes:

Pursuant to the requirements of the laws of New York State, I present herewith a report on the activities and the accomplishments of the faculty and staff of the College of Veterinary Medicine for the year ending June 30, 1989, this being the ninety-second annual report of this college.

Respectfully submitted,

Robert D. Phemister
Dean

OFFICE OF THE PRESIDENT

Cornell University
Ithaca, New York

October 6, 1989

The Board of Trustees of Cornell University, the Chancellor and Board of Trustees of the State University of New York, and the Governor of the State of New York

Ladies and Gentlemen:

In accordance with the requirements of Section 5711 of Article 115 of the State Education Law, I am pleased to submit on behalf of Cornell University the report of the College of Veterinary Medicine for the year beginning July 1, 1988, and ending June 30, 1989.

Sincerely yours,

Frank H. T. Rhodes
President

OFFICE OF THE CHANCELLOR

State University of New York
Albany, New York

October 16, 1989

The Board of Regents, the Governor, and the Legislature of the State of New York

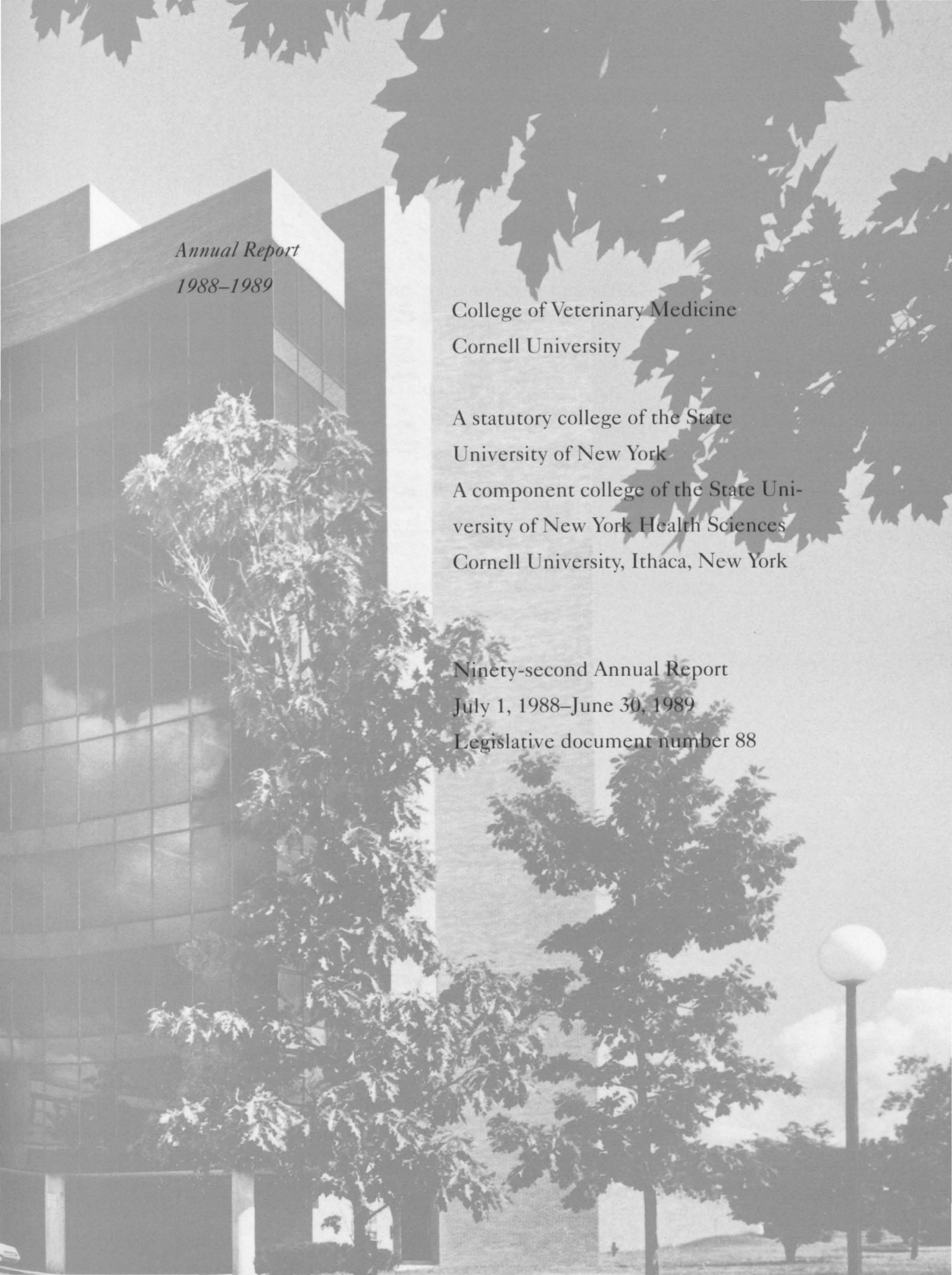
Ladies and Gentlemen:

Pursuant to the law, the 1988–1989 Annual Report of the College of Veterinary Medicine at Cornell University is herewith submitted.

Very respectfully yours,

D. Bruce Johnstone
Chancellor

The College of Veterinary Medicine is located on the Ithaca campus of Cornell University. The college's Veterinary Research Tower houses laboratory and office space for faculty and staff.



Annual Report
1988–1989

College of Veterinary Medicine
Cornell University

A statutory college of the State University of New York
A component college of the State University of New York Health Sciences
Cornell University, Ithaca, New York

Ninety-second Annual Report
July 1, 1988–June 30, 1989
Legislative document number 88

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Message from the Dean

This past year, like the years that have preceded it, was part of a continuum of educating and graduating, serving and discovering that has gone on since the college was chartered in 1894. Yet 1988–89 stands out as a year of anticipation of important things to come on several fronts. It was, in short, a year of special promise.

During the year our planning for new facilities moved into high gear. In August 1988, the state increased the bonding authority of the State University of New York by $1 billion. Thanks to the efforts of the college's Central Planning Committee, chaired by Dr. Bruce W. Calnek, the programming phase of our project was completed in December. The new buildings, when they are completed several years from now, will address the serious current problems of crowding and obsolescence brought on by the remarkable growth of the college and by the constant advances in science and technology that demand increasingly sophisticated facilities. They will provide the college with modern large and small animal teaching and referral hospitals, expanded research space, and vastly improved teaching facilities geared to modern methods of instruction. Our current plans call for a 70 percent increase in total college space at an estimated cost of $82 million.

This past year was also one when a large number of faculty were caught up in an exploration of new possibilities for the veterinary academic program. The faculty, under the leadership of Drs. David Slauson and Cornelia Farnum, began by examining various aspects of society's current and projected needs for veterinarians. They considered our particular strengths and weaknesses as a college and the advantages and disadvantages of contemporary approaches to veterinary education.

It is apparent that our students are capable of assuming more responsibility for directing their own education, particularly in a setting that provides greater flexibility and more opportunities for small-group interactions with faculty members. This finding has led to a reexamination of the ways in which teaching and learning occur. We are interested in achieving a better balance between learning facts and being able to apply them. We want our graduates to be highly motivated, self-directed learners for the rest of their professional lives and to understand the societal, scientific, moral, and economic contexts within which they practice their profession.

It is a challenge to determine how best to accomplish our goals within the four-year curriculum: to build a strong scientific base; to provide a good grasp of the comparative aspects of veterinary medicine; to ensure a strong clinical foundation; and to foster the development of attitudes and values necessary for a

Dr. Bruce Calnek and Dean Robert Phemister look over an architect's model of the planned new facilities at the college.

profession that serves the health needs of both animals and people. This evaluation is ongoing, but current faculty discussions promise to lead to major changes and improvements in the ways we prepare our graduates for productive professional lives.

The academic year 1988–89 was also a time for giving special emphasis to the international dimensions of the college. When we recruit faculty, we attempt to attract the best people from anywhere in the world. Although most of our faculty continue to be educated in the United States, an increasing number have received some part of their education in other countries. At a time when our future as a nation and as a profession demands that we consider problems and opportunities from a global perspective, the incorporation of an international base of experience should serve us well. In addition to the perspectives brought by individual faculty members, the college has entered into formal exchange agreements with the Postgraduate School of Veterinary Science of the Universidade Federal do Parana in Brazil and the School of Veterinary Medicine in Hannover, West Germany. In May, we hosted the president of The Gambia, His Excellency Alhaji Sir Dawda Kairaba Jawara, as the first Poppensiek Visiting Professor in International Veterinary Medicine. President Jawara, who is the only veterinarian to become a head of state, presented a lecture, "Animal Disease as a Factor Limiting Economic Development in West Africa," and spent a week on campus as a guest of the college.

In June Dr. Robert Wasserman and Dr. Bud Tennant became James Law Professors of Physiology and Comparative Medicine, respectively. This designation recognizes distinguished faculty members who have achieved national and international renown in their fields and have demonstrated a long-standing commitment to excellence in the college.

The following pages of this annual report describe in greater detail these and other highlights of 1988–89, a year of exceptional accomplishment and promise.

Robert D. Phemister

Robert D. Phemister
Dean

The State of Veterinary Medical Education at Cornell

One of the most important developments in education at the College of Veterinary Medicine over the past year was the formation of the Academic Planning Committee. With funding from the college and the Pew National Veterinary Education Program, the committee will examine problems facing veterinary medical education, including how to increase the number of students selecting veterinary medicine as a career, how to improve teaching methods and curriculum, and how to prepare veterinarians for both professional and societal roles. At the end of their study, the committee will attempt to identify long-term solutions.

Admissions

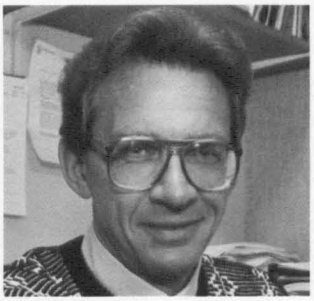
The Class of 1992

Despite declining applicant pools at veterinary colleges nationwide, "the level of competition for admission to the college is very good," said Marcia James Sawyer, director of Student Affairs and Admissions. More than 450 applications were received for eighty spots in the class of 1992. Twenty-three men and fifty-seven women were admitted. With a mean age of 24.7, the class is slightly older than in previous years. As a group, the class members have had roughly 4.8 years of postsecondary education; seven members of the class have master's degrees. The mean score of the class on the graduate record examination was 1250. Sixty-four class members are New York State residents, and fifteen come from contract states. Of the eighty-member class, forty-four graduated from colleges other than Cornell, proving that one does not have to attend Cornell as an undergraduate to be admitted to the university's College of Veterinary Medicine.

High school students in Cornell's summer program Explorations in Veterinary Medicine gather around Dr. Richard Hackett as he explains how clinicians perform an endoscopic examination of a horse's larynx while the animal exercises on the treadmill.

Guaranteed Admissions Program

The Guaranteed Admissions Program is designed to provide early, guaranteed admission to the College of Veterinary Medicine to good undergraduate students who may then choose to broaden their undergraduate education with study abroad or course work not strictly related to the sciences. In the first year of the Guaranteed Admissions Program, eleven undergraduates in their second year at Cornell were accepted for admission to the college. Their acceptance



1989 Norden Distinguished Teacher Award.

Students in the D.V.M. program at Cornell's College of Veterinary Medicine selected Dr. Wayne Schwark, professor in the Department of Pharmacology, to receive the 1989 Norden Distinguished Teacher Award. The award is given annually to a full-time member of the veterinary faculty who has demonstrated continued excellence in teaching.

Dr. Schwark has taught pharmacology at Cornell since 1972. Presently, he teaches pharmacology and toxicology electives in the fall and spring semesters and he's responsible for the spring pharmacology course for second-year students. "I believe the primary goal of this school is to produce veterinarians," Schwark said. "Just being in contact with the students, seeing them get turned on to veterinary medicine—that's the biggest thrill that all of us get from teaching."

guaranteed them a spot in either the class of 1993 or the class of 1994. Seven of these eleven students have chosen to start classes in the fall of 1989 after their junior year, and the remaining four students will complete their undergraduate work before beginning their veterinary studies.

Seeking Tomorrow's Students

Explorations in Veterinary Medicine, a Cornell summer session program for high school students, completed a second successful year. In the summer of 1988, twenty-eight participants spent four afternoons a week at the college in a six-week survey course of veterinary medicine. Admission to the program is competitive and open to students who indicate an interest in veterinary medicine. At least three "graduates" have completed their freshman year at Cornell, and one will apply next year for admission to the college under the Guaranteed Admissions Program.

Taking the Sting Out of Debt

In 1988–89, the college's Office of Financial Aid calculated a student's total annual expenses to be $16,670 for a New York State resident and $18,360 for an out-of-state resident. Of these amounts, tuition was $8,450 and $10,200, respectively. The college is working to lessen this financial burden. Gloria Crissey, director of financial aid, said, "We're trying to give students who have been accepted a proposed financial aid package before they actually decide whether they will accept a spot in the entering class. This tells them what it will cost to attend, what they will need for a modest living while they're in the D.V.M. program, and the amount of financial aid they are eligible to receive."

With 250 of 317 students receiving some form of financial aid in 1988–89, it is encouraging that grant monies have increased significantly, from $125,000 in

Carol L. Popolow '89 monitors the progress of a patient in the Small Animal Clinic's intensive care unit.

Association for Women Veterinarians Award

Mary Frances Hoover '90 will receive $1,000 as winner of one of two student scholarships awarded by the Association for Women Veterinarians. Second- and third-year veterinary students in the United States and Canada are eligible for the awards. Eighty-one students applied for this year's scholarships. Winners are chosen based on essays they submit, academic achievement, and financial need. Hoover is pursuing a dual degree at the college—a D.V.M and a Ph.D. in environmental toxicology.

Dr. Katherine Houpt, a member of the AWV, Mary Hoover, and Dean Robert Phemister

1988 to $200,000 in 1989. The college also is committed to increasing the amount of scholarship monies for students.

The Veterinary Student Employment Program

In 1988–89, the Veterinary Student Employment Program (VETSEP) provided financial assistance to 109 students working for departments within the college, paying a maximum of $1,500 of each student's total salary. This arrangement offers incentives both for students to work at the college and for departments to hire veterinary students.

According to Dr. Alexander de Lahunta, chairman of the anatomy department, the program offers other benefits as well. "Students who are agonizing over whether they might be interested in pursuing research as a career or going on and doing graduate work after veterinary college have an opportunity through VETSEP to work with an investigator. If we can get them excited by somebody's research program here at the college," he said, "then we have the chance of turning them on to research. It's certainly a way of encouraging veterinary students to go into graduate work."

The Veterinary Alumni Student Employment Program

During the summer of 1988, two students working at veterinary clinics of college alumni earned money to defray tuition costs and fees through the Veterinary Alumni Student Employment Program (VALSEP). VALSEP matches the alumnus-employer's usual wage with a grant of up to $1,500. Ken Byman '89 worked at the clinics of Dr. William Cadwallader in Homer and Tully, New York, and Teresa Hlaing '89 worked with Dr. Gerald Bezner and his colleagues at the Boulevard Animal Hospital in Syracuse, New York. This year alumni support increased the funds available through VALSEP, and in the summer of 1989 four VALSEP students worked with participating practitioners.

Expanding Horizons and Other Avenues of Learning

Expanding Career Opportunities

Last summer six veterinary students explored novel and nontraditional employment opportunities at home and abroad, thanks to the Expanding Horizons Program. Sponsored by the college, the program provided the students with grants to study white muscle disease in lambs in Morocco, proboscis monkeys in Sarawak, marine mammals, Hoffman's two-toed sloth, exotic animal medicine, and wildlife conservation. According to Associate Dean S. Gordon Campbell, program director, proposals are selected based upon their potential for uncovering new career possibilities for the applicant and other veterinary graduates.

Students in the Microcomputer Learning Resources Center

Computers to Lea(r)n On

Opportunities for computer-assisted learning expanded with the opening of the Flower Veterinary Library Microcomputer Learning Resources Center on April 20, 1989. The center is divided into two sections: a large classroom with twenty-two IBM Personal System/2 computers, and a smaller outer area with six Apple Macintosh II computers for individual computer use. The IBM computers were provided through IBM's Project Ezra. Alumni funds purchased four of the Macintosh computers and the remainder were provided through a State University of New York program to increase student access to computers. A variety of software is available for use, including educational programs on horse breeding farm management, acid-base simulation, herd ration calculation, and dog genetics. Susanne Whitaker, head librarian, planned and equipped the center, and she is encouraged by the reception students and faculty have given the facility.

The Graduates

The Class of 1989

Of the seventy-seven students who graduated from the D.V.M. program in the spring of 1989, sixty-one entered private practice and fifteen chose to continue their veterinary medical education as interns in accredited programs across the country.

Plotting the Course of Graduate Studies

In February 1989, the Executive Committee of the college met to consider the graduate studies program. They agreed that a strong emphasis must be placed on seeking the very best students for graduate assistantships. This could be accomplished best, they felt, by encouraging nationwide recruitment, recruiting veterinary students through paid summer jobs made available in research laboratories at the college, and providing training grants and stipends for academically superior students.

Little Shop of Horrors

They packed the house for three consecutive nights—students, faculty, families, and friends—to see the Veterinary Players in Little Shop of Horrors. *A musical comedy that takes a few grizzly turns, the college's version was directed and produced by Richard Goldstein '90 and coordinated entirely by students. With more than eighty people directly involved, the production is one of the largest extracurricular events ever to take place at the college.*

Financing for the play came from the Graduate Activities Finance Commission, the Alumni Association, and ticket sales. After covering production costs, the students were able to contribute $500 from proceeds to the Tompkins County Society for the Prevention of Cruelty to Animals.

Last year the Small Animal Clinic treated more than 12,000 dogs, cats, and birds.

Service to the Public

Monitoring Disease and Improving Diagnostic Tests

An Improved Test for Lyme Disease

In the Diagnostic Laboratory of the College of Veterinary Medicine, Dr. Richard Jacobson and Dr. Sang Shin, in collaboration with research support specialist Eric Shaw, have developed a more valid test for Lyme disease—a difficult-to-diagnose yet potentially devastating bacterial infection that is on the rise in both humans and domestic animals. The key to the test is computerization. "We've modified the current testing systems to create a computerized kinetics ELISA [enzyme-linked immunosorbent assay] test," said Jacobson, an associate professor of immunoparasitology. The test is not only more efficient and reliable than tests previously available but also more sensitive to the presence of infection.

As Shaw explained, "Our work is directed toward a rational way to interpret the results, particularly where low reactivity occurs." The computerized test is presently used to detect Lyme disease in dogs and horses, but the researchers are adapting it for use in cattle and other species.

Diagnosis of Lyme disease is complicated because serological tests for the presence of the spirochete *Borrelia burgdorferi*, the bacteria that causes Lyme disease, are unreliable in some cases and difficult to interpret. "In much of the serology that's being done, interpretation of the results is highly subjective and difficult to confirm because the organism often appears in low numbers and may cross-react with other organisms commonly present in the bodies of both humans and domestic animals," Jacobson said.

"Epidemiologists are at the early stages of understanding the distribution and spread of Lyme disease."

Although the test is being validated in animals, applications of the team's findings can be used to improve human testing based on the kinetics ELISA system. The ELISA test for the presence of *Borrelia* antibodies in dogs and an IFA (indirect fluorescent antibody) test for use with cats and horses became available to veterinarians February 1. "Epidemiologists are at the early stages of understanding the distribution and spread of Lyme disease," said Shin, an

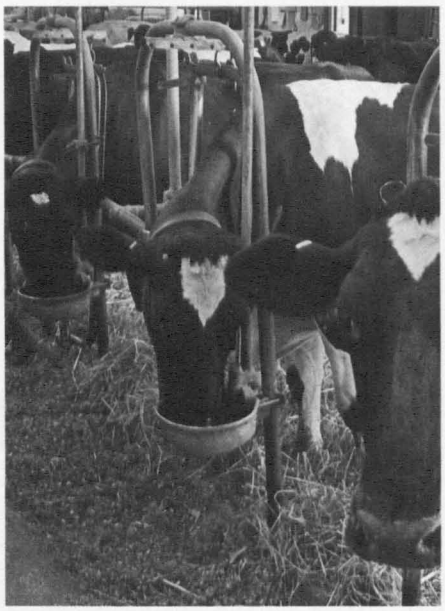
By performing microsurgery on a tick's intestines and saliva glands and then isolating the bacteria using different filtration techniques, Dr. Sang Shin successfully gathered samples of the spirochete Borrelia burgdorferi *which causes Lyme disease.*

Dr. Richard Jacobson (seated) and Dr. Sang Shin in the college's Diagnostic Laboratory recently developed a computerized diagnostic test for Lyme disease which is more efficient, reliable, and sensitive than previously available tests.

associate professor of microbiology. "We also are improving culturing techniques by using microfiltration systems. If we can identify seropositive dogs and interpret test results accurately, we'll have a better understanding of those locations where people will be at risk."

New Culturing Technique Developed for Isolation of Johne's Organism

Dr. Sang Shin has developed a new, highly selective culture medium that has revolutionized the ability of the Diagnostic Laboratory to isolate and diagnose *Mycobacterium paratuberculosis*, the organism that causes Johne's disease, a bacterial disease of cattle. The new medium and culturing technique suppress the contaminants in a fecal sample but allow the Johne's organism to grow. In the past, a large percentage of samples would be overgrown with fungi and other contaminants, making it impossible to distinguish whether or not the Johne's organism was present. According to Dr. Donald Lein, director of the Diagnostic Laboratory, the new method eliminates that problem.



Diagnostic time has also been shortened. With the old methods of culturing for Johne's organism, it took up to twenty weeks to determine a negative result. "Now," Lein said, "we're down to twelve weeks using the new method." Cows that are shedding large numbers of the organism can be detected as early as three to four weeks. "We've had problems with media for thirty to forty years," Lein acknowledged. "Dr. Shin solved most of those problems, basically in a year."

Halting *Salmonella dublin* in the Dairy-Beef and Veal Industry

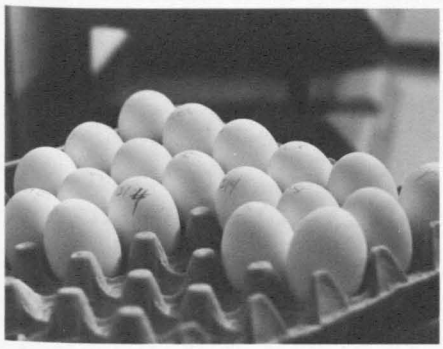
Researchers are working with producers in New York State's dairy-beef and veal industry to control a strain of *Salmonella* new to the Northeast. *Salmonella dublin* has appeared in veal calves and dairy steers raised for beef, apparently carried to the Northeast by trucks transporting beef cattle from the West. The trucks

passed on the infection when they were not disinfected before being used to transport calves. Unfortunately, according to Dr. Donald Lein, "*Salmonella dublin* sets up a long carrier state in cattle which we don't see in infections with other species of *Salmonella* in cattle. It is also a public health problem because *Salmonella dublin* is highly infectious to humans."

Researchers in the Diagnostic Laboratory are now investigating ways to prevent the spread of *S. dublin* to the state's primary dairy herds and to control the disease in veal-producing establishments. Linking vaccinations with a program to increase recognition of the disease appears to be successful.

The major poultry flocks in New York State have been tested once, and they appear to be negative for Salmonella enteriditis.

Testing Poultry Flocks and Eggs for *Salmonella enteriditis*



To detect *Salmonella enteriditis* in New York State's poultry industry, Dr. Sang Shin has set up a testing program for eggs, poultry feeds, and environmental and fecal material. Over the last year, the major flocks in the state have been tested once, and they appear to be negative for the disease. Now, the Diagnostic Laboratory is setting up a monitoring surveillance program for the poultry industry. Special testing programs have already been instituted for primary breeding hatcheries that produce stock for the laying industry. These programs involve 100 percent of the birds so producers can be sure they're selling pullets free of *S. enteriditis*.

Improved *Pasteurella anatipestifer* Vaccine Developed

A new vaccine for one of the most serious diseases of domestic ducks has been developed by Cornell researcher Dr. Tirath Sandhu at the college's Duck Research Laboratory in Eastport. His vaccine for *Pasteurella anatipestifer* provides better immunity than the old vaccines and can be sprayed for mass vaccinations in hatcheries, thus eliminating the stress of inoculation.

Several serotypes of *P. anatipestifer* are seen in ducks, and the new vaccine uses the three most common—serotypes 1, 2, and 5. Old vaccines used killed bacteria, but this one uses live organisms that are avirulent; that is, the organisms produce immunity in the bird without producing disease.

A major difference between the old and the newly developed vaccines is the form of vaccination. "Two injections of the old vaccine were needed before the duckling became immune to the bacteria," Sandhu said. "This was a stress to the bird, and in the large hatcheries where 10,000 to 15,000 ducks needed inoculation, this was also very labor intensive." The newly developed vaccine can be given in an aerosol spray just after the ducks hatch and while they are still in

the hatching incubator. This convenient form of vaccination has already been used on farms in California and Canada. The vaccine has undergone extensive testing and is now licensed by the USDA for production and distribution.

The newly developed vaccine can be given in an aerosol spray just after the ducks hatch.

Diagnostic Testing of Exotic and Wild Animals Expands

The Bronx Zoo, the National Zoo, and other exotic animal and game farm operations are sending increased numbers of samples to the Diagnostic Laboratory, expanding the laboratory's testing of exotic animals and birds. Also, as a result of the growth of the llama industry in New York State, testing for diseases such as equine herpes virus I and encephalitis in llamas has increased. Local wildlife have not been neglected. Last fall, investigators in the Diagnostic Laboratory collected samples from the local deer population. They found that the deer are free of epizootic hemorrhagic disease (EHD) and bluetongue but infected with leptospirosis. The Diagnostic Laboratory will continue to monitor the deer population for the spread of Lyme disease.

Extension Veterinarians Aid Animal Industry in New York State

Poultry Extension Veterinarian Appointed

Dr. Ahmed Mutalib is the new poultry extension veterinarian in the Department of Avian and Aquatic Animal Medicine at the college. Working with poultry farmers, he offers assistance in solving any production or disease problems producers may have. "I work in cooperation with the regional poultry specialists," Mutalib said, "and I encourage farm producers to call me directly or through the extension offices."

Dr. Ahmed Mutalib

Most veterinary medical practitioners see few poultry patients, and Mutalib's experience in avian medicine will be useful. Mutalib earned his D.V.M. and master's degrees (in avian pathology) from the University of Saskatchewan, Canada. He has more than sixteen years of experience in his field and is the author of several scientific publications.

New Feline Extension Veterinarian Joins Faculty

Veterinarians with questions on the veterinary medical care of feline patients now have a specialist to call. Dr. John E. Saidla has been appointed to the newly established position of feline extension veterinarian for the college. Saidla is also assistant director of the Cornell Feline Health Center. He is developing diagnostic and consultation services for the college's Feline Health Center and Diagnostic Laboratory and he'll help develop continuing education activities in

An increasing number of samples from exotic animals such as dolphins, whales, and llamas are being tested at the Diagnostic Laboratory.

feline medicine and surgery. Continuing work he began as a private practitioner, Saidla also will investigate computer databases for medical records systems and veterinary medical research. One computer project will list feline genetic conditions represented in the scientific literature for use as a reference source by veterinarians and breeders.

Equine Extension Veterinarian Tracks Disease

Dr. John E. Lowe has been named the new equine extension/field service veterinarian for the Diagnostic Laboratory. He has full responsibility for the equine field service, including planning extension programs for New York State equine veterinary practitioners and their clients. Backed by the extensive diagnostic and clinical facilities of the Diagnostic Laboratory and the College of Veterinary Medicine, he will investigate equine disease outbreaks and problems. In addition, Lowe will promote equine-related interests of the Diagnostic Laboratory and Cornell's Colleges of Veterinary Medicine and Agriculture and Life Sciences.

Title Changes Reflect Extension Emphasis

Four field veterinarians became senior extension associates in the Quality Milk Production Program. According to Dr. Philip Sears, program director, the title change more accurately reflects the consultation and extension work the veterinarians perform.

Dr. John E. Saidla, the college's new feline extension veterinarian

Facilities and Equipment Enhance Treatment

Teaching Hospital Adds Doppler Color Flow Imaging System

Doppler flow, or the measurement of blood flow and velocity, is just one part of an ultrasound examination of the heart. A new technology is now available at the Veterinary Medical Teaching Hospital in which blood cells are color coded in red or blue by their direction of flow. Instead of a black-and-white image, the ultrasound screen can indicate blood flow in patterns of red, blue, or a mosaic of the two colors. Called the Doppler color flow imaging system, this instrument is used by the hospital's cardiology and radiology services.

Blood cells individually color coded by their direction of flow are normally seen in uniform patches of red and blue. If there is turbulence, however, the colors commingle and produce a red and blue mosaic. In a dog with heartworms, for example, the area around the clot of worms is speckled with various intensities of red and blue because the blood is forced by the blockage to go in many directions.

Dr. Amy Yeager and Dr. Sydney Moise perform a cardiac evaluation using the recently acquired Doppler color flow imaging system.

Other problems can also be identified with color. "Anytime you have an abnormality in the heart, such as a shunt, a pressure drop, or a stenosis, it causes the normally laminar blood flow to become turbulent, or nonlaminar," said cardiologist Dr. Sydney Moise. "This machine sees such blood flow as multidirectional and as multiple colors." With turbulence identified by color, abnormalities can be found more rapidly than with a conventional black-and-white Doppler.

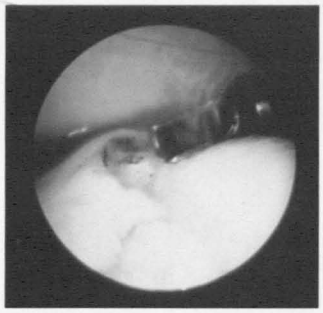
Radiologists Dr. Amy Yeager and Dr. Kathy Beck use the Doppler color flow imaging system to evaluate noncardiac structures. For example, it can document blood flow through a portosystemic shunt.

Lasers Revolutionize Surgical Procedures

With the acquisition of two surgical lasers, surgery at the College of Veterinary Medicine has made a technological leap comparable to the introduction of sterile surgical techniques in the 1940s, a change that revolutionized surgery. Thanks to funding from the college's Joint Alumni-Faculty Committee for Unrestricted Alumni Funds and a major gift from Mr. and Mrs. William Entenmann, clinicians in the Veterinary Medical Teaching Hospital now have available for use a carbon dioxide surgical laser. A second laser, a continuous wave YAG laser, is on loan and also available. The lasers will be used cooperatively by surgeons in the Small and Large Animal Clinics.

The comparatively recent arrival of the laser to veterinary medicine means that its capabilities in companion animal surgery have not yet been fully determined. According to Dr. Jay Harvey, a surgeon in the Small Animal Clinic, the laser could be especially useful in cancer surgery. In treating cancer of the oral cavity and skin tumors, for example, the laser beam could be microfocused for extremely precise cutting or tissue removal. The laser may also have applica-

A laser will enable surgeons to reach previously inaccessible areas in joints since it can literally go around corners with the help of a series of mirrors.



The tip of the laser is just visible inside the joint of a horse's knee.

tions in liver surgery, where the control of bleeding (hemostasis) is vital; laser activity at the surgical site can seal blood vessels less than 0.6 mm in diameter.

Surgeons anticipate many uses for the laser in large-animal surgery. Dr. Alan Nixon, who is studying the treatment of equine joint and tendon diseases, will apply laser technology to equine surgical procedures. A laser will enable him to reach previously inaccessible areas in joints since it can literally go around corners with the help of a series of mirrors. With its hemostatic properties, the laser is especially useful for resecting synovial membrane and adhesions inside joints and tendon sheaths with a minimum of bleeding.

There are also great possibilities for the laser in wound management. When a laser is focused on tissue, interstitial and intracellular water absorbs the light in the far infrared range. This causes the water in the cells to boil and convert to superheated steam, destroying the cells' membranes. Since microorganisms are also destroyed by the laser, infected wounds are sterilized as the surgeon removes tissue.

Other applications include the removal of granulation tissue and skin tumors in horses, oronasal tumor removal, and relief of upper airway obstructions such as enlarged or infected laryngeal cartilages. Finally, human patients with incisions and dissections made by lasers seem to experience less postoperative pain; the same benefit is expected for animal patients.

Research at the College

Facilities and Equipment Enhance Research

James A. Baker Institute Takes On New Look

Renovations and expansion have given the James A. Baker Institute for Animal Health a new look. At a cost of approximately $1 million, the institute added nearly 4,500 feet in new laboratory and office space and renovated some existing facilities. According to Dr. Douglas McGregor, director of the institute, the new space was needed not only to support current initiatives in microbiology, particularly in the areas of infectious diseases, but also to provide new faculty with laboratory space. The main building of the institute dates from 1950 when it was known as the Veterinary Virus Research Institute.

Imaging System in Pharmacology

With new research equipment valued at nearly $250,000, the Department of Pharmacology has stepped into a new era of cell biological research. The equipment, the latest in integrated fluorescence imaging and electrophysiology systems, will allow researchers to establish a system in which fluorescence measurements can be made in a cell simultaneously with electrophysiological recordings. This equipment makes quantitative imaging of fluorescence in individual living cells accessible to a wider group of investigators by providing a flexible system that is relatively easy to use and suitable for studies in a variety of biological systems. For example, researchers can visualize and analyze quantitatively such diverse cellular functions as mitosis, motility, stimulus secretion coupling, phagocytosis, growth, and chemotaxis.

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Dr. Robert H. Wasserman, seated at a spectrofluorometer in the Department of Physiology, was named a James Law Professor with Dr. Bud C. Tennant. The James Law Professorships recognize distinguished faculty who have earned national and international reputations in veterinary medicine and the biomedical sciences and who demonstrate a commitment to excellence and academic leadership.

The projects included in this section represent only a sampling of the research conducted at the College of Veterinary Medicine at Cornell.

New Pathogen-Free Poultry Building Opens

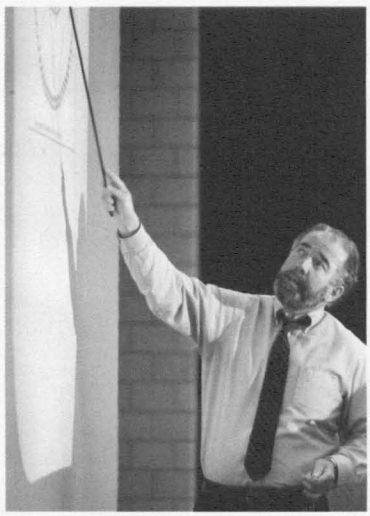
The Department of Avian and Aquatic Animal Medicine has opened its new Specific Pathogen Free (SPF) Poultry Production Facility. A major gift from Dr. Hiram N. Lasher '42 and his wife, Bertha, significantly helped in funding construction of the SPF facility. Located on Snyder Hill across from the Levine Laboratory, the 4,000-square-foot building is designed to house SPF chickens for avian disease research. There are two rooms for backup breeder flocks, complementing those in the existing SPF breeder facility, and two rooms for brooding chicks and growing young stock.

SPF Poultry Production Facility

Helping Man and Animal

Work on Fertility in Dogs Earns Beecham Award

The study of canine reproduction has earned Dr. Patrick Concannon the 1989 Beecham Award for Research Excellence at the College of Veterinary Medicine. The award is presented annually by Beecham Laboratories to a young investigator whose research achievements are likely to have a significant impact on our understanding of the biology or medical management of animals.



Dr. Patrick Concannon, recipient of the 1989 Beecham Award for Research Excellence

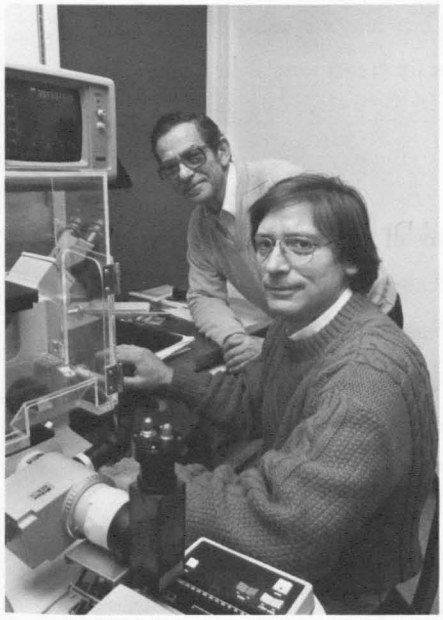
Concannon, a senior research associate in the Department of Physiology, is studying the reproductive endocrinology of the dog. His work is particularly significant in terms of understanding the changes that occur during pregnancy and the response of the pregnant animal to insulin, as some cases of diabetes are precipitated by pregnancy. In addition, Concannon has demonstrated several nonsurgical methods for regulating reproductive activity in dogs by manipulating the control of ovarian function. They are important both for controlling the pet population and for enhancing fertility in dogs with inherited traits or qualities of medical interest. As a result of his work, researchers are now able to control within a few days when a bitch will ovulate and to predict within one day the whelping date. Several methods of contraception in dogs developed and tested by Concannon will provide veterinarians and pet owners with safer and alternative means of preventing bitches from having unwanted pups.

The Effects of Vitamin D and Dietary Calcium on Nerve and Heart Function: A Relation to Hypertension?

Dr. Robert Wasserman and colleagues in the Department of Physiology are studying the effects of vitamin D and dietary calcium on nerve and heart tissues from chickens. Their research in cell physiology is related to studies being conducted elsewhere in clinical experiments with hypertensive patients.

Electrophysiological studies by graduate student Dr. Qiang Cai and neurophysiologist Dr. Daniel Tapper have shown that nerves from vitamin D–deficient animals are considerably more excitable than nerves from chickens receiving adequate amounts of vitamin D. Nerve excitability is similarly increased by low dietary calcium intake. Previous studies by Dr. Y. S. Lee, Curtis Fullmer, and Mary Brindak showed that the nerves examined by Cai and Tapper contain calbindin-D, a vitamin D–dependent, calcium-binding protein, first discovered in intestinal tissue several years ago by Wasserman and Dr. Alan Taylor, now at Baylor Dental College, Dallas, Texas.

Dr. Robert Gilmour and Dr. Michele Buddle examined heart tissue under similar dietary circumstances and observed that cardiac cells are more excitable when the heart tissue is derived from either vitamin D–deficient or calcium-deficient animals. Their results underscore the generalized effects of these dietary deficiencies on the behavior of excitable tissues. The relationship of these observations on nerve and heart tissue to hypertensive disease and possibly other diseases in animals and humans remains to be determined.



Physiologists Dr. Robert Wasserman and Dr. Curtis Fullmer are two of the researchers studying how vitamin D and calcium affect nerve and heart tissues.

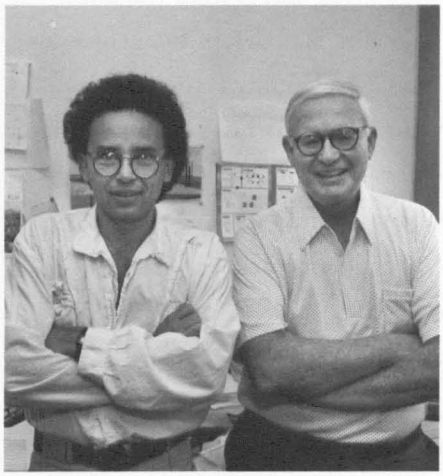
Obesity, Exercise, and Diabetes

Dr. Emmett Bergman, Dr. Richard Rawson, and Dr. David Robertshaw of the Department of Physiology are looking at the role of exercise in glucose utilization. In this study, obese sheep with a prediabetic condition similar to mature onset diabetes in humans are exercised on a treadmill. Since insulin has less effect in an obese individual than it does in a lean individual and exercise has an insulinlike action, the researchers are trying to determine if the obese sheep's diabetic state is as resistant to the effect of exercise as it is to insulin. This is the first time that level of exercise and its effect on insulin dosage have been measured, and initial data suggest that insulin resistance does not transfer to the insulinlike effect of exercise.

Cancer Metastasis

Metastasis is the most frequent cause of death in cancer patients. Understanding the mechanisms of the spread of cancer cells from the primary tumor via blood and (or) lymph vessels to secondary organ sites and the conditions that promote survival and growth of cancer cells at those sites might allow researchers to eventually design and develop new approaches for interfering with metastasis. In the Cancer Cell Biology Laboratory of the Department of Pathology, Dr. Bendicht Pauli and his associates have found that the initial implantation of blood-borne tumor cells at secondary organ sites is mediated by organ-specific homing receptors localized on the surfaces of capillary endothelial cells. When extracted and incubated with tumor cells, these homing receptors prevent tumor cell adhesion to capillary endothelium and impede metastatic spread in the animal host.

$8.9 Million NIH Grant for Hepatitis and Liver Cancer Research



With a $8.9 million NIH grant, Dr. Bud Tennant (right) is studying the woodchuck hepatitis virus. Dr. Christoph Seeger (left) is investigating the replication and pathogenesis of the virus.

It is estimated that more than 250 million people worldwide are chronic carriers of the hepatitis B virus and more than 300,000 die each year from liver cancer attributed to the viral infection. The National Institute of Allergy and Infectious Diseases of the National Institutes of Health has awarded Dr. Bud Tennant and his associates more than $8.9 million to study a virus of woodchucks that is similar to the hepatitis B virus. The woodchuck hepatitis virus produces chronic forms of liver disease similar to those seen in humans with persistent hepatitis B infection. Tennant has been studying the link between the hepatitis B virus group and liver cancer for almost a decade. He and his colleagues currently are investigating the molecular mechanisms responsible for the virus-associated malignant transformation of hepatocytes. They also are using the woodchuck model in the development of antiviral drugs for treatment of hepatitis B virus infection.

Signals for Fluid Intake

With a new grant from the National Institutes of Health, physiologist Dr. T. Richard Houpt is studying the physiological signals for fluid intake—specifically, what tells the body it is dehydrated. Some signals for water intake are known. With dehydration, for example, the blood becomes more concentrated. But this signal is seen only under extremely abnormal conditions. The day-to-day, minute-by-minute intake of fluid is not determined by measurable changes in blood concentration, and the signals that operate on a normal basis are not fully understood. The information Houpt uncovers in his study may shed light on fluid intake and also on many psychogenic disorders associated with eating and drinking.

Neuromuscular Disease in Cairn Terriers

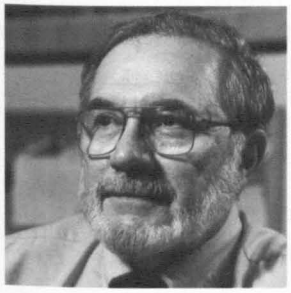
Dr. John Cummings and Dr. Alexander de Lahunta in the Department of Anatomy are investigating a new, potentially inherited neuromuscular disease in the Cairn terrier. Their observations in Cairn terriers were published simultaneously with findings by researchers from England and Australia. Light and electron microscopic examination of neural tissues showed widespread degenerative disease of the nervous system. This disease in Cairn pups is distinctly different from globoid cell leukodystrophy, which also occurs in Cairn terriers, although early clinical signs are similar.

Effects of Placental Disease on Pregnancy Outcome

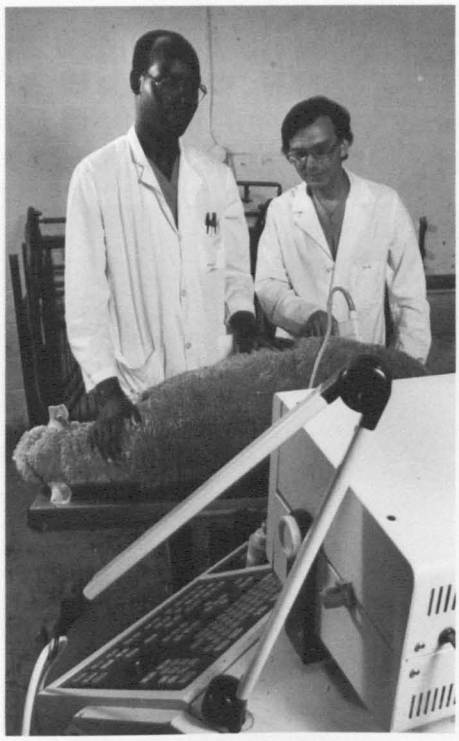
The placenta, as the physical and functional interface between the fetus and its mother, controls fetal development and pregnancy outcome. Dr. Donald Schlafer, associate professor of pathology, is studying the mechanisms through which placental diseases develop and, in turn, how placental function and fetal well-being are affected. He is also investigating how damaged placentas are able to compensate for functional insufficiencies. Experiments are being conducted in cattle and sheep in collaboration with colleagues in other departments at the college and on campus. A new model for studying the effects of primary fetal placental damage has been developed and partially characterized. Additionally, placental tissues from naturally occurring cases of in utero growth retardation or abortion, submitted through the pathology services of the Diagnostic Laboratory, are being studied to increase understanding of basic placental pathophysiology.

Research Looks at Premature Birth

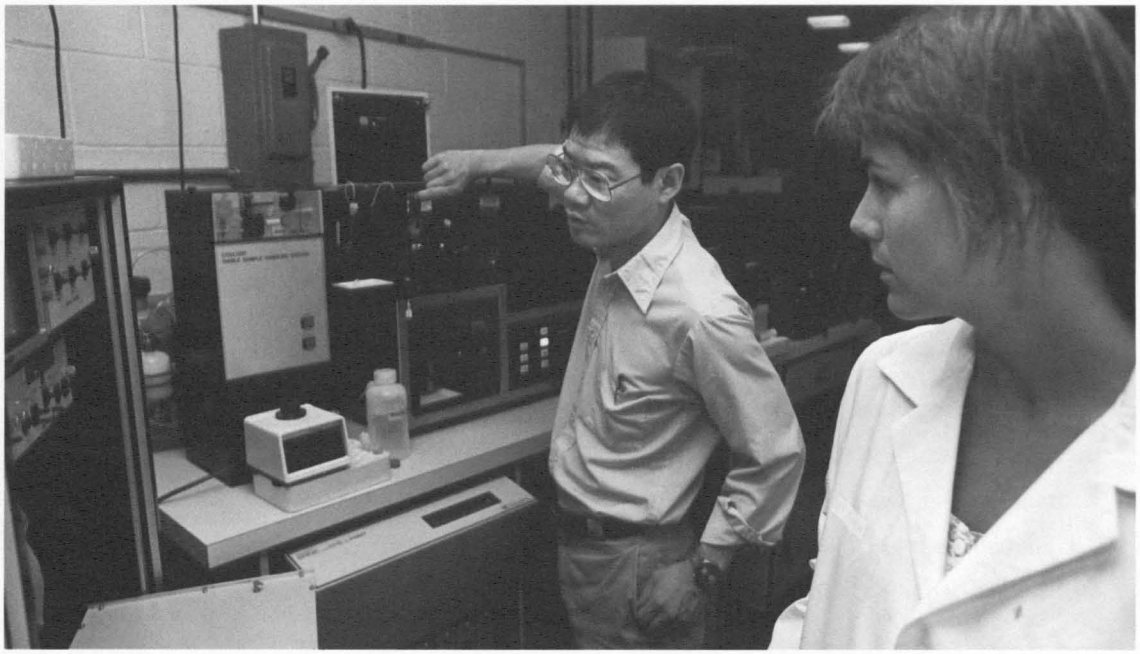
Premature birth is a major national problem because babies that are too small have low chances of survival and those that do survive often have mental or physical handicaps. Dr. Peter Nathanielsz and fellow researchers in the Laboratory for Pregnancy and Newborn Research are studying the mechanisms that retard fetal growth and the factors that lead to premature birth. One area of interest is nutrition because nutritional deficiencies during pregnancy may lead to premature birth. They are also interested in the parts of the brain responsible for the initiation of the birth process. There is accumulating evidence that the fetus's brain actually determines the onset of birth.



Dr. T. Richard Houpt



As part of their work in the Laboratory for Pregnancy and Newborn Research, Dr. Peter Nathanielsz and Dr. James Owiny use ultrasound to diagnose pregnancy in a ewe.



Dr. Andrew Yen, with research support specialist Mary Forbes, analyzes cells in the Flow Cytometry Laboratory.

Genetic Control of Leukemogenesis

Dr. Andrew Yen in the Department of Pathology is studying the roles of certain oncogenes and anti-oncogenes in controlling the proliferation and differentiation of mammalian cells, with a focus on hematopoietic cells and leukemia. Of particular interest is how specific agents, some of which are of dietary significance and some of which modulate DNA synthesis, affect the proliferative arrest and phenotypic differentiation of leukemic cells. Biophysical and biochemical techniques are being used to elucidate the role of genes controlling early events in the metabolic cascade leading to terminal differentiation. A practical, long-term potential goal of this work is to develop an alternative form of cancer therapy that uses the induction of terminal differentiation to neutralize neoplastic cell populations. This alternative is in contrast to the cytotoxic objectives of conventional chemotherapy.

Inherited Fragility of Bones and Skin

Dr. Ronald Minor and Dr. Joyce Wootton in the Department of Pathology are studying the primary and secondary effects of mutations affecting type I collagen of humans, dogs, cats, and cattle with fragile, hyperextensible skin or brittle bones. Their studies have demonstrated that similar clinical diseases in both humans and domestic animals result from a variety of abnormalities in either the deposition or degradation of fibrils and fibers of type I collagen. Their data show that mutations in different genes can result in clinically similar or indistinguishable diseases.

Taurine and Cardiomyopathy in Cats

Joyce Carnevale '90 is studying dietary taurine deficiency in the cat with Dr. Harold Hintz, professor of animal nutrition. Cats that are deficient in taurine or

that fail to use taurine metabolically usually develop a type of heart disease known as cardiomyopathy. Kitten mortality complex is related to this condition.

Toxicology Studies Look at Protective Enzyme

Species and individual susceptibility to the toxic effects of chemical exposure can be directly related to the capacity of the species or individual to metabolize the chemical. Dr. John Babish, associate professor of pharmacology, is studying an enzyme system produced by the body that mediates the biotransformation of most foreign compounds into more toxic and carcinogenic derivatives. His long-term goal is to establish an understanding of the systems controlling the expression of this enzyme in various tissues and to use this information to predict adverse responses to specific therapeutic regimens or to exposure to environmentally distributed chemicals.

The Role of Growth Factors

Dr. Richard Cerione, assistant professor of pharmacology, is studying the molecular mechanisms by which signals are transmitted from receptor proteins on the surface of cell membranes to specific biological effectors. Presently, his investigations are focused on two areas, the rhodopsin-coupled visual transduction system and growth factor receptor/tyrosine kinases. These studies have revealed a general similarity in the biochemical pathways regulating the seemingly disparate biological events of vision and cell growth. The primary aim of future studies will be to understand what goes awry in the normal growth pathway, causing a normal cell to become tumorigenic.

Early Mortality in Salmonids in Cayuga Lake

Dr. Jan Spitsbergen, assistant professor in the Department of Avian and Aquatic Animal Medicine, is studying early mortality in Cayuga Lake landlocked Atlantic salmon. In a joint investigation conducted last fall by Cornell's Fish Pathology Laboratory and the Department of Environmental Conservation, researchers

Dr. Jan Spitsbergen

found that 98 percent of Cayuga Lake salmon weakened and began dying three weeks after hatching, while the offspring of salmon taken from an Adirondack lake showed less than 5 percent mortality by the onset of the feeding stage. (It is not known if early life stage mortality problems occur in landlocked salmon from other Finger Lakes because only offspring of salmon from Cayuga Lake have been studied.) Spitsbergen believes that the consistent mortality rate from year to year combined with the strict life stage specificity of mortality suggests a contaminant-induced disease. Her work will now concentrate on identifying which of many possible contaminants may be responsible for the mortality syndrome. A Department of Environmental Conservation contract, through the Return a Gift to Wildlife Program, is funding an initial study.

Tumor Disease in Walleyes from Oneida Lake

Dr. Paul Bowser, associate professor in the Department of Avian and Aquatic Animal Medicine, and graduate student Dr. Daniel Martineau are investigating the high incidence of dermal sarcomas in walleyes from Oneida Lake. Researchers had suggested the lesions were caused by a virus, having seen what looked like virus particles in tissue sections under an electron microscope. Bowser has been able to transmit the disease in walleyes for the first time.

Pike may prove to be a good animal model for studying the environmental modulation of tumors. Their tumors are observed only in cooler times of the year, virtually disappearing in the summer and reappearing in early spring and fall.

Dr. Margaret Barr of the college's Feline Health Center

Agents of Disease: Viruses

AIDS-like Disease Found in Exotic Cats

Working with zoos and the college's sera bank, Dr. Margaret Barr has identified the feline immunodeficiency virus (FIV) for the first time in a number of exotic cats, including Florida panthers. FIV infection in cats is much like AIDS; it has

Dr. Fredric Scott

Dr. Benjamin Lucio

Dr. Syed Naqi

a very long incubation period and four to five years may pass before an infected cat shows signs of the disease. Its presence, especially in the relatively isolated Florida panther population, means that FIV is probably widespread in felines and has been present for a long time.

Vaccine Tested for Feline Infectious Peritonitis

An experimental vaccine for feline infectious peritonitis (FIP) has been developed and researchers are working to make it more effective. According to Dr. Fredric Scott of the Feline Health Center, although the vaccine produces a good antibody reaction in cats, it is not producing an adequate degree of protection. Study of this immune-mediated disease and the feline immune response to it will continue.

Chicken Anemia Agent

Researchers in the Department of Avian and Aquatic Animal Medicine are studying chicken anemia agent (CAA), a virus they believe may be responsible for several diseases or conditions of previously unknown etiology. Formerly called "hemorrhagic syndrome" or aplastic anemia, CAA causes a severe anemia that destroys bone marrow, severely damages some lymphoid organs, and causes hemorrhage. Dr. Benjamin Lucio has successfully isolated the virus from a chicken flock in the United States, and he is now working with chickens to learn how the virus is transmitted and the characteristics of the infection. This information will be used in determining how best to deal with the infection.

Infectious Bronchitis Virus

Dr. Syed Naqi's studies on avian infectious bronchitis virus may improve vaccination strategies against the disease. The infectious bronchitis virus mutates frequently and strains are continually evolving in the field. For this reason, vaccines that are used against the disease aren't always completely effective. Naqi, a professor in the Department of Avian and Aquatic Animal Medicine, is working on ways to better identify new strains of the virus and to determine how new viruses behave differently from old strains.

Using the Raccoon Pox Virus to Produce Feline Vaccines

Work continues on recombinant studies that use the raccoon pox virus to produce vaccines for cats. The virus, isolated from raccoons in Maryland several years ago, has been found to be an excellent carrier virus for recombinant vaccines. Vaccinia, or cowpox virus (the vaccine for smallpox), is commonly used in experimental vaccine production, but researchers at the Feline Health Center have been searching for an alternative suitable for the cat. Under a grant from the Morris Animal Foundation, an array of pox viruses—from cattle, sheep, humans, and birds—were screened to see if any could be used in the cat. They found the raccoon pox virus to be superior to all the others. The virus doesn't produce any disease, and its similarity to vaccinia means that researchers can use the same plasmids used to produce the recombinants in vaccinia.

Parvovirus: The Structure and Function of Virus Proteins

Using a sophisticated molecular approach, Dr. Colin Parrish is working with canine parvovirus to understand genetically the relationships between the structures and functions of the virus proteins as well as any properties that distinguish the canine virus from the feline parvovirus. He also is examining the evolutionary relationships between various parvoviruses to understand how one virus might be derived from another. Various methods of developing parvovirus vaccines are also being explored.

Bovine Leukemia Virus

Dr. James Casey, associate professor of virology, is studying the bovine leukemia virus (BLV) and some of the peculiarities this virus exhibits. For example, BLV has a limited host range and is very tissue specific, infecting only a subset of bovine lymphocytes. The virus is highly restricted even within these lymphocytes in the expression of viral genes. In this way it is quite similar to the human pathogen HTLV1, which causes a form of adult human leukemia. Casey has sequenced BLV and shown that its genome structure is similar to HTLV1. He has identified a number of control sequences in the BLV genome and will now investigate how these sequences are involved in the generation of neoplasias.

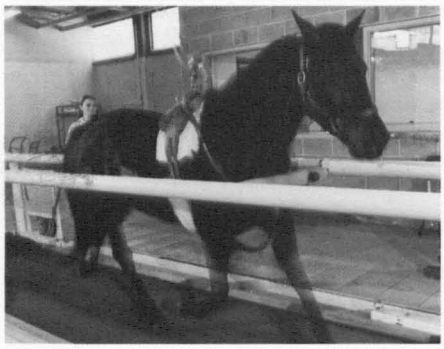
Equine Research

Work Begins at Equine Performance Testing Clinic

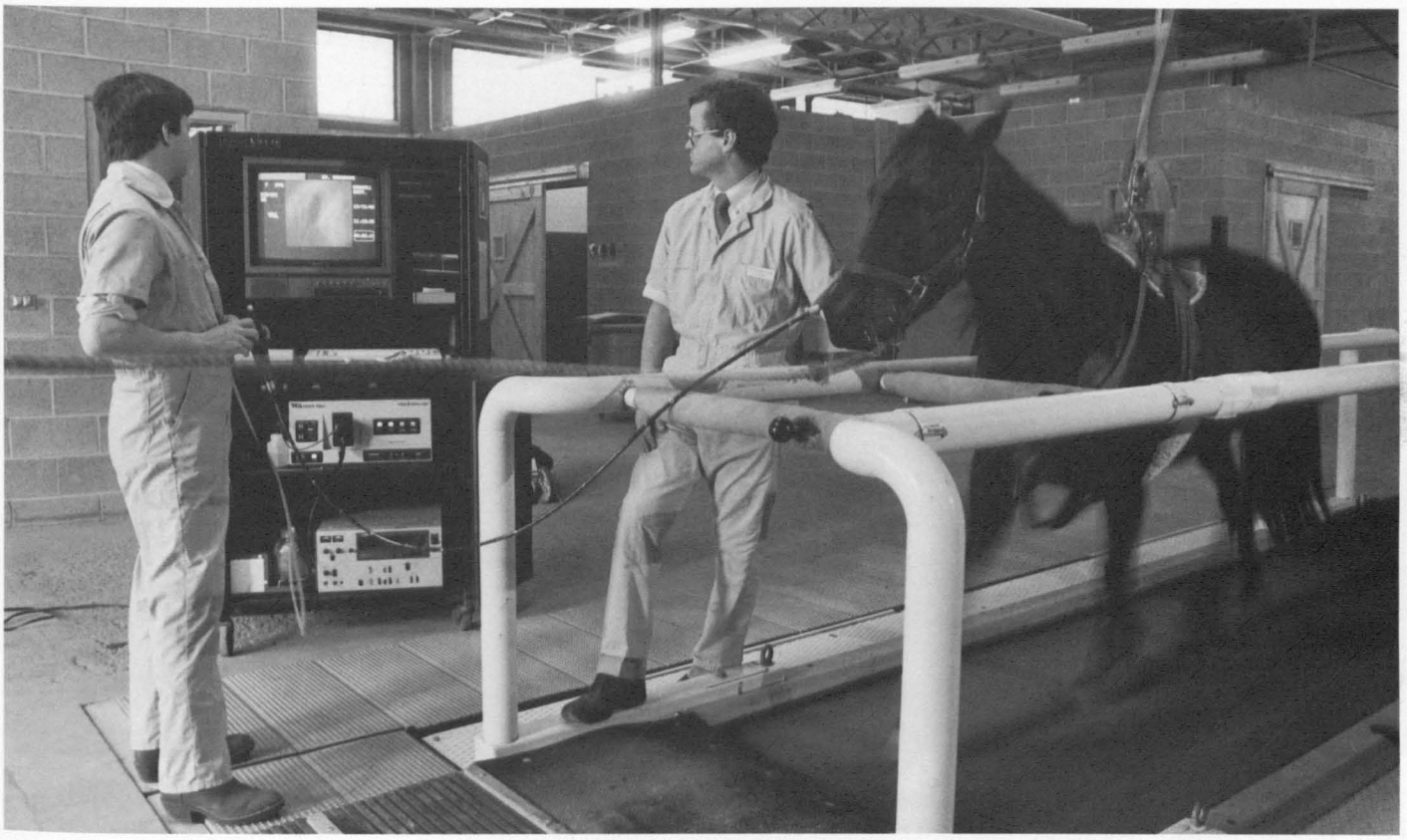
Cornell University's Equine Performance Testing Clinic is uniquely equipped to evaluate and treat the horse at rest and during exercise. Clinical performance evaluation is possible through the Respiratory Function Testing Unit. Two new units—the Lameness and Gait Analysis Unit and the Fitness and Performance Testing Unit—will open in 1990.

Equine Performance Testing Clinic

The Equine Performance Testing Clinic was made possible through the support of alumni of the College of Veterinary Medicine at Cornell, the Mrs. Cheever Porter Foundation, the Harry M. Zweig Memorial Fund, and the Finger Lakes Division of the Horsemen's Benevolent and Protective Association. The New York Division of the Horsemen's Benevolent and Protective Association has provided generous support to staff and equip the Respiratory Function Testing Unit.



Horses are evaluated on the treadmill of the Equine Performance Testing Clinic at the same level of activity at which they are expected to perform.



A video camera transmits an endoscope's view of the airways while the horse exercises on the treadmill. The videotape is used in the evaluation of upper respiratory conditions, roaring, and palate problems.

The centerpiece of the clinic is its high-speed treadmill. While a horse is exercised on the treadmill, its upper respiratory tract can be examined with an endoscope and its respiratory or cardiovascular performance can be measured and recorded.

Equine Infectious Anemia and Lentiviruses

Dr. James Casey is studying the lentivirus that causes equine infectious anemia, which belongs to the same virus family as the AIDS virus. He has cloned the virus and produced isolates of the virus that differ in their ability to cause disease in animals. Some isolates are highly virulent and cause disease quickly; others produce extremely mild symptoms. By identifying the differences between the two types of isolates, much can be learned about how the virus causes disease.

Equine Influenza: Protection Shown for A2 Subtype Virus

A nasal spray equine influenza vaccine developed by Dr. Dorothy Holmes looks more promising than ever, according to recent trials. After more than a decade in development, the nasal spray vaccine, which uses live viruses (current vaccines administered by injection contain inactivated viruses), has been shown to protect ponies with no adverse side effects for at least six months. The influenza vaccines currently available for horses occasionally have temporary side effects such as appetite loss, muscle soreness, and dullness, and they provide protection for only a limited time. Some owners are reluctant to vaccinate their horses because the possible side effects may interfere with a horse's performance.

The Equine Research Park, College of Veterinary Medicine

Zweig Awards

In one of the first state programs to support equine research through revenues from racetracks and off-track betting, the College of Veterinary Medicine received $437,000 in 1989. The monies are granted through the Harry M. Zweig Memorial Fund for Equine Research, created in memory of Dr. Harry M. Zweig, a longtime supporter of the equine industry in New York State. Following are the selected researchers and projects for 1989.

Immunogenetic Studies of the Horse

Fundamental genetic and immunological studies by Dr. Douglas Antczak are providing a theoretical foundation upon which many different applied studies can be based. These include the investigation of the role of maternal immune response to the fetus in early pregnancy; epidemiological, genetic, and virological studies of equine sarcoid, a common skin tumor; and the characterization of equine diseases of the immune system, including immunodeficiencies and leukemias.

Analysis of Equine Immune Response to Influenza Virus

Dr. Judith Appleton has isolated and cloned antibodies, called monoclonal antibodies, against influenza viruses in horses. Further study may reveal more about how the horse's immune system reacts to influenza virus.

Culture and Transfer of Equine Trophoblastic Vesicles

Maternal recognition of pregnancy is essential to the continuation of pregnancy. Dr. Barry Ball has developed a system to produce artificially equine trophoblastic vesicles that, in preliminary studies, mimic the signal(s) responsible for pregnancy recognition in the mare. Further studies will examine the signals the trophoblast sends.

The Equine Myenteric Plexus with Special Reference to Pelvic Flexure Pacemaker

In certain cases colic may be caused by disorders of the nerve supply to the gastrointestinal tract. Dr. Gilbert Burns and Dr. John Cummings will examine clusterings of nerve cells responsible for generating the very complex motility patterns of the colon and define the normal anatomy.

Equine Arteritis Virus: Continuing Studies of Diagnosis and Pathogenesis

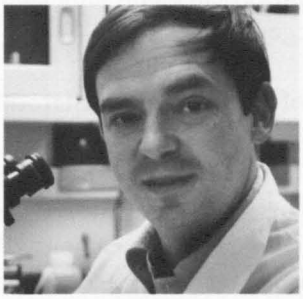
Dr. Edward Dubovi will continue work to produce monoclonal antibodies for the equine arteritis virus. These reagents are needed for rapid and accurate antibody detection tests as well as for tests to detect the virus in tissue sections.

Steroidogenesis by Equine Preovulatory Follicles

Dr. Joanne Fortune will determine how hormones act to regulate the development and function of ovarian follicles in mares. This may lead to improved methods for ovulation induction in horses and better information on the factors that predict ovulation and reproductive status.

Bronchial Artery Blood Flow in the Horse

Bronchial circulation appears to supply a large part of the lung's supporting tissue. Therefore, study of the changes in bronchial circulation may be important in the control of exercise-induced pulmonary hemorrhage (EIPH), which occurs in 75 percent of horses after racing. Dr. Robin Gleed, Dr. Richard Hackett, and Dr. Alan Dobson have developed a technique suitable for measuring bronchial artery blood flow and will concentrate on measuring changes in bronchial flow during exercise in normal and EIPH-afflicted horses.



Dr. Douglas Antczak

Muscle Morphology and Motor Control of the Normal Equine Forelimb

Dr. John Hermanson will make an in-depth anatomical analysis of the shoulder muscles and soft forelimb tissues of the horse to identify specific neuromuscular disturbances leading to lameness. This knowledge should contribute to improved preventive and curative treatments of classic shoulder lamenesses.

Dr. Barry Ball

Effect of Furosemide on Salt Intake of Horses

Cornell researchers have found that horses treated with furosemide (Lasix) drink more water to compensate for urinary losses. Dr. Katherine Houpt will determine whether horses will eat more salt after treatment with Lasix and how salt intake affects the proper management of fluid intake for optimum performance, well-being, and health.

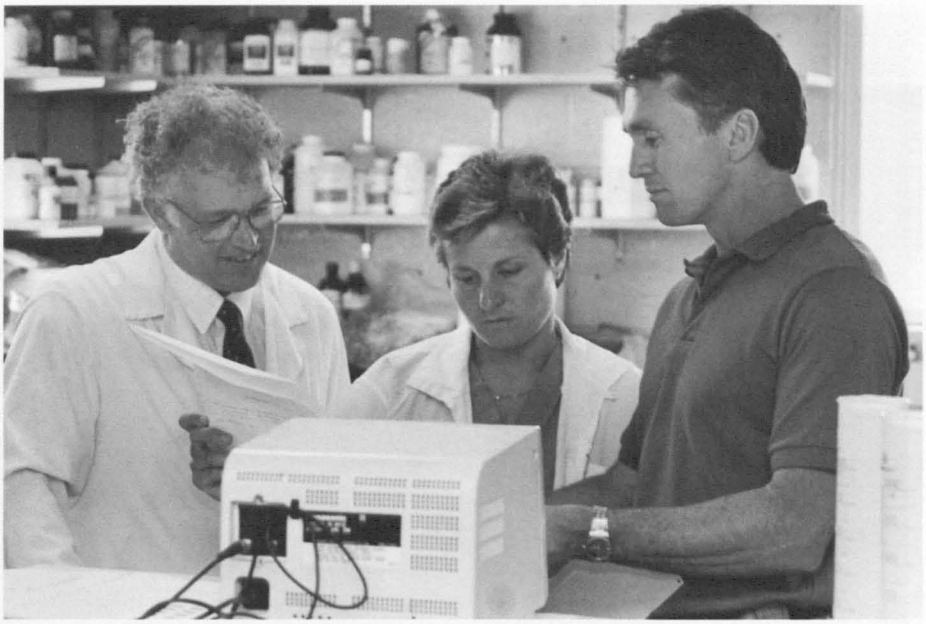
Applying New Technology for Evaluating and Predicting Fertility of Stallions

Dr. Donald Lein and his co-researchers will use the computer-assisted semen analysis (CASA) software package to investigate the effects of a variety of factors on semen quality and fertility.

Dr. Joanne Fortune

Gait Analysis Instrumentation

Monies have been allocated for the development of a highly sophisticated program for computer-assisted gait analysis in horses. When operational, this instrumentation will be used by the college's Equine Performance Testing Clinic, which houses a high-speed treadmill.

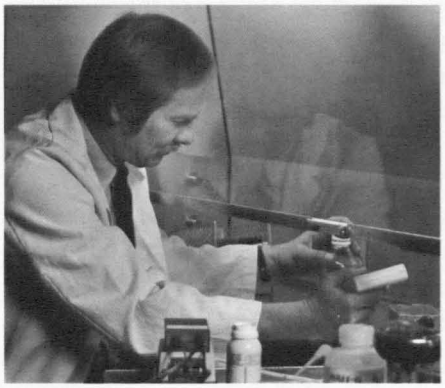


Drs. George Lust, Susan Fubini, and Rory Todhunter are investigating osteoarthritis in the horse.

Osteoarthritis in the Horse

Dr. George Lust and his co-researchers will develop a diagnostic blood test to predict, prior to the development of clinical signs, which horses may have damaged joints due to overexercise. This test will aid early diagnosis and improve the accuracy of prognosis in cases of osteoarthritis. They will also investigate the influences of postoperative exercise and intraarticular polysulphated glycosaminoglycan (Adequan) on articular cartilage regeneration.

Neutrophil-Dependent Mechanisms of Endotoxin-mediated Equine Microvascular Injury



Dr. David Slauson

Dr. David Slauson and Dr. Philip Bochsler of the Department of Pathology have developed an equine microvascular endothelial cell culture system for studying the influence of endotoxin on neutrophil-endothelial interactions. With this system, Slauson and Bochsler have established that endotoxin does not directly injure equine microvascular endothelial cells and that endotoxin-induced injury is neutrophil-dependent. They will attempt to define the mechanisms of neutrophil-mediated microvascular injury to develop appropriate means of therapeutic intervention.

Determination of Nucleotide Sequence of M Protein Gene of *Streptococcus equi*

Streptococcus equi is a group C streptococcus that causes strangles. Dr. John Timoney has shown that vaccines available for strangles stimulate the production of serum antibodies but not local antibodies in the pharynx. To solve this problem, he has begun work on the synthesis of an artificial peptide vaccine that could be used as an intranasal spray and which would not produce adverse reactions.

Travers Awards

The Travers Ball, held in August at the running of the famous Travers Stakes race in Saratoga Springs, New York, raises money to support equine research at the College of Veterinary Medicine at Cornell and the programs of the Saratoga Performing Arts Center. In late 1988, the Travers Committee presented Dr. Robert Phemister, dean of the college, with a check for $41,250. This money is to be used for faculty projects that have the potential to improve the health and well-being of thoroughbreds. The following researchers and their projects were selected to receive funding in 1989.

Culture of Equine Oviductal Embryos

Dr. Barry Ball has shown that 60 to 70 percent of pregnancies in subfertile mares fail between the time of fertilization and day 14 of pregnancy and that this may be due to abnormalities as yet undefined in the early embryo. He will examine two- to four-cell equine embryos for morphology, structure, and growth.

Value of Various Sources of Fat for Racing Thoroughbreds

Dr. Harold Hintz and Dr. Herbert Schryver will compare the digestibility of four forms of processed fat that are presently marketed as dietary additives. This study will help determine their physiological and economical effectiveness.

Nutritional and Other Risk Factors Associated with Orthopedic Diseases in Thoroughbred Horses

Dr. Hussni Mohammed and Dr. Lennart Krook will provide data on the prevalence of orthopedic diseases, describe the distribution of nutritional programs for thoroughbreds in New York State, and evaluate and quantify the association between nutritional factors and the risk of developing orthopedic diseases in thoroughbred horses.

A Chondrocyte Fibrin Polymer Transplant for Cartilage Resurfacing in Horses

A focal or diffuse loss of cartilage from the joint surfaces is common to all arthritic joints. Dr. Alan Nixon will explore the possibility of using cultured chondrocytes and commercially available fibrin-based bonding agents to repair damaged cartilage in horses.

The Effects of Alpha2 Adrenoreceptor Agonist Analgesia on Central Nervous System Function in Thoroughbreds

Alpha2 adrenoreceptor agonist medications, represented by xylazine (Rompun) or detomidine (Domosedan), are typically used for the control of pain or as a preanesthetic, given prior to general anesthesia, for extensive surgery in the horse. They work by producing central nervous system depression, which may be partially due to a change in blood flow to the brain. Dr. Charles Short and Dr. Francis Kallfelz will try to determine if these medications cause behavioral or other central nervous system changes that last longer than the duration of drug action.

Support and Funding for the College

Since its founding in 1865, a unique partnership for support between the public and private sectors has contributed to the growth and distinction of the educational institution that is Cornell University. As the first statutory college established at Cornell, the College of Veterinary Medicine draws its strength and preeminence in teaching, research, and public service from both the long-standing support of New York State and the academic independence and achievements made possible through private gifts and contributions.

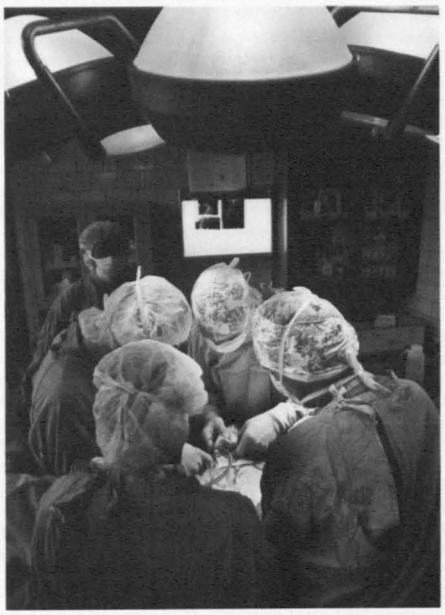
Public Sector Support

In 1988–89, the College of Veterinary Medicine received just over one-third of its operating income in the form of an annual appropriation from the New York State Legislature. This funding, along with income from tuition and fees, supports the "infrastructure" of the college, covering expenses for most faculty and staff salaries, facilities and maintenance, and standard equipment in the teaching hospital, classrooms, and laboratories.

Additional funding for research programs and projects comes to the college through grants and contracts awarded on a competitive basis by state and federal agencies. Cornell's College of Veterinary Medicine ranks first in total research activity and funding among veterinary schools in the United States. In 1988–89, income from these sources made up approximately 35 percent of the college budget.

Private Sector Support

Although private support constitutes a relatively small percentage of the college's current budget, these gifts play a vital role in initiating and building new programs, leading to important advances in veterinary medicine. Gifts from alumni, friends, corporations, foundations, and other organizations enable improvements



A gift of the Kuipers family in memory of their dog Candy provided funds at a critical time for the purchase of a surgery table for the Small Animal Clinic.

in the quality of our college programs far beyond what government funding alone can support. These contributions have significant impact by providing a measure of flexibility that supplements and enhances public funding to keep us at the forefront of veterinary medicine.

Gifts and grants from private sources fund innovation on the part of faculty and inspiration for students at the College of Veterinary Medicine—in many cases by providing "seed money," which can move a pilot project in the classroom or research lab to the stage where ongoing funding can be successfully obtained. Cornell's veterinary alumni are among our most loyal and generous donors; in 1988–89, 39 percent provided gifts to the college. In the past year, alumni support helped to leverage major gifts from the Finger Lakes and New York divisions of the Horsemen's Benevolent and Protective Association and the Mrs. Cheever Porter Foundation to establish the new Equine Performance Testing Clinic.

Discretionary gifts from many alumni and friends made available to the dean have provided the resources to recruit outstanding new faculty and capitalize on unexpected and unbudgeted opportunities to bring distinguished guest lecturers to campus, test new teaching strategies, and support student initiatives. Such quick action, not feasible without unrestricted donations, often provides the college with an important competitive edge. Several major unrestricted gifts, received through bequests, will be invested and applied in support of a variety of programs and projects where the need is greatest in coming years.

Gifts have answered critical needs in other areas as well. New scholarships have been created with gifts from individuals, foundations, associations, and alumni organizations to provide much-needed assistance to veterinary students. A friend stepped in at the critical time with funds to purchase a new surgical table for the Small Animal Clinic. Gifts from veterinarians and pet owners, made in memory of beloved pets, continue to support important studies seeking new ways to cure and treat diseases and improve the health of companion animals.

The College of Veterinary Medicine will rely on annual allocations from New York State for basic operating support and remains confident that its faculty will continue to compete successfully for research grants and contracts in the future. Given the predictable budgetary constraints that will limit future increases in and the availability of state and federal funding, private support will become increasingly critical as the college strives to maintain its margin of excellence and respond to new challenges in veterinary medicine.

Major Donors and Sponsors in 1988–89

The support of all our donors and sponsors, at every level, is vital to our efforts in fostering animal health. Unfortunately, space in this publication does not permit a complete listing of the more than 1,500 contributors who supported the College of Veterinary Medicine in 1988–89. We recognize below those alumni, friends, corporations, foundations, organizations, and public agencies who have provided support in the past year at a level of $500 or more.

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New York State Agriculture and Markets
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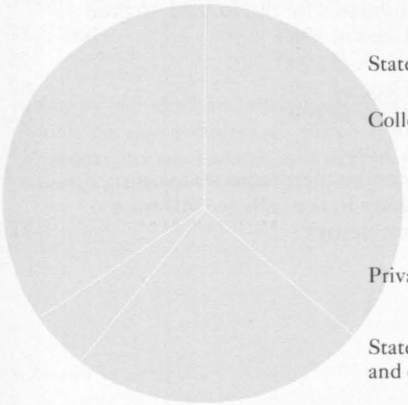
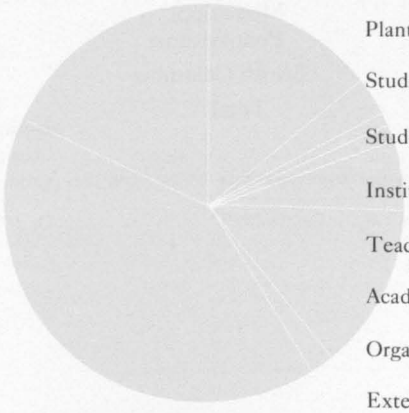
SOURCES OF FUNDS 1988–89



USE OF FUNDS 1988–89



Statistics

Table 1

LIBRARY USE, 1988–89

On campus	
Reserve books (in-library use)	8,209
Books lent (home use)	23,774
Reference questions answered	8,172
Audiovisuals and software used	6,122
Computer searches performed	1,511
Total, on campus	47,788
Interlibrary	
Books lent	72
Photocopy items provided	701
Books borrowed	109
Photocopy items received	1,099
Total, interlibrary	1,981

Table 2

LIBRARY HOLDINGS, 1988–89

Bound volumes at beginning of year	75,856
Acquisitions	1,596
Less withdrawals	- 426
Total bound volumes	77,026
Periodicals and annuals	1,324
Audiovisual items	32,130
CD-ROM titles	5
Microcomputer software titles	44

Table 3

QUALIFICATIONS OF ACCEPTED APPLICANTS, CLASS OF 1993

	Number of Students	*Percentage of Class*
Amount of preveterinary preparation		
Three years of college	11	13
Four years of college	42	53
More than four years of college (graduate level)	27	34
Institution previously attended		
Cornell University	32	40
Other	48	60
Field of preparatory study		
Animal science (or related)	30	37
Biological sciences (or related)	35	44
Other	15	19

Table 4

GEOGRAPHIC DISTRIBUTION OF ACCEPTED APPLICANTS, CLASS OF 1993

Legal Residence	*Number*
New York	61
Contract states	14
Connecticut	2
Delaware	1
Maryland	2
New Jersey	6
Puerto Rico	1
Vermont	2
Other states	4
Arkansas	1
Florida	1
Mississippi	1
Pennsylvania	1
British Columbia	1
Total	80

Table 5

ADMISSION SUMMARY, CLASS OF 1993

Area	*Applicants*	*Accepted*
New York	207	61
Contract states	112	14
Other	132	5
Total	451	80

Table 6

STUDENT ENROLLMENT, 1988–89

Candidates for the D.V.M. degree	
Class of 1989	77
Class of 1990	75
Class of 1991	82
Class of 1992	81
Total	315
Cornell undergraduates taking courses in the college (full-time equivalents)	71

Table 7

GRADUATE STUDENTS AT THE COLLEGE OF VETERINARY MEDICINE, 1988–89

Candidates for the Ph.D. degree	85
Candidates for the M.S. degree	22

Table 8

DEGREES AWARDED, 1988–89

D.V.M. (with distinction: 4)	77
M.S.	9
Ph.D.	17

Dr. W. Jay Gould with an avian patient in the Small Animal Clinic's intensive care unit.

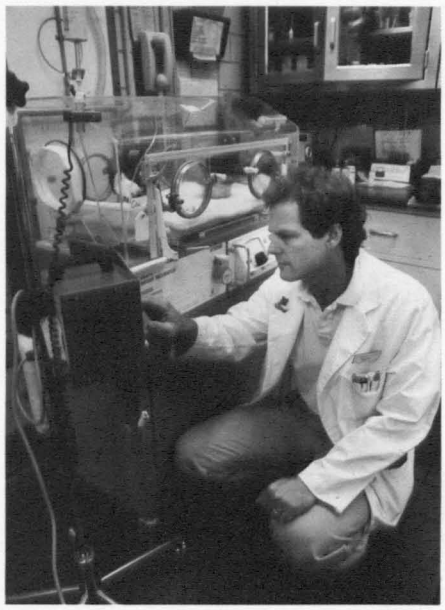


Table 9

INTERNS AND RESIDENTS, 1988–89*

Teaching Hospital	
Interns	9
Residents	19
Pathology	
Residents	8
Total	36

* *As of August 15, 1989*

Table 10

CLINICAL PATIENTS AND DIAGNOSTIC EXAMINATIONS, 1988-89

	Horses	*Cattle*	*Sheep & Goats*	*Swine*	*Dogs*	*Cats*	*Birds*	*Others*	*Total*
Medical and surgical patients	1,789	582	35	7	8,393	3,434	422	352	15,014
Ambulatory Clinic patients	1,696	36,361	1,982	573			58	40,670	
Clinical pathology specimens	7,574	3,257	132	548	15,142	4,575	NA	2,748 [a]	33,976
Diagnostic Laboratory tests	28,040	314,003	9,680	2,125	27,165	9,872	2,096	11,595	404,576
Necropsies	319	456	89	43	395	223	108	490	2,123
Surgical pathology specimens	705	455	88	36	4,304	960	66	218	6,832
Laboratory animal examinations			7		279	62	1,520	307	2,175
Aquatic animal accessions								473	
Marine Biological Laboratory								394 [b]	
Fish Diagnostic Laboratory								79 [b]	
Poultry Diagnostic Services [c]									3,633
Ithaca							2,315		
Eastport							1,318		
Quality Milk Promotion Services	2	132,592	774	2	5			81 [d]	133,956
Total									643,428

[a] Category includes birds, sheep, and other miscellaneous species.
[b] Number of case submissions; each may have included several animals.
[c] Includes chickens, turkeys, ducks/geese, and other poultry and birds.
[d] Number of samples submitted includes 4 rabbits, bulk tanks, bedding, teat dips, water, and other environmental samples.

Financial Statements

Table 11

SUMMARY OF GRANT, CONTRACT, AND RESTRICTED GIFT EXPENDITURES BY SOURCE OF FUNDING

Source	*1988–89*	*1987–88*
Federal		
Department of Defense		
Grants and contracts	$4,789	$ 87,525
Cornell Biotechnology Institute	383,831	474,591
Department of Energy	0	0
Environmental Protection Agency	86,359	166,459
National Institutes of Health	4,722,815	4,840,857
National Science Foundation	335,530	77,152
Department of Agriculture		
Grants and contracts	554,279	503,270
Federal appropriations	318,952	265,593
Total, federal grants and contracts	$6,406,555	$6,415,447
State		
Cornell Biotechnology Institute	$232,467	$ 242,615
Department of Environmental Conservation	103,220	40,476
Harry M. Zweig Memorial Fund	388,330	396,361
New York State Agriculture and Markets contracts	4,415,520	4,263,999
New York State Racing and Wagering Board	3,099,894	3,033,762
New York State Sea Grant Institute	18,959	28,688
Other state agencies	343	2,016
Total, state grants and contracts	$8,258,733	$8,007,917
Total, federal and state grants and contracts	$14,665,288	$14,423,364
Private Support (Restricted)		
Industry		
Grants and contracts	$1,028,246	$1,034,418
Cornell Biotechnology Institute	50,752	54,727
Foundations	318,812	347,355
Alumni, friends, associations, nonprofit organizations	514,687	357,198
Endowments	184,477	190,419
Total, private support (restricted)	$2,096,974	$1,984,117
Grand total, grants, contracts, and gifts	$16,762,262	$16,407,481

Table 11 is a summary of grant, contract, and restricted gift expenditures of the College of Veterinary Medicine at Cornell for the fiscal years July 1, 1987, through June 30, 1988, and July 1, 1988, through June 30, 1989. The amounts reported exclude expenditures for indirect costs as well as expenditures of unrestricted gifts. Previous annual reports have titled the Private Support section "Industry, foundations, gifts."

New Editor for Cornell Veterinarian

Dr. Maurice White, associate professor of clinical sciences, has been named editor of the Cornell Veterinarian. *White is an ambulatory clinician in the Veterinary Medical Teaching Hospital and lectures in selected D.V.M. core courses. He is also the developer of* CONSULTANT, *a system for computer-assisted differential diagnosis and one of the first diagnostic databases available for widespread use in human or veterinary medicine.*

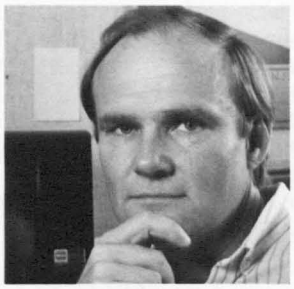


Table 12

SOURCES OF FUNDS (in Thousands)	*1988–89*	*1987–88*
State appropriation	$14,888	$14,431
Federal and state grants and contracts	14,665	14,423
Private support (restricted)	2,097	1,984
College income*	9,961	8,406
Total	$41,611	$39,244

** College income includes indirect cost recovery on grants and contracts, tuition, unrestricted gifts from private sources, and other income from college programs.*

Table 13

USES OF FUNDS (in Thousands)	*1988–89*	*1987–88*
Instruction and departmental research	$5,896	$5,656
Teaching Hospital	5,906	5,424
Organized research	17,025	15,962
Extension and public service	7,612	7,530
Academic support	720	609
Student services	349	303
Institutional support	2,859	2,556
Plant maintenance and operation	792	832
Student aid	452	372
Total	$41,611	$39,244

Tables 12 and 13 are summaries of the income and expenditures of the College of Veterinary Medicine for fiscal years July 1, 1987, through June 30, 1988, and July 1, 1988, through June 30, 1989. These figures do not include expenditures for salary fringe benefits, estimated for 1988–89 at $5,397,282, or for general support services provided by the university. In previous years, private support was included under grants and contracts in table 12.

Olafson Medal in Veterinary Pathology

Dr. Frank Bloom '30 was awarded the Olafson Medal in Veterinary Pathology after nomination by noted pathologists in the United States and selection by a panel of faculty and advisers at the College of Veterinary Medicine. The Olafson Medal is given in recognition of outstanding individual commitment by a pathologist within the areas of teaching, diagnostic pathology, and research and reflects Dr. Peter Olafson's own dedication to and advancement of the field of veterinary pathology. The award is sponsored by the Department of Pathology, with support from family, friends, and former students of Dr. Olafson.

Faculty and Staff Changes

New Appointments

Verna K. Affolter, instructor
Ana L. Alcaraz, visiting fellow
Hui-Ging Bai, visiting associate professor
Jeffrey E. Barlough, assistant professor
Stephen C. Barr, assistant professor
Felix D. Bastida-Corcuera, visiting assistant professor
Jonathan Black, adjunct professor
James W. Casey, associate professor
Thomas Donnelly, adjunct assistant professor
Marwan E. El-Sabban, research associate
Carsten Enevoldsen, visiting fellow
Laurent Fuhrer, visiting fellow
Daniel G. Gamett, postdoctoral associate
Robert O. Gilbert, assistant professor
Ruben N. Gonzalez, senior research associate
Martin Groschup, visiting fellow
Chen-Wen Huang, postdoctoral associate
Ranier Huopalahti, visiting assistant professor
Jorge Jacuinde, visiting fellow
Sylvia M. Jones, postdoctoral associate
Jorge W. Lopez, assistant professor
Xiu-Feng Lu, postdoctoral associate
John W. Ludders, associate professor
Esa A. Mantysaari, research associate
Ahmed A.H. Mutalib, senior extension associate
Colin R. Parrish, assistant professor
Tony D. Perdu, research associate
John E. Saidla, feline extension veterinarian
Ynte Schukken, visiting assistant professor
Marsha A. Segerberg, postdoctoral associate
Nori G. Tolosa de Talamoni, visiting assistant professor
Anne K. Voss, postdoctoral associate
Timothy Wachs, postdoctoral associate
Ryoji Yamaguchi, visiting assistant professor
Andrew Yen, associate professor

While animal health technician Kevin Bleck restrains the patient, Dr. William Rebhun checks the progress of lameness in a bull.

Promotions and Title Changes

Ana L. Alcaraz, resident (from visiting fellow)
Hellmut E. Augustin-Voss, veterinary assistant (from postdoctoral associate)
Felix D. Bastida-Corcuera, veterinary assistant (from visiting assistant professor)
Philip N. Bochsler, instructor (from veterinary assistant)
Heidi S. Cross, postdoctoral associate (from postdoctoral fellow)
*Normand G. Ducharme, associate professor (from assistant professor)
David A. Dzanis, instructor (from veterinary assistant)
Jon W. Erickson, postdoctoral fellow (from postdoctoral associate)
Kathleen P. Freeman, visiting fellow (from postdoctoral associate, from assistant professor)
William A. Horne, assistant professor (from senior research associate)
Katherine A. Houpt, professor (from associate professor)
*Thomas J. Kern, associate professor (from assistant professor)
Benjamin Lucio-Martinez, associate professor (from senior research associate)
Wolfgang M. Muck, postdoctoral fellow (from visiting fellow)
Stephen B. Olmsted, postdoctoral associate (from assistant)
Julio Oriol, visiting fellow (from instructor, from veterinary assistant)
Marie A. Perrone, instructor (from senior resident)
*John F. Randolph, associate professor (from assistant professor)
Richard E. Rawson, instructor (from postdoctoral associate)
*Janet M. Scarlett, associate professor (from assistant professor)
Karel A. Schat, professor (from associate professor)
Sang J. Shin, associate professor (from senior research associate)
Juergen Steinmeyer, postdoctoral associate (from postdoctoral fellow)
Angelika E. Stock, veterinary assistant (from postdoctoral associate)
Bud C. Tennant, James Law Professor of Medicine (from professor)
Karen M. Trotter, postdoctoral associate (from assistant)
Robert H. Wasserman, James Law Professor of Physiology (from professor)
Gregory A. Weiland, associate professor (from acting chair)
Duzhang Zhu, postdoctoral associate (from veterinary assistant)

**Tenure received*

Completed Appointments

Jean-Francois Beaulieu, postdoctoral fellow
Michael L. Bruss, visiting associate professor
Thomas J. Divers, visiting associate professor
Tae Young Ha, visiting fellow
Fidelma A. Kennedy, courtesy assistant professor
Thomas J. Lane, visiting professor
Hannu M. Mykkanen, visiting fellow
Stephen B. Olmsted, postdoctoral associate
Kenneth Stebbins, instructor
Rachid Zini-Filali, visiting professor

Resignations

Hector W. Alila, senior research associate
Steven P. Arnoczky, adjunct associate professor
Robert A. Bullis, senior research associate
Donald R. Callihan, senior research associate
Stephen G. Dill, assistant professor
Kathleen P. Freeman, visiting fellow
Carlos M. Gamazo, postdoctoral fellow
Marian C. Horzinak, courtesy professor
Lance F. Karcher, instructor
Hae Shik Kim, visiting fellow
Martial Kubina, postdoctoral associate
Jen-Hsou Lin, visiting professor
Thomas V. Little, instructor

Glenn L. Millhauser, postdoctoral fellow
Wolfgang M. Muck, postdoctoral fellow
Catherine A. Picut, postdoctoral fellow
Carlos G. Santisteban, visiting assistant professor
H.L. Shivaprasad, assistant professor
Kerstin Thoren-Tolling, visiting associate professor

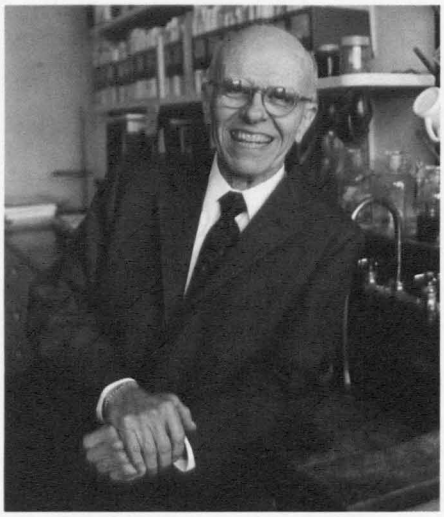
Retirements

Jay R. Georgi, professor of veterinary parasitology, emeritus
Charles E. Hall, associate professor
William Hansel, Liberty Hyde Bailey professor, emeritus
Louis Leibovitz, professor of aquatic animal medicine, emeritus
Donald S. Postle, professor of veterinary science, emeritus

Deaths

Arthur G. Danks, professor emeritus

Faculty Awards and Honors



Dr. Habel Honored

In 1988, Dr. Robert E. Habel, professor emeritus of anatomy, was awarded the Outstanding Achievement Award from the American Association of Veterinary Anatomists (AAVA). Habel is the second recipient of this award; Dr. Ralph Kitchell, the first recipient in 1986, presented the award to Habel during ceremonies at the AAVA annual meeting held in Corvallis, Oregon. The award honors Habel for "his commitment to excellence, his scholarly achievements, and his distinguished contributions to veterinary anatomy." He is author of the textbooks *Applied Veterinary Anatomy* and *Guide to the Dissection of Domestic Ruminants* and coauthor of *Guide to the Dissection of the Horse.*

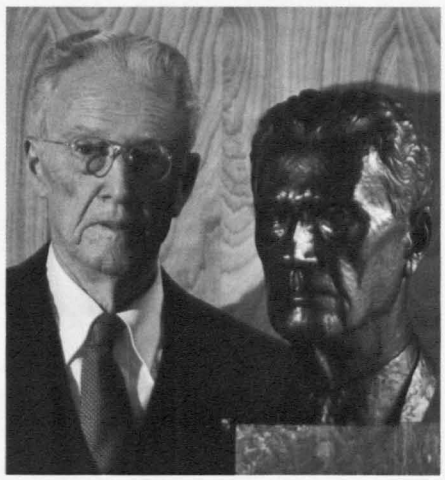
Dr. Roberts Receives Salmon Award

Vermont practitioner Dr. Stephen J. Roberts received the Daniel Elmer Salmon Award for distinguished alumni service from the Alumni Association of the College of Veterinary Medicine. Roberts is a 1938 alumnus of the college and a former faculty member. He retired in 1972 after thirty years as a teacher and clinician. He is the author of *Veterinary Obstetrics and Genital Diseases*, a standard textbook in veterinary medical curriculums. An outstanding volunteer, Roberts serves on the college's Development Committee and is a member of the Alumni Association's Executive Committee. He served as secretary-treasurer of the Alumni Association from 1948 to 1965.

The Daniel Elmer Salmon Award for distinguished alumni service was first awarded in 1986. In addition to Roberts, it has honored four other college alumni: Dr. Arthur Gordon Danks '33, Dr. Ellis P. Leonard '34, Dr. Frederick Oliver Wright '41, and Dr. John Murray '39. The award is named in honor of Salmon, the first person at Cornell and in the United States to earn a Doctor of Veterinary Medicine degree in a regular academic program. Salmon is also known for isolating the organism *Salmonella*, which was named for him.

Author Honored by State Society

Dr. Ellis P. Leonard, a 1934 alumnus of the College of Veterinary Medicine, was recognized for his contributions to the veterinary profession in a unique presentation by the New York State Veterinary Medical Society on January 10, 1989. At the banquet held during the college's annual conference for veterinarians, Leonard was presented with a bronze bust of himself, sculpted by New York City artist Elliot Goldfinger. The bust was given in appreciation for Leonard's contributions to the coming 1990 centennial celebration of the New York State Veterinary Medical Society. Over the past three years Leonard has compiled a one hundred–year history of the society, which will be published in a commemorative book entitled *A History of Veterinary Medicine in New York State.*



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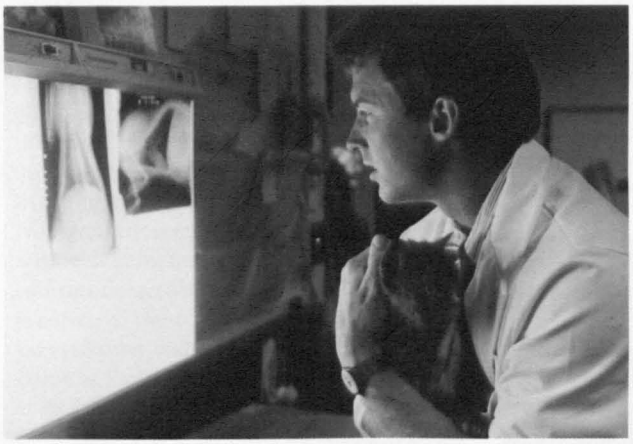
Marcia J. Sawyer, director of student affairs and admissions
Robert Webster, director of facilities administration
Susanne K. Whitaker, librarian, Flower Veterinary Library



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Donald F. Smith, chair, Department of Clinical Sciences
Donald Lein, director, Diagnostic Laboratory
Douglas D. McGregor, director, James A. Baker Institute for Animal Health
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College information: 253-3000

An operator is on duty from 8:00 a.m. to 5:00 p.m. Monday through Friday, except holidays.

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Direct general inquiries to

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College of Veterinary Medicine
Cornell University
Ithaca, New York 14853-6401
Telephone: 607 253-3740

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Requests for information concerning the following special programs or facilities may be directed to the persons and numbers listed. All addresses are at the College of Veterinary Medicine, Cornell University, Ithaca, New York 14853-6401.

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Marcia James Sawyer
C117 Schurman Hall
Telephone: 253-3700

James A. Baker Institute for Animal Health
Dr. Douglas D. McGregor
Snyder Hill Road
Telephone: 277-3044

Biomedical Communications
Sandra P. Berry
L21 Teaching Hospital
Telephone: 253-3234

Biomedical Electronics
H. Donald Hinman
621 Research Tower
Telephone: 253-3600

Bovine Research Center
Dr. Donald H. Schlafer
325C Research Tower
Telephone: 253-3352

Jocelyn Kearing '92, on a leave of absence from the College of Veterinary Medicine, competed on the 1988 Olympic rowing team in Seoul, Korea.

Center for Research Animal Resources
Dr. Fred W. Quimby
221 Research Tower
Telephone: 253-3520

Computing Facility
John M. Lewkowicz
624 Research Tower
Telephone: 253-3606

Contagious Equine Metritis Quarantine Station
Dr. Donald H. Lein
206 Diagnostic Laboratory
Telephone: 253-3900

Continuing Education
Dr. John E. Saidla
101C James Law Auditorium
Telephone: 253-3200

Diagnostic Laboratory
Dr. Donald H. Lein
206 Diagnostic Laboratory
Telephone: 253-3900

Equine Drug Testing and Research
Dr. George A. Maylin
925 Warren Drive
Telephone: 255-6555

Equine Infectious Diseases, Laboratory for
Dr. Dorothy F. Holmes
216 Research Tower
Telephone: 253-3412

Equine Research Park
Carol Collyer
Director of Equine Services
Telephone: 255-7753

Extension Service
Telephone: 253-3900

Bovine
Dr. Michael A. Brunner
204 Diagnostic Laboratory

Bovine/Epidemiology
Dr. Christine Rossiter
205 Diagnostic Laboratory

Equine
Dr. John E. Lowe
209 Diagnostic Laboratory

Feline
Dr. John Saidla
208 Diagnostic Laboratory

Swine
Dr. Barbara Straw
203 Diagnostic Laboratory

Feline Health Center
Dr. Fredric W. Scott
618 Research Tower
Telephone: 253-3414

Graduate Programs Office
Nanette Blakely
Schurman Hall
Telephone: 253-3276

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Susanne Whitaker
C201 Schurman Hall
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Dr. Robert F. Playter
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QUALITY MILK PROMOTION PROGRAM, REGIONAL LABORATORIES:
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Buffalo Raceway, Hamburg
Midstate Raceway, Vernon
Downs, Vernon
Monticello Raceway, Monticello
Saratoga Raceway, Saratoga Springs
Yonkers Raceway, Yonkers

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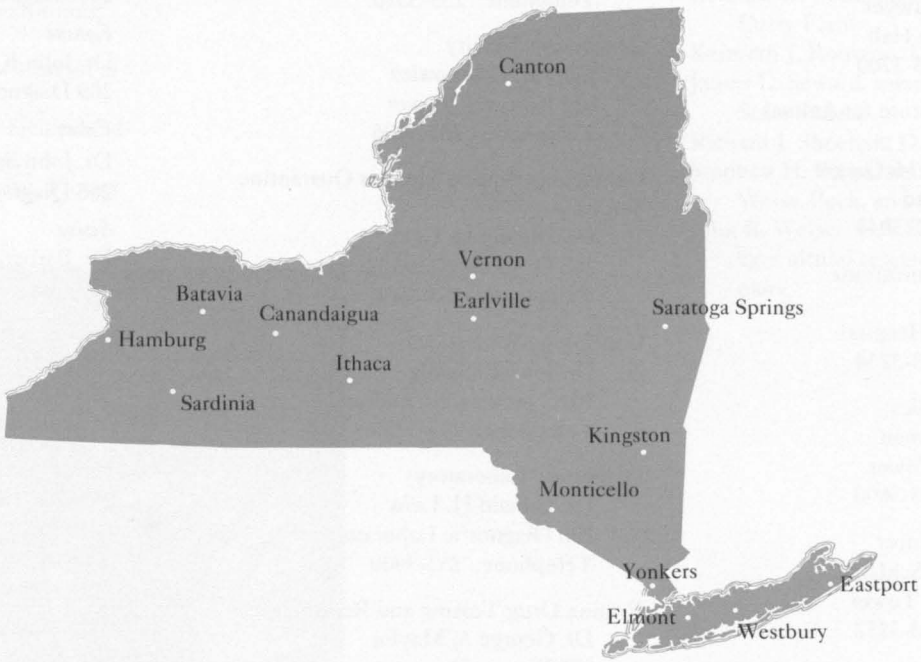
Belmont Racetrack, Elmont
Finger Lakes Racetrack, Canandaigua
Saratoga Racecourse, Saratoga Springs



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VETERINARY MEDICINE
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