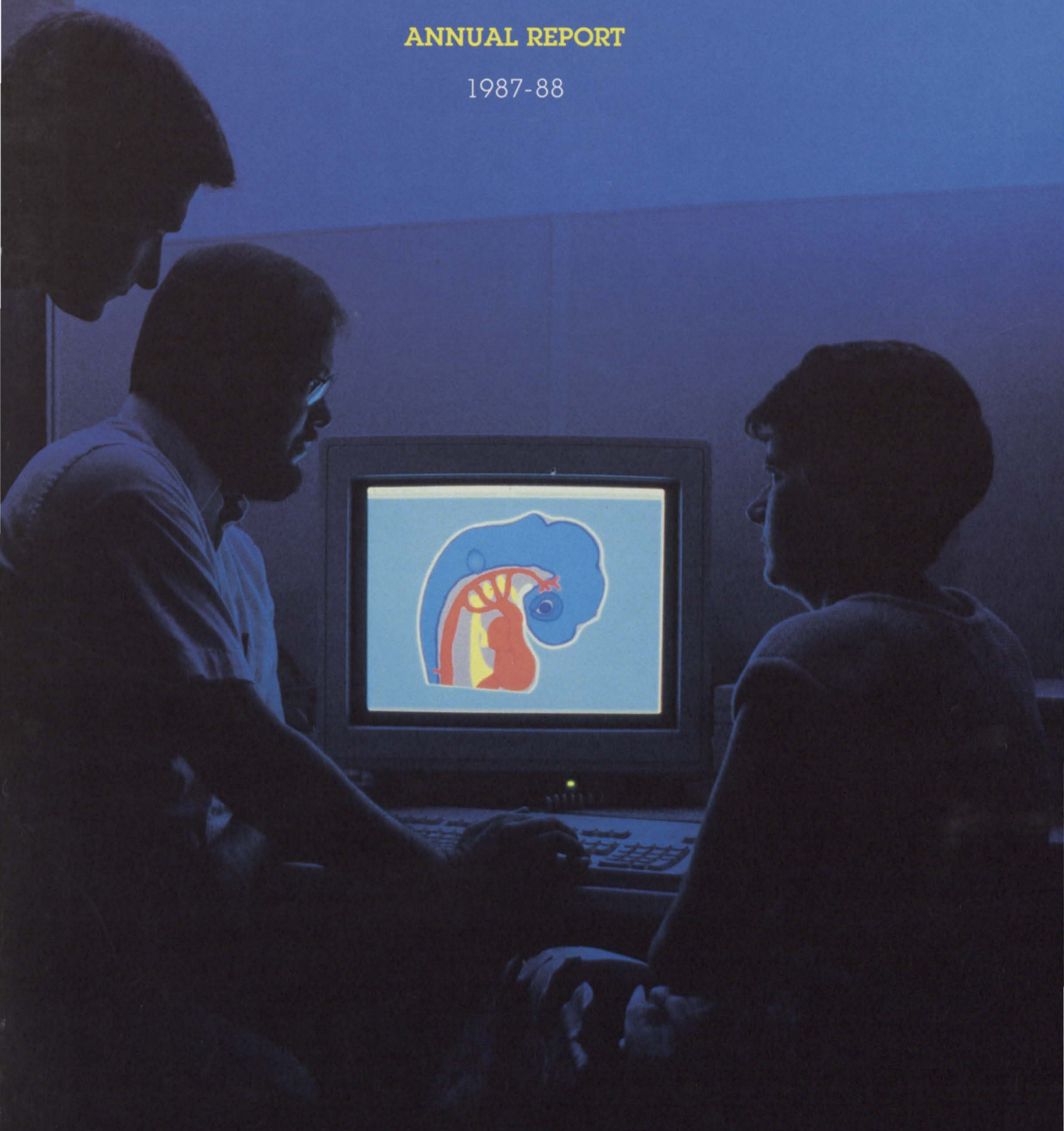


COLLEGE OF
VETERINARY MEDICINE

ANNUAL REPORT

1987-88



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-FIRST ANNUAL REPORT

July 1, 1987-June 30, 1988

Office of the Dean

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

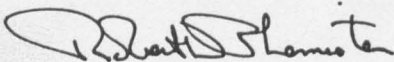
September 1, 1988

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, 1988, this being the ninety-first annual report of this college.

Respectfully submitted,



Robert D. Phemister
Dean

Office of the President

Cornell University
Ithaca, New York

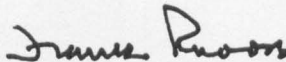
October 6, 1988

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, 1987, and ending June 30, 1988.

Sincerely yours,



Frank H. T. Rhodes
President

Office of the Chancellor

State University of New York
Albany, New York

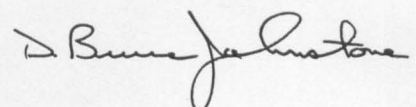
October 16, 1988

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

Ladies and Gentlemen:

Pursuant to the law, the 1987-88 Annual Report of the College of Veterinary Medicine at Cornell University is herewith submitted.

Very respectfully yours,



D. Bruce Johnstone
Chancellor

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Ozzie, a two-year-old male camel, was a patient in the Large Animal Clinic. Surgeons successfully repaired a fracture of his left tibia.

The College of Veterinary Medicine at Cornell University, in Ithaca, New York, is the primary health resource for the state's multibillion-dollar 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 1987-88 year, of the students, faculty, and staff who worked to accomplish that mission and, by doing so, to justify the public trust.



Dean Robert Phemister

MESSAGE FROM THE DEAN

It has been 112 years since the first Doctor of Veterinary Medicine degree was awarded by Cornell University and more than 90 years since the college was granted its charter by the state of New York. Measured against that time span, with its accompanying record of accomplishments, the account of any single year is likely to seem insignificant. Yet as I look back on the year 1987–88, I am impressed by the substantial progress the college has made on many fronts. I suspect that it has always been so. Only by continually improving its programs has the college been able to sustain its position in the front ranks of the profession.

We began the year with new leadership in place in several academic departments and so were able to fill a number of faculty vacancies that had accumulated over the past two years. Many of them were new positions made available through increased state funding; others represented openings following retirements or departures. In all, twelve individuals joined our professorial ranks during the past year. I am confident that they will bring credit not only to themselves but to the college and Cornell University. Such positions are filled only after a national or international search for the best qualified person. In search after search we were successful in recruiting our first choice, which reflects well on the current standing of the college and augurs well for its future. A particularly noteworthy addition was the establishment of an endowed chair in wildlife medicine. Through the great generosity of Dr. Jay Hyman '57, the college will now be able to give increased attention to the health needs and diseases of nondomestic species of animals.

In large part because of the excellence of our faculty, we continue to attract outstanding students. National statistics show that again this year we were the most selective college of veterinary medicine in the United States in terms of the number of offers extended relative to the size of our applicant pool. The Graduate Record Examination (GRE) scores of our entering class were the highest among those at all the colleges that use this nationally accepted test. Statistics aside, it is the diversity of their backgrounds, the richness of the experience they bring, and the breadth of their talents that impress us so greatly. Educators in all fields have long noted that if a college could only do one thing right, it should be to admit outstanding students, for that is a giant step toward having excellent graduates.



Dr. John Hermanson (right) helps teach the gross-anatomy laboratory for first-year students, which is a yearlong course on the anatomy of dogs, horses, cows, small ruminants, pigs, birds, and fish.

Another section of this report offers a glimpse of the breadth and significance of the college's research activities. A recent assessment of veterinary medical education in the United States (the Pew National Veterinary Education Program) concluded that "research, more than any other function of a veterinary school, will determine how effective the profession will be in serving the needs of our rapidly changing society." A commitment made several decades ago to develop the research mission of the college has been successful beyond what could have been imagined at that time. During the past year more than \$16 million was spent on various research projects. That the majority of the funds were obtained on a competitive basis reflects well on the scientific capabilities of the faculty. For the past several years

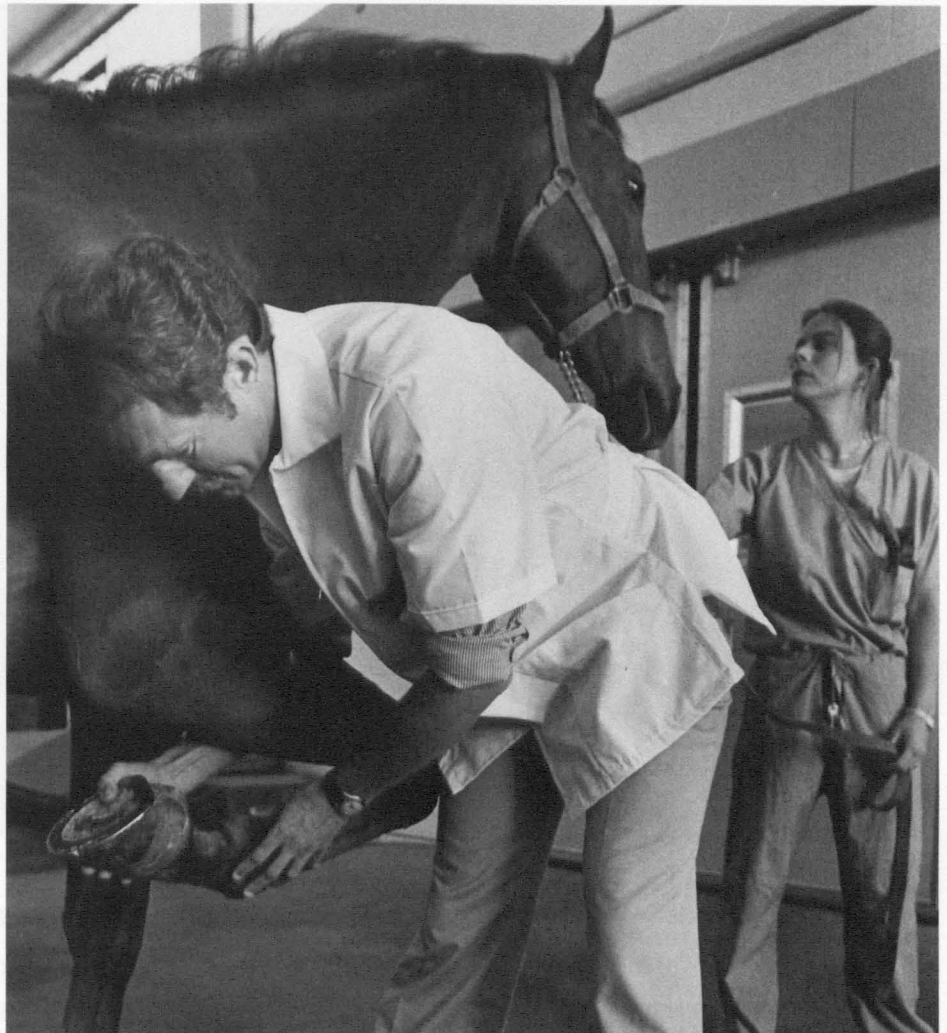
the college's research expenditures have exceeded those of any other college in North America, and that was true again this year. Moreover our research program continues to grow in the face of increased national competition for funding.

One of the missions of the college is to provide veterinary medical services that are responsive to the needs of society. In fulfilling that mission, we have given emphasis to services that complement our educational programs and are not generally available from veterinarians in private practice. Thus the Teaching Hospital at the College of Veterinary Medicine serves as a major referral center for specialized diagnostic, medical, and surgical services. The animal patients are an integral part of the education of veterinary students, interns, residents, and graduate students. During the past year we strengthened several clinical areas by adding faculty members with special expertise,

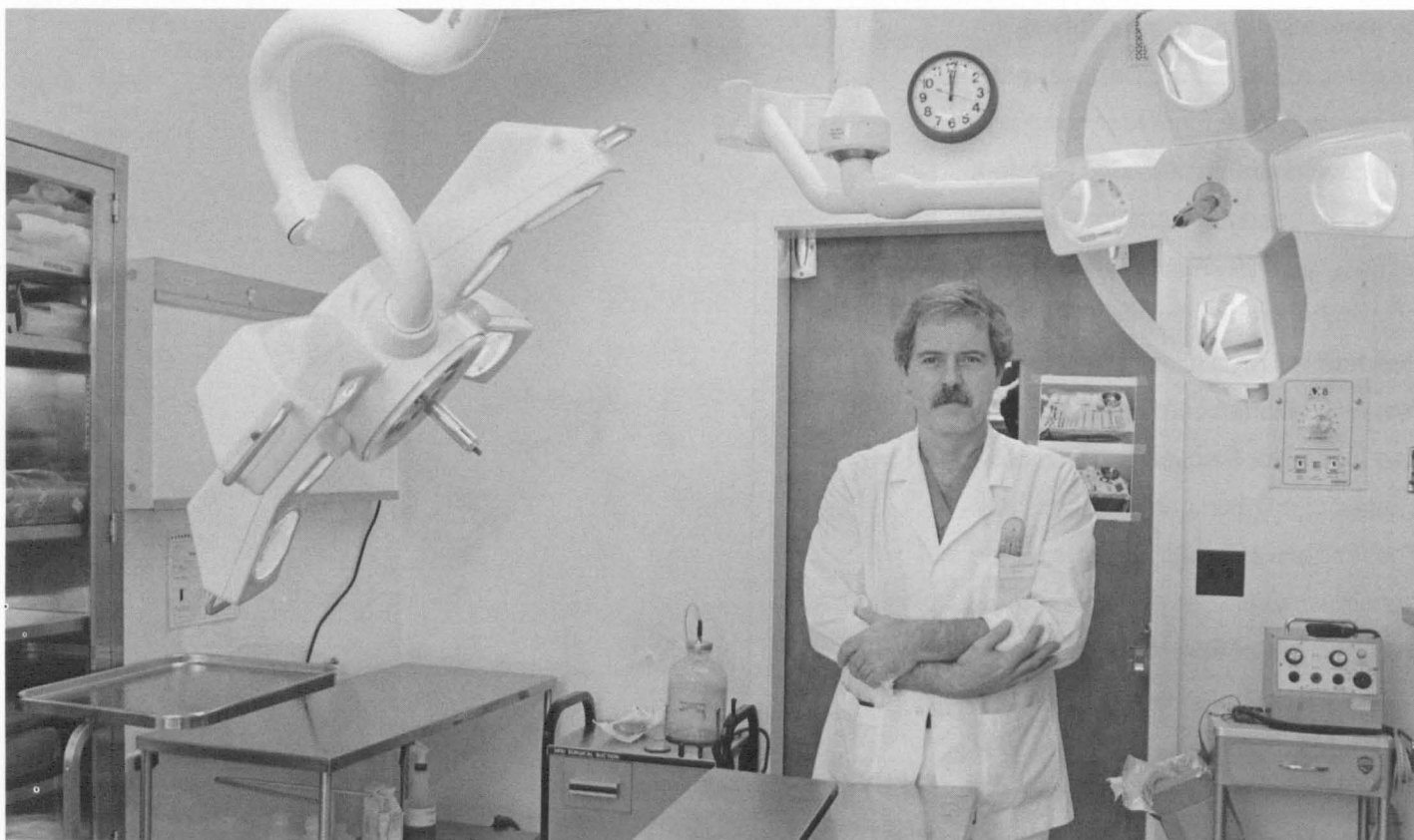
by renovating limited areas of the hospital, and by adding a major performance testing facility for horses. The new laboratory includes a state-of-the-art treadmill capable of simulating conditions that require maximal physical effort by the patient. The treadmill will greatly assist in the direct evaluation of cardiopulmonary and locomotor function and will aid studies of nutrition and metabolism. The facility was made possible by the generous support of alumni and by major gifts from the Horsemen's Benevolent and Protective Association and the Mrs. Cheever Porter Foundation. Constraints on space continue to be a major concern in the hospital, as they are throughout the college. With the assistance of the State University Construction Fund, we have completed the programming phase of our facilities master plan. As soon

as legislation is passed increasing the bonding authority of the State University of New York, we will begin to benefit from an appropriation of \$5.7 million that will enable us to complete the detailed planning and design phase. We are optimistic that work will have begun by the time this report is published.

This is a time when veterinary medicine, in common with other health professions, must respond to dramatic changes in its external environment. We are challenged, for example, to make full use of the recent spectacular advances in molecular biology and in the electronic management of information. We are being challenged to react rapidly to profound structural and technological changes in animal agriculture. Only by understanding and adjusting to those changes will veterinary medicine continue to make significant contributions to animal health and production. Changes in attitudes about animals have elevated expectations for their nutrition, housing, and health care. Major



Dr. Alan Nixon joined the faculty of the Department of Clinical Sciences in May. An equine orthopedic surgeon, he is researching diseases of joints and tendons.



Dr. Robert Kaderly, newly appointed chief of the Teaching Hospital's surgery section, stands in the newest of the Small Animal Clinic's surgery suites. This surgery room is reserved for complex orthopedic procedures and ophthalmic surgeries.

demographic changes in the human population of the United States, with their associated economic and social factors, are already affecting the kinds of companion animals people choose and the kinds of animal health care they seek. The profession must also respond to increased expectations for food safety and public health, as well as to the global problems of infectious disease, inadequate food production, and toxic residues. Each of those challenges opens opportunities for the profession to expand and enhance its role in society.

This college has a long tradition of leadership in serving the needs of society. As those needs change, it is essential that we respond to the changes. The past year has been one of working toward that end. A faculty symposium entitled "Veterinary Education at Cornell" was held in the fall and was very well attended. For two days, working in small groups and in general sessions, a hundred faculty members considered the present status and future needs of our teaching programs; the ways we evaluate students; the balance among teaching, research, and service; and the role Cornell will play as we approach the next century. After considering various alternatives and attempting



to define appropriate solutions, the participants made many specific recommendations. Those led to specific proposals and actions that will strengthen our educational program. For example, increased support has been made available to encourage instructional innovation and to improve teaching services. Greater emphasis has been given to instruction in ethics, including a new course in veterinary ethics that will be offered this fall. The admission process and the course requirements for admission were scrutinized, and major changes were made. Additional recommendations from the symposium will be implemented during the coming year.

Clark Kerr has said, "The major test of a modern American university is how wisely and how quickly it adjusts to important new possibilities." It is fair to apply that acid test to the College of Veterinary Medicine at Cornell. Indeed, it is our challenge to ensure that this college and its graduates earn a position of leadership and distinction that matches the enormous possibilities of the final years of this century, just as our predecessors earned such a place at the close of the last century. Given our past traditions and present strengths, I am confident that we shall meet the challenge.

Surgery resident Mark Parchman discusses a patient's case with a student on his service. Fifty-nine percent of the graduates of the class of 1988 entered private practice, and 16 percent entered internships, research positions, or post-doctoral study.



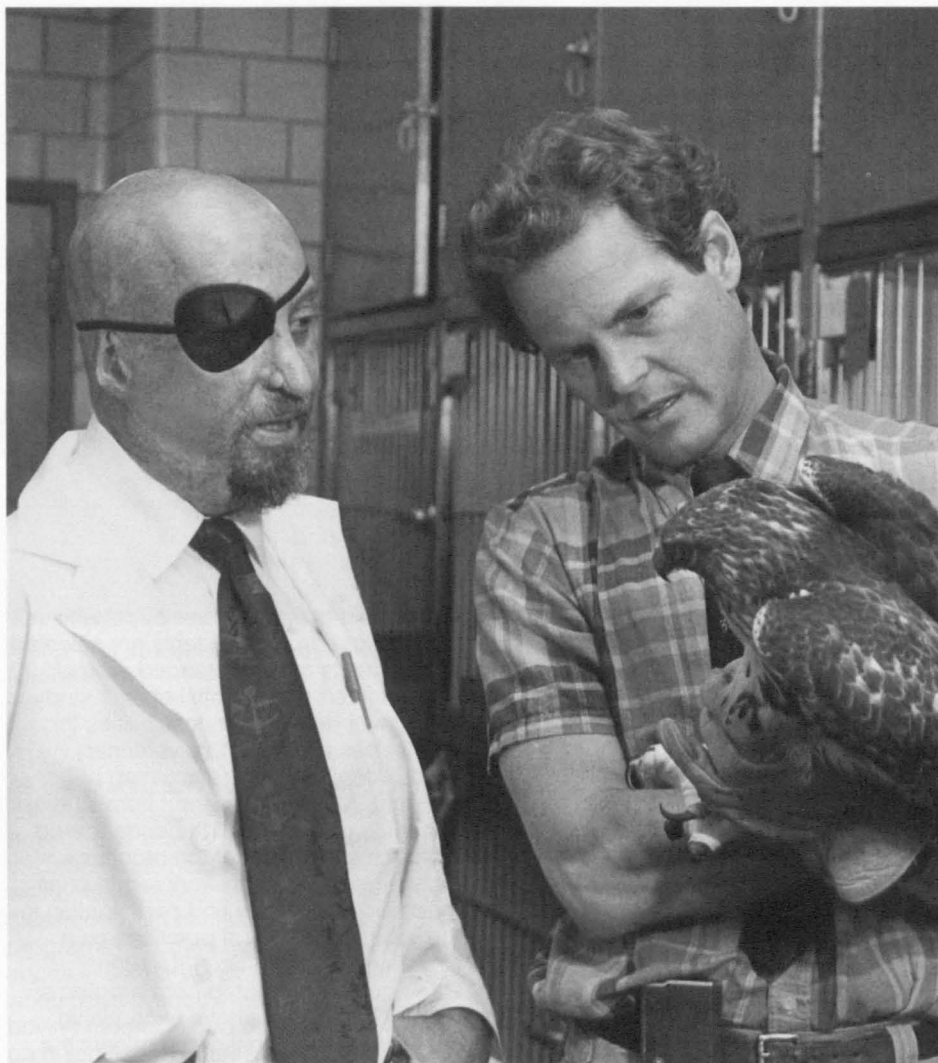
EDUCATION AND THE COLLEGE

As the fiscal year was ending in June, the members of the class of 1988 were entering the veterinary medical profession. Three percent of the class chose research and related positions, and 13 percent decided to continue their training as interns in programs at veterinary colleges across the United States and Canada. But most of the graduates (59 percent) took the traditional path into practice, with 72 percent of that group employed in small-animal practices, 17 percent in mixed-animal practices, and 11 percent in large-animal practices. Students who had not indicated their future plans by graduation could choose employment with a number of private practices throughout the Northeast.

As they pursue their professional careers, the graduates of the class of 1988 have the opportunity to demonstrate the ability that their professors and an admission committee saw as potential four brief years before. Dr. Jay Harvey, recipient of the Norden Distinguished Teacher Award in 1981 and 1988, notes that today's students are exceptionally well rounded, possessing a broad scope of ability despite their focus on veterinary medicine.

Certainly superlatives can describe the eighty first-year students who began their veterinary medical studies in fall of 1987. The members of the class of 1991 are bright; their average GRE score was the highest among those at the thirteen schools that require the test for admission. They're talented and motivated as well. In a class where many of her classmates play the violin, the piano, and even the oboe, Susan Liew Giovengo plays eight different musical instruments. Born in Malaysia, Susan speaks English, Malay, several dialects of Chinese, and a smattering of French. Susan Neno studied bottlenosed dolphins in the Gulf of Mexico last summer, and Ronald Cammarata was in Panama studying the tamarin, a small monkey. Before enrolling in veterinary college, Tom Graves was a professional pianist in New York City. Carol Luke's undergraduate degree in biology earned her a job at Brookhaven National Laboratory as a genetic toxicologist. Richard Caputo was a chemical engineer and worked in the defense industry at Grumman Corporation. Anne Kendall owned and operated a dairy farm for ten years and was corecipient of the American Farm Bureau National Outstanding Young Farmer Award in 1981.

Talent isn't confined to the first-year class. In the first Student Art Exhibit, organized by second-year student John



Kearney and sponsored by the Office of Student Affairs, over twenty-five students from all classes displayed their talents in oil painting, pen and ink drawing, quilting, sculpture, basket and fabric weaving, stained glass, beadwork, photography, and other media.

With such a wealth of intelligence and ability, what is the college doing to prepare its students to enter, participate in, and derive satisfaction from careers they will follow well into the twenty-first century?

The self-examination necessary to answer that question began in fall of last year with the preparation of an in-depth report on the college's objectives, organization, finances, physical facilities and equipment, clinical resources, library resources, enrollment, admissions, faculty, curriculum, postdoctoral education, departments, and hospital. The report

Above: Dr. Jay Hyman '57 and Dr. Jay Gould, a clinician in the Teaching Hospital, examine a hawk admitted to the Small Animal Clinic.

Opposite: The community practice service, under the direction of Dr. Patricia Tamke (left), gives students private-practice experience on a clinical rotation.

was prepared for the evaluation committee of the American Veterinary Medical Association's Council on Education, whose members visited the college over a three-day period as part of its accreditation.

The education council's evaluation was complimentary, noting the library's resources, the college's extensive research activity, and the quality of the faculty and

students. The report recommended that the facilities master plan, with its projected increase in space and facilities, be pursued vigorously. It also recommended that admission requirements explicitly include courses in the humanities, in social studies, and in mathematics. Noting a decrease in the food-animal accessions in the hospital, the report also urged that students receive more clinical exposure to swine, small ruminants, and beef cattle. At its April 1988 meeting, the Council on Education voted for continued full accreditation for the College of Veterinary Medicine at Cornell for up to seven years.

The period of introspection begun in September 1987 continued through fall, with a faculty retreat in October that re-examined the college's priorities, goals, curriculum, strengths, and weaknesses.

Partly in response to the retreat and to informal requests from faculty members and students, the Curriculum Committee, chaired by Dr. Charles Guard, considered the addition of an ethics course. According to Dr. Guard, the committee recommended designing a course that would "in a vocationally specific context, train students to construct an ethical argument and proceed to a decision consistent with a moral philosophy." As conceived by the committee and voted upon by the faculty, the course will require first-year students to attend lectures and discussions on ethics during their second semester. Open discussions are scheduled for the second and third years. All students will be required to fulfill a certain number of discussions by the end of their third year. Discussions might cover such topics as animal rights, euthanasia of unwanted animals, and cosmetic surgery for animals. The goal of the discussions is to increase student awareness of the moral and professional dilemmas they may face in their careers and to help students develop the ability to make responsible choices.

In an effort to enlarge our students' experience of the world around them, we have implemented two new programs. Each program gives students the opportunity to temporarily step off the progressive path that leads from undergraduate to professional education and beyond.

The Guaranteed Admission Program allows students to apply for admission to the professional D.V.M. program after their sophomore year and enter the College of Veterinary Medicine after either their junior or their senior year. The program is attracting highly qualified stu-

dents who would like to broaden their undergraduate education but might be reluctant to do so if it could jeopardize their chances of being accepted by the veterinary college. The students must still maintain their grade point average, but knowing that their course of study is not being scrutinized by an admission committee is encouraging some of them to make a foray into the arts; to take a semester abroad or a language course; or to study engineering, history, or anthropology, to name a few possibilities. Those "possibilities" may well add to the potential of those future veterinarians to contribute to their profession and their community.

Similar in long-term intent to the Guaranteed Admission Program, the Expanding Horizons Program, now in its second year, provides veterinary students with the opportunity to explore novel and nontraditional employment opportunities at home or abroad. Students are selected on the merits of their intended area of study and on the potential of their study to uncover new career possibilities for themselves and for future veterinary graduates. Projects are anything but ordinary, running the gamut from studies of marine mammals, of the endangered Florida panther, and of the proboscis monkey in Sarawak to work with a pharmaceutical company and participation in the veterinary medical practices on a Navajo reservation. Dr. S. Gordon Campbell, who initiated both programs, says, "Our students have exceptional talents and goals that could benefit the profession and society as a whole. The Expanding Horizons Program is one way we encourage them to use their own initiatives to identify new or nontraditional veterinary careers."

The college is stretching in other ways to provide its students with the best possible preparation for their careers in veterinary medicine.

A tool to help improve veterinary education was announced at the March faculty meeting by Cynthia Hannah-White, a programmer-analyst on the staff of the college's computer facility. The new tool is a computerized "curriculum map" designed to assist the faculty by providing ready access to up-to-date information on the subject matter of the core courses in the curriculum. Last fall faculty members were asked to prepare topic outlines of each of the core courses. The outlines were then entered into the college's mainframe computer, and each topic was indexed by the teacher's name,

the species studied, its organ system, the physiologic or disease process, and the causal agent (if any). When the system is completed, any student or faculty member will be able to search the entire core curriculum in a matter of minutes, from any of more than a hundred computer terminals throughout the college.

Dr. Drew Noden, professor of anatomy, and Dr. Kathy Beck, assistant professor of radiology, are among several faculty members using the Macintosh™ computer to develop programs for teaching. Dr. Noden's projects include creating animations that demonstrate the development of various organ systems and that illustrate how errors early in embryonic development can result in congenital malformations (e.g., vascular ring anomalies and patent ductus arteriosus). Dr. Beck, together with Dr. Nelly Farnum, assistant professor of anatomy, and Steve Angelos, a second-year veterinary student, is preparing lessons in which radiographs, CT-scans, and computer-generated illustrations will be used together in the instruction of radiographic anatomy. The Macintosh™ computer graphics system was purchased by grants from alumni and the dean.

The computer isn't the only instructional tool helping students prepare for situations they will meet in their professional careers. Thanks to Dr. Sydney Moise, Dr. James Flanders, and the Merck Company, students will be able to see videotapes of the patient-care process. Dr. Moise and Dr. Flanders are videotaping selected cases from admission through discharge and building a library of tapes that will be available to all students. "With video recordings of actual cases and rounds presentations," Dr. Moise explains, "we can increase the exposure of students to clinical material." Instead of describing a cardiac murmur or abnormal lung sounds, the instructor will now be able to show a video of an actual patient with the abnormal sounds. Says Moise, "Not only would the techniques and the abnormalities be displayed, but the interaction of the veterinary team would be demonstrated. Also, the actual workup of cases could be followed, beginning with the interview of the animal's owner." Cases could be reviewed for practice tips or for alternate diagnoses or courses of treatment. Dr. Moise points to this critical review as a way for the student to appreciate the nature of the real-life situations clinicians experience and the on-the-spot thinking process they must use.

Even before they reach the real world of veterinary practice, students have the opportunity to put their classroom and clinical experience to use on the new community practice service. Dr. Patricia Tamke runs the program as a preventive-medicine service, seeing pets for check-ups, lacerations, or such routine problems as ear mites and fleas. However routine those examinations may be, they test the students' powers of observation and give them valuable preparation for their own practices. Says Tamke, "Students like the service because they work up a case and make decisions. They get excited when they're doing a routine puppy check and they hear a heart murmur." If students sometimes overlook flea dirt in a search for a sign of major illness, Dr. Tamke is there to remind them of the everyday things, from proper vaccination and ear cleaning to worming. Students also learn the importance of client education when they explain flea control or give the first-time pet owner pointers on nutrition and training. In many ways, the service is as close to real practice experience as students will receive prior to graduation.

Tomorrow's veterinarians will also need training in wildlife medicine and avian and exotic animal medicine—primarily because we can no longer neglect any species from increasingly endangered habitats. Last fall associate professor Jay Gould joined the Teaching Hospital's staff as a specialist in avian and exotic-animal medicine. In his appointment at the College of Veterinary Medicine, half of Dr. Gould's time will be spent on patient care in the Small Animal Clinic, with the remaining half divided between teaching and research. He'll teach the pet-bird medicine course and an elective course in avian and exotic animal medicine that last year drew fifty-six students—a number that reflects increased student awareness of the importance of this specialty in veterinary medicine. Still, much remains to be learned, even by the experts. "We need to know much more about the care and management—the nutrition and breeding, the environment and medical needs—of wild animals, including birds," says Dr. Jay Hyman, an alumnus of the college and an internationally recognized whale doctor. Because of his own interest in animals in their natural environment, Dr. Hyman endowed the Jay Hyman Professorship in Wildlife Medicine at the college in 1988, the first such professorship of its kind. The professorship will be devoted to research and teaching about wild animals and birds of all kinds.



A first-year student in the gross-anatomy laboratory

As our graduates discover, there is no cutoff point for education. Learning doesn't end when the diploma goes on the office wall. Each year the college welcomes veterinarians back to the classroom with continuing education programs including the annual conferences in January and June, specialty workshops in such areas as equine and bovine medicine and surgery, and a pathology short course. Last year the college's continuing education programs had an attendance of more than 670.

Many veterinarians are making a full-time return to the classroom and the laboratory, and according to Dr. G. Geoffrey Sharp, chair of the Department of Pharmacology, there is a need for well-trained researchers with D.V.M. degrees. Notably, in May 1988 the pharmacology department received a timely National Institutes of Health (NIH) training grant with funding support for six graduate students. Dr. Sharp sees the grant as "cement for pharmacology, the solid financial support for a graduate program."

"The department has always placed a high priority on teaching," says Dr. Sharp, "and when our graduate students have completed the program, they should be able to teach any area of pharmacology." Faculty members from throughout the physical sciences departments at Cornell are participating, making the graduate program in pharmacology a truly interdisciplinary, intrauniversity program.

Grants and scholarships make postdoctoral education feasible for many veterinarians. And part-time or summer employment makes veterinary medical education possible for many of those just beginning their D.V.M. studies. The college's alumni have sponsored a pilot program known as the Veterinary Alumni Student Employment Program (VASEP). Unlike a similar program called VETSEP that subsidizes salaries for students employed by college departments, VASEP sponsors a student in an alumnus's privately owned practice or laboratory. The alumnus-employer's usual wage is matched by a VASEP grant of up to \$1,500. So, as Dr. Herbert Schryver, secretary-treasurer of the alumni association and professor of pathology at the college, explains, "Students will earn from two sources—pay from the practice and from the grant." After a summer's employment, students have earned a competitive salary, enjoyed an opportunity to work in the profession, and reduced their need to borrow.

Educating tomorrow's veterinary professionals is more than a goal—it is a responsibility mandated by the original New York State legislation establishing the college. Viewed in that light, the educational process is not taken lightly. It is scrutinized and compared to programs at other colleges of veterinary medicine. It is added to, subtracted from, weighed for relevance, studied in committee, and finally declared sound with modifications. Such critical examination encourages innovative teaching methods, ensures that course material is continually revised, and results in a curriculum that better prepares students for specialization, for postgraduate training, or for the demands of private practice. The members of the class of 1988 may feel all the doubts and insecurities of novices as they begin their careers. Yet their competence, indeed their desirability in the job market, is based on an education that gives them what they need to know as professionals and addresses their personal growth as members of the community.





Research at the College of Veterinary Medicine is taking place at laboratory benches, on high-speed treadmills, and in food-animal herds across the state of New York. Some of the work is conducted with an advanced fluorescence imaging system that televises the inner workings of a cell. Other projects take place in isolation units, where ponies receive new vaccines to protect them from challenge by wild viruses.

This research benefits nearly every animal species, including man. It reveals the pathogenesis of deadly diseases in companion animals; it shows how a virus causes tumors; it develops vaccines that protect the food-animal industry; and it even offers clues to how human embryos take shape.

Above: This chick and the poultry industry depend on protective vaccines produced through research.

Opposite: Dr. Robert Gilmour uses a microelectrode to record the electrical activity of a single cardiac cell. He is studying individual heart cells to learn how they react during normal and abnormal heart rhythms.

HEAD TO HEART



Drugs, the Brain, and Neurotransmitters

Dr. Linda Nowak is studying the fundamental mechanisms by which neurotransmitters exert their effects on neurons from the mammalian central nervous system. At the present time, the excitatory amino acid neurotransmitter glutamate is under investigation. Despite the importance of glutamate neurotransmission in nearly all brain regions, few therapeutic agents exist, due in part to the large number of glutamate receptor subtypes within the brain, but also to the complexity of the neural networks that employ glutamate as neurotransmitter. Using sophisticated electrophysiological techniques, Dr. Nowak has been examining biophysical properties of some of the neuronal plasma membrane proteins activated by three different drug classes that interact with separate subtypes of glutamate receptors. The ability to distinguish excitatory amino acid receptors and the identification of drugs selective for those receptors would allow researchers like Dr. Nowak to design drugs that might allow specific control of some excitatory amino acid neurotransmitter pathways involved in abnormalities as diverse as epilepsy and Huntington's chorea.

Epilepsy Controls

Dr. Wayne Schwark is studying the way certain drugs control epileptic seizures. He has developed a new method to measure the time course of antiepileptic drugs following a single administration, allowing more efficient investigation, particularly when minimal amounts of novel antiepileptic drugs are available. Dr. Schwark has also produced a consistent model of status epilepticus in rats. Preliminary data indicate that an experimental antiepileptic drug with a novel mechanism of action may be able to prevent that disorder.

Calcium Channel Regulation

Dr. William Horne, with Drs. Gregory Weiland, Robert Oswald, and Richard Cerione, is studying the regulatory properties of the purified calcium channel complex in artificial membrane systems. An understanding of how calcium channels in cell membranes in the heart are regulated may lead to a better understanding of the mechanisms by which a number of diseases occur, including the different forms of cardiomyopathy and various types of arrhythmias.

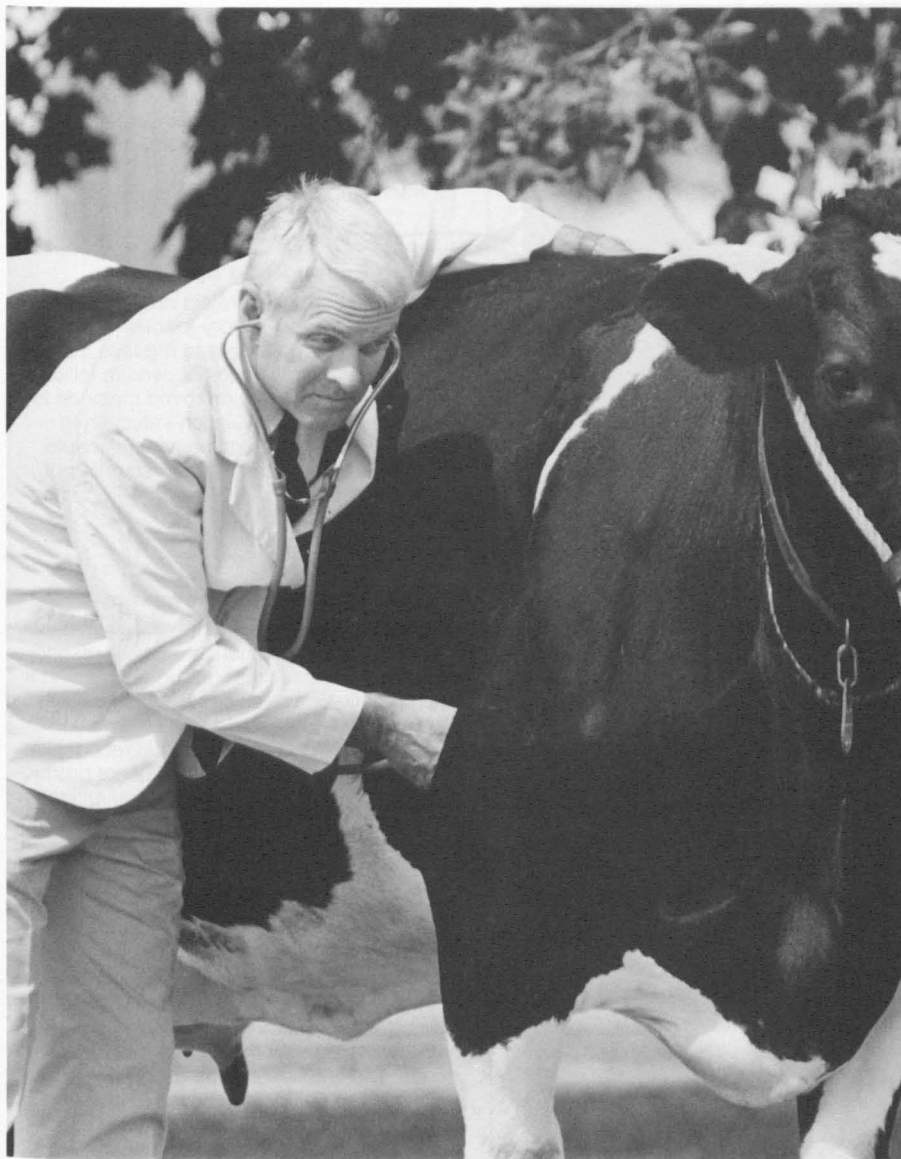
Amino Acids and Heart Disease

Dr. Sydney Moise, Dr. William Horne, and Dr. Robert Gilmour have identified a fox population fed a taurine-deficient diet that has a 25 percent prevalence of dilated cardiomyopathy. Second only to severe coronary artery disease, cardiomyopathy is the major disease in humans for which cardiac transplantation is done. Researchers will investigate the hypothesis that taurine deficiency is the cause of the dilated cardiomyopathy, providing information on the etiology of the disease.

Predicting Heart Arrhythmias

Dr. Robert Gilmour is looking at why the heart produces abnormal heart rhythms, or arrhythmias. He has developed a model of the heart's activity in which electrical impulses that signal heart muscle cells to contract are deliberately fragmented into waves, a condition known as reentry or circular movement of impulse propagation. His objective is to discover how reentry works, how it can be stopped, and how it is affected by drugs. He also wants to determine if reentry is related to other oscillations or rhythms in the body. The information he gathers will be used to explain how to slow, speed, and stop cardiac arrhythmias. He may find it possible to calculate the single movement in a cycle and the precise point in the heart where the application of an electrical signal would stop an abnormal rhythm.

METABOLISM AND ITS CONTROLS



Vitamin D and Bones

Calcium regulation in the body is affected by vitamin D. Dr. Francis Kallfelz and Dr. Robert Wasserman are continuing studies on the possible role of alterations in vitamin D metabolite levels in the occurrence of "milk fever," or hypocalcemia, in dairy cattle. Preliminary results indicate that certain vitamin D metabolites may prevent mobilization of calcium from bone when present at above-normal levels. Studies are under way in late-pregnancy sheep fed normal or high calcium to evaluate possible differences across the placenta in circulating vitamin D metabolite levels. Initial results show that pregnant sheep fed high dietary calcium develop a hypocalcemic syndrome similar to that seen in cattle.

Thermal Regulation and Camels

Dr. David Robertshaw is concerned with the interactions of water metabolism and thermal regulation with specific reference to desert-adapted mammals. His most recent work has been on the camel, since the camel is probably the best-adapted domestic mammal of the desert. He is examining the physiological basis for long-term survival in the desert without the availability of water.

Controlling Appetite

Dr. T. R. Houpt is working on the physiological mechanisms behind the control of eating and drinking. He is particularly interested in the interaction between food intake and water intake and has found that in normal free-ranging animals, the physiological disturbances that are known to lead to stimulation of food and water intake are not involved. That means that some other factors drive food and water intake and that the classic concepts only relate to gross disturbances of the system.

Loss of Parathyroid Gland No Loss to Cats

Dr. James Flanders and Dr. Francis Kallfelz began investigating calcium metabolism in the parathyroidectomized cat after they observed clinical cases of cats without parathyroid glands that thrived and were still able to maintain moderate levels of serum calcium. That was unexpected, since the parathyroid glands are one of the major regulators of calcium in the body and since, in cats and human beings, potentially life-threatening hypocalcemia usually results from damage to (or accidental removal of) the parathyroid glands during thyroidectomy. If Dr. Flanders and Dr. Kallfelz can determine the means by which cats adjust to the aparathyroid state, the study may yield information useful for the treatment of hypoparathyroidism in both cats and people.

Treatment for Osteoporosis

Dr. Robert Corradino is learning more about the effectiveness of synthetic vitamin D compounds. His work, in conjunction with that of Dr. Rajiv Kumar at the Mayo Clinic, may be important in the management of osteoporosis in human beings and in the treatment of hypervitaminosis D.

THE BIOREGULATION OF REPRODUCTION



Diabetes and Pregnancy

Dr. Patrick Concannon's study of the reproductive endocrinology of the dog is particularly significant in terms of understanding the changes that occur during pregnancy and the response of the pregnant animal to insulin. Dr. Concannon's study has medical significance because some cases of diabetes are precipitated by pregnancy. His work is also important in understanding and manipulating the control of ovarian function in the dog. This research program has demonstrated several nonsurgical methods for regulating reproductive activity in dogs as a means to deal with the pet population problem and has also developed several protocols for enhancing fertility in dogs with inherited traits or qualities of interest. This work allows researchers to determine within ten days when a bitch will ovulate and to estimate the whelping date to within one day.

Hormonal Controls of Pregnancy

Dr. William Hansel, a Liberty Hyde Bailey Professor of Physiology, leads a group that is studying the function of the bovine ovary and, in particular, the control of the corpus luteum. His work encompasses the early detection of pregnancy and the development of methods for transferring frozen bovine embryos.

Saving Endangered Species

Dr. Joanne Fortune's project on steroidogenesis by equine preovulatory follicles is determining how hormones act to regulate the development and function of ovarian follicles. Her study may lead to improved methods for ovulation and superovulation induction in horses. Endangered equine species could also benefit from a better understanding of factors that predict ovulation or reproductive status.

Signals to Maintain Pregnancy

Dr. Barry Ball will test the hypothesis that the embryonic signals in horses that are responsible for pregnancy recognition originate in a portion of the embryonic membrane called the trophoblast. It is believed that an embryonic signal is responsible for maternal recognition of pregnancy and for the subsequent production of hormones critical to a uterine environment conducive to pregnancy. Without such a signal, the embryo is lost and the mare returns to estrus.

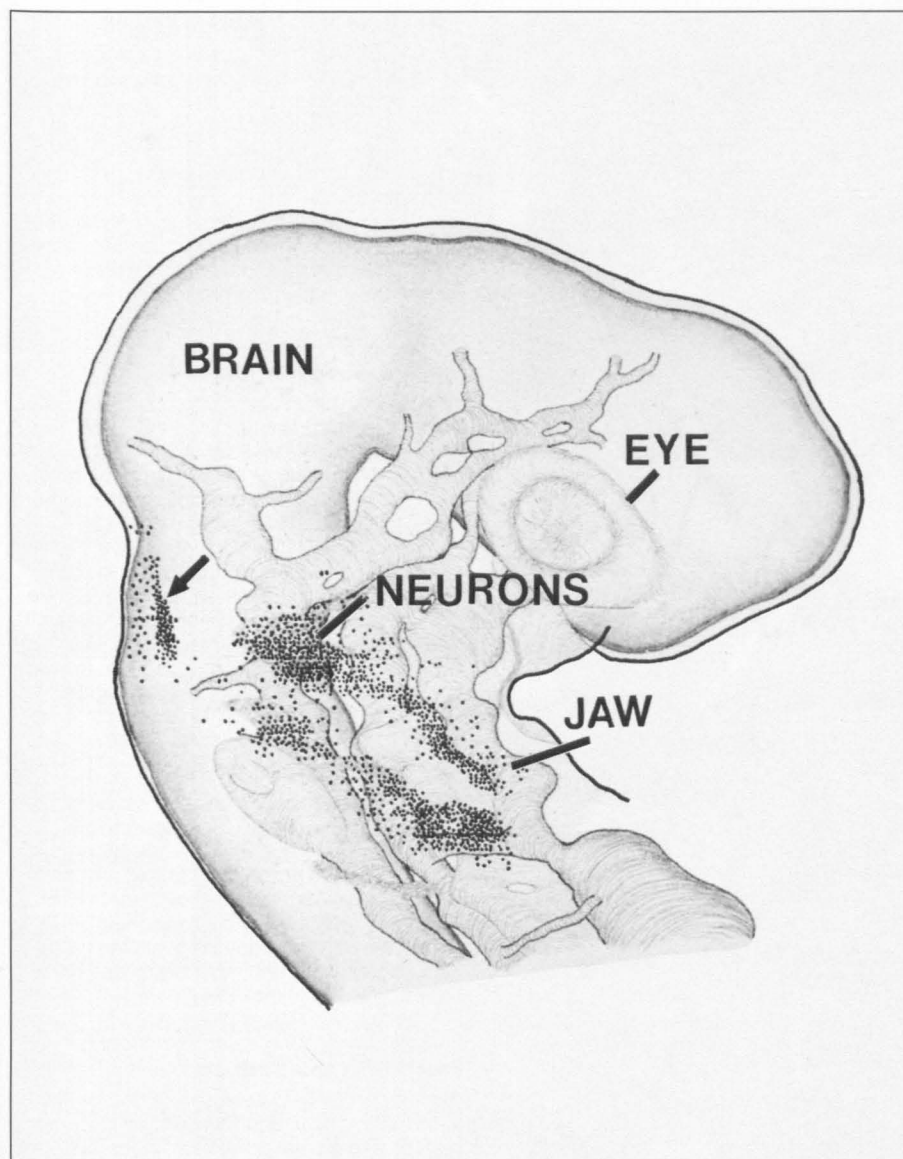
Marking Equine Genes

Dr. Douglas Antczak's immunogenetic studies of the horse continue to explore the characteristics of the Equine Lymphocyte Antigen (ELA) and to develop new markers for several horse genes. The markers can be used in parentage testing as an adjunct to conventional blood typing. The reproductive immunology of the mare is also under study, with researchers hoping to define precisely the tissues of the horse placenta that control the mare's antifetal immune response.

Pregnancy and Premature Labor

Dr. Peter Nathanielsz and his fellow scientists in the Laboratory for Pregnancy and Newborn Research are concentrating their research efforts on the prevention of premature labor and on fetal growth and brain development. They have demonstrated that myometrial activity affects the development of the fetus by altering uterine blood flow and placental exchange and also by stimulating the fetus and changing its behavioral state.

DEVELOPMENT: FROM THE BEGINNING



Mapping Facial Development

Dr. Drew Noden's anatomical studies are improving our understanding of how the head and face develop by telling us more about where the tissues originate, about how the original, or precursor, cells get to definitive locations, and about how the different components that are necessary for normal development interact. In recent work, Dr. Noden has utilized monoclonal antibodies directed against neural crest cells to localize the cells as they migrate through the head of avian embryos. That was done to verify the validity of earlier studies in which crest cells had been transplanted—a procedure that may cause distortions. He is currently focusing on the origins and remodeling of embryonic blood vessels and on the possible role of vascular defects in craniofacial birth defects. Dr. Noden transplanted suspected precursor cells into a chick embryo at the position marked by an arrow in the drawing above. (The drawing is a side view of the head of an embryo that was less than a quarter of an inch long.) Two days after Dr. Noden implanted the cells, they had migrated to the sites where the jaw and the sensory neurons that innervate the face develop.

Growth Plates

Dr. Cornelia E. Farnum is studying controls of the growth of bones postnatally by analyzing cellular interactions at the chondroosseous junction of growth plate cartilage. Her work relates to an understanding of the pathogenesis of a variety of diseases of postnatal bone growth, including the development of angular deformities.

Connective Tissue Abnormalities

The Connective Tissue Research Laboratories, directed by Dr. Ron Minor, are studying genetic diseases of collagen and other extracellular matrix proteins. Work at the laboratory includes studies of inherited abnormalities in the structure, synthesis, deposition, organization, or turnover of type I collagen, the major fiber-forming collagen making up most connective tissues. Abnormal amounts or organization of that collagen result in fragile skin, ligaments, tendons, bones, and teeth.

Canine Hip Dysplasia

The cause or causes of the joint laxity predisposing dogs to hip dysplasia are under study by Dr. George Lust. The disorder is known to be polygenetically inherited and may affect more than 50 percent of the offspring of susceptible breeds. Dr. Lust believes that a connection may exist between maternal secretion of the polypeptide hormone relaxin and the occurrence of dysplasia in the offspring. He is testing his hypothesis by identifying and comparing the sources of relaxin and the pathways of its transmission to the offspring in breeds with high and low incidence of hip dysplasia.

Storage Disease Defined

During the past year Dr. John Cummings and Dr. Alexander deLahunta have studied and defined a storage disease in Portuguese water dogs caused by an inherited enzyme deficiency. The disease is similar to GM1 gangliosidosis in human beings. Collaboration with colleagues at medical colleges has resulted in the development of a blood test to identify carriers of this progressive disorder.

Models for Neurological Disorders

Dr. John Cummings is also studying a previously unrecognized and especially rapidly advancing form of neuritis in young dogs caused by a *Toxoplasma*-like parasite. In addition, he is conducting an evaluation of the fine structural bases for two forms of neuronal death commonly observed in inherited cerebellar degeneration in dogs. Dr. Cummings's study of α -mannosidosis in kittens, a congenital deficiency of an essential enzyme associated with severe neurologic disturbances, suggests the existence of various disease subcategories like those in human beings.

EVALUATING THE EQUINE ATHLETE: DIAGNOSIS AND TREATMENT



Early Warning of Osteoarthritis

Early recognition of osteoarthritis in horses and appropriate early therapy may prevent or lessen the arthritic changes that result in lameness. Dr. George Lust and Dr. Susan Fubini are working on the development of a serodiagnostic test for osteoarthritis. The test would involve measuring the levels of a particular protein (cartilage fibronectin) in synovial fluid and serum of disease-free horses and those affected with osteoarthritis.

Dr. Lust, professor of physiological chemistry, and senior research associate Dr. Nancy Burton-Wurster are already examining the role of fibronectin in articular cartilage destruction at an early state of the osteoarthritic process, before changes in joints can be detected by radiographic methods. The researchers hope to prepare a monoclonal antibody specific for equine cartilage or synovial fluid fibronectin that would detect trace amounts of the material in the blood of horses and signal the early signs of osteoarthritis.

Effects of Inflammation

Dr. David Slauson's study of the mechanisms of equine inflammation at the cellular level may improve therapeutic intervention in the future. By first assessing the interaction of equine white blood cells with blood vessel linings, the effect of certain chemical mediators can be examined using anti-inflammatory drugs. Considering the large quantity of anti-inflammatory drugs used in the equine industry, the study should yield information of potential clinical significance.

Colic Damage Studied

Strangling intestinal obstruction (twisted intestine), which is a common cause of colic, damages or kills tissue by disrupting blood supply to a section of the intestine. By developing a model of strangulation obstruction that closely resembles clinical cases of twisted large intestine, Dr. John Lowe, Dr. Normand Ducharme, and graduate student Dr. Pamela Wilkins will evaluate the influence of various medical treatments. Their research can be used to evaluate drugs likely to favorably modify the reperfusion period that follows in a surgically corrected twisted intestine.

Recognizing Joint Disease

About a third of lamenesses are caused by joint disease. However, the diseases that affect joints are not always clearly separable, since each may progress to or occur at the same time as degenerative joint disease. Dr. Kathleen Freeman and coinvestigator Dr. Rory Todhunter will investigate and assess prognostic techniques and methods to recognize early signs of joint disease.

Fertility in the Stallion

Work by Dr. Donald Lein, director of the Diagnostic Laboratory, and Dr. Robert Foote, professor of animal physiology in the College of Agriculture and Life Sciences, has led to the adaptation of a commercially available computer-assisted semen analysis system for the evaluation of stallion semen and to the development of a technique to evaluate progressive motility of a semen sample. They can be used to evaluate and predict fertility in breeding stallions.

EVALUATING THE EQUINE ATHLETE: IMPAIRED PERFORMANCE



Nasal Bleeding in Racehorses

The bronchial artery has been implicated as a possible source of nasal bleeding in racing horses, since that artery serves lung tissue and is known to operate at a higher pressure than the other arteries in the lung. Dr. Alan Dobson, Dr. Robin Gleed, and Dr. Richard Hackett have fitted horses with transit-time ultrasound flow probes around their bronchial arteries for a continuous measure of the flow in those arteries. Measurements are recorded while the horses are exercised and at rest, on the track and on the treadmill. One finding surprised the researchers: While the horses' blood flow goes up during exercise, it continues to go up after exercise and reaches its highest point after exercise has stopped. The significance of that finding won't be clear until additional data are compiled.

Vitamin E and Muscle Damage

Vitamin E protects the cellular membranes of the body from destruction by metabolites known as free radicals. Dr. Harold Hintz and graduate student Kathy Petersson are studying the effects of vitamin E sufficiency and deficiency on membrane integrity in exercised and nonexercised horses. Their study will determine whether the vitamin E concentration within muscle and plasma is an important factor in performance and in the prevention of cellular damage. Research will determine the vitamin E dietary requirement for horses at work and at rest.

Evaluating Fitness

With graduate student Lynn Dunn, Dr. Harold Hintz is also studying the effect of training on postexercise energy requirements and body composition. The researchers have developed specialized instrumentation that determines energy expenditure by measuring oxygen consumption and carbon dioxide production of horses that have just completed hard work. They will also take physiological measurements of heart rate and plasma lactic acid. Fitness will be evaluated by measuring lactic acid levels in the horses' blood and monitoring their heart rate during a weekly training session.

"Roaring" and Poor Performance

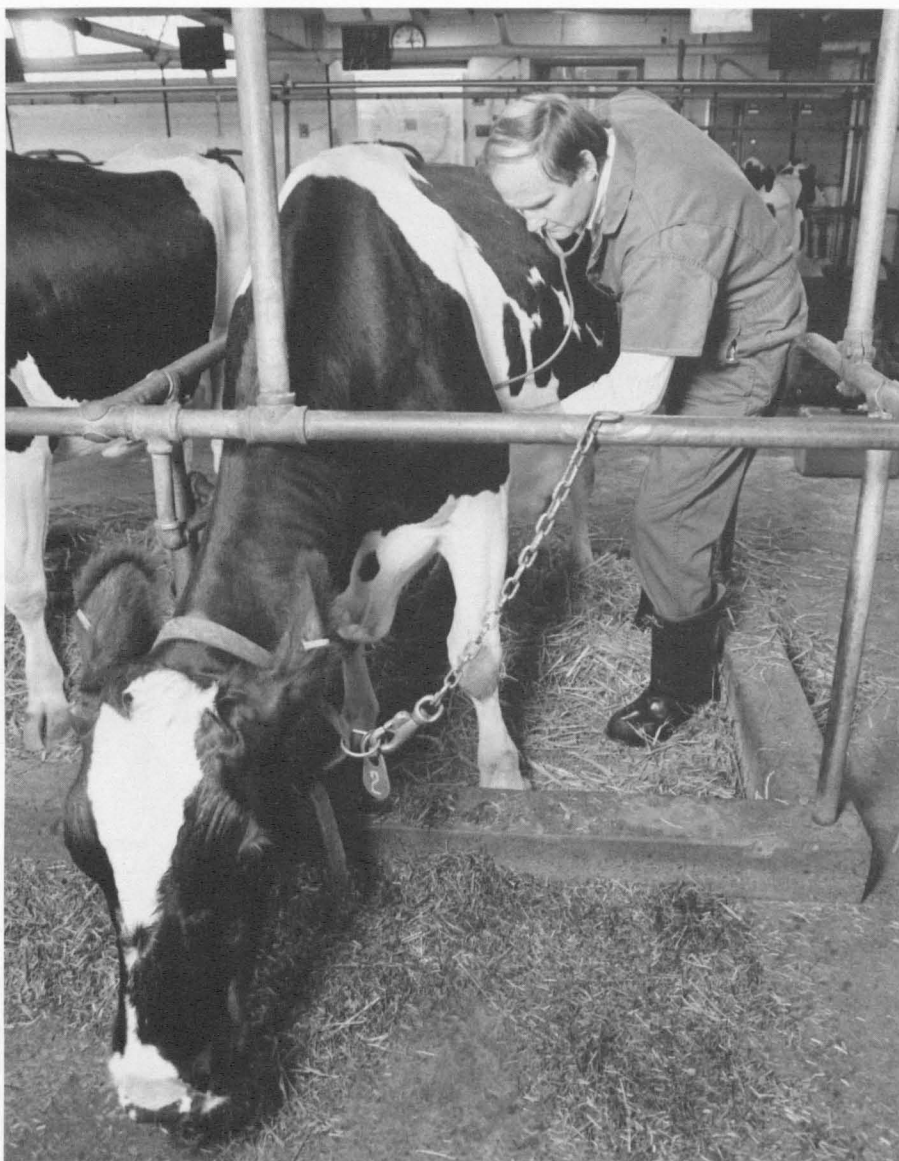
The most common upper respiratory disorder in performance horses is idiopathic laryngeal hemiplegia ("roaring"), a condition in which half of the larynx (windpipe opening) is paralyzed due to degeneration of the nerves that supply it with motor innervation. The condition leads to respiratory noise and poor performance toward the end of a race or other strenuous workout. Dr. John Cummings, Dr. Normand Ducharme, and Dr. M. Susan Hackett are using an intraneuronal marker to positively identify the neurons in the brain stem that innervate the equine larynx.

In closely related work, Dr. Ducharme and Dr. Richard Hackett have nearly completed a study of laryngeal function in resting horses. Part two of the project will be the assessment of laryngeal function by endoscopic (fiber-optic) examination and by measurement of translaryngeal pressures in horses exercising on a high-speed treadmill. Data from resting and exercising horses will be compared.

Racetracks and Racing Fractures

A bone fracture may be the single most serious injury the equine athlete sustains. It is widely believed that fractures in racehorses are caused by racetrack conditions. Other explanations should be considered, according to Cornell's Dr. Lennart Krook and Dr. George Maylin. They have studied bone fractures and found that racetrack fractures are mostly pathologic. In a report they describe how osteochondrosis may be directly associated with fractures in many cases.

PRODUCTION AND DISEASE CONTROL



Sick Calves and Productive Cows

Will a sick calf grow up to be a productive member of the herd? After studying the effects of calfhood morbidity on age at first calving, epidemiologist Dr. Hollis Erb, ambulatory clinician Dr. Maurice White, and Maria Correa, a graduate student in epidemiology, produced data that seem to suggest that it all depends on the illness. They found that scours, or diarrhea, in calfhood has no effect on reproductive success, while heifers with respiratory illness as calves were two times less likely to calve and had a six-month delay in calving compared with heifers who had not had the illness. Heifers who had been dull or off feed as calves were 1.6 times more likely to calve than cows with a history of illness. And they calved two months sooner than non-dull heifers.

Help for Egg Production

In New York State, where marginal egg prices mean that producers cannot afford to lose eggs, problems with poor egg production have involved Dr. Syed Naqi, Dr. Benjamin Lucio-Martinez, and Dr. H. L. Shivaprasad in field testing using sentry birds as indicators of disease. They suspect that the decreased egg laying may be caused by infectious bronchitis virus.

Pneumonia Studies

Bovine respiratory disease, especially pneumonic pasteurellosis in both cattle and calves, continues to account for major losses in the cattle industry. By studying the biology and persistence of the fibrin deposits the disease produces in the lungs, Dr. David Slauson will increase our understanding of the progression and resolution of acute pneumonic pasteurellosis.

Illness Changes Drug Effectiveness

Dr. Charles Guard and Dr. Wayne Schwark are studying the influence of disease states on how antibacterial drugs behave in calves. Their studies will discover whether the distribution of antibacterial drugs to tissues differs from the patterns when there is an actual clinical illness. Thus far they've found that it is difficult to predict the drug dosage regimes necessary to achieve specified drug levels in tissue solely on the basis of intravenous pharmacokinetic data. New baseline studies have been established, which the researchers are using to investigate the possible alteration in dosage of the drugs typically prescribed for calves with bronchopneumonia and for cows with mastitis.

Recommended Dosages

Dr. Charles Guard, Dr. Wayne Schwark, and Dr. Alan Dobson are also examining the effects in holstein calves in clinical settings of the recommended dosages of three commonly prescribed drugs: metoclopramide, clenbuterol, and butorphanol. Results have shown that all three drugs may significantly affect several organ systems. For example, clenbuterol significantly affected cardiovascular function by increasing heart rate and decreasing mean arterial pressure. Both metoclopramide and butorphanol produced behavioral changes in the calves. Butorphanol inhibited forestomach contractions, and metoclopramide decreased intraruminal pressure.

VACCINES FOR DISEASE CONTROL



Vaccine for Strangles

In a smear of pharyngeal lymph node cells (above) long chains of *Streptococcus equi*, the causative agent of strangles, are able to multiply freely next to white blood cells, which produce the antibodies that protect the body from infection. Dr. John Timoney has shown that available vaccines for strangles stimulate production of serum antibodies but not local antibodies in the pharynx. He and his coresearchers have developed an avirulent strain of *S. equi* and are attempting to design a synthetic peptide vaccine that produces no adverse reaction and could be used as a nasal spray. Further development and application of the vaccine will require finding the site of adhesion and penetration of *S. equi*, characterizing the receptor on the epithelium, and studying the effect of antibodies on the adhesion process.

Vaccines against Parasites

Vaccination of food and companion animals against most parasitic infections has proved to be exceedingly difficult. Parasites often evade or subvert the host immune response, resulting in chronic and debilitating infections. Dr. Richard Jacobson is probing the effect of parasitism and vaccination on the "circuitry" that regulates the immune system in mammals. The goal of his research is to broaden our understanding of the complex interactions that allow the parasite to remain within the host in the face of a fully competent host immune system.

Vaccine for Bovine Brucellosis

Dr. Alex Winter is performing studies to develop a nonliving vaccine for bovine brucellosis. Studies are also under way in cattle to develop a simple, rapid system for distinguishing susceptible from immune animals on the basis of standard serological tests following challenge with *Brucella abortus* vaccine strain 19. The system could be used to predict the protective efficacy of nonliving vaccines in order to permit informed decisions on selection of vaccines for full-scale challenge trials in cattle.

Vaccine for Equine Influenza

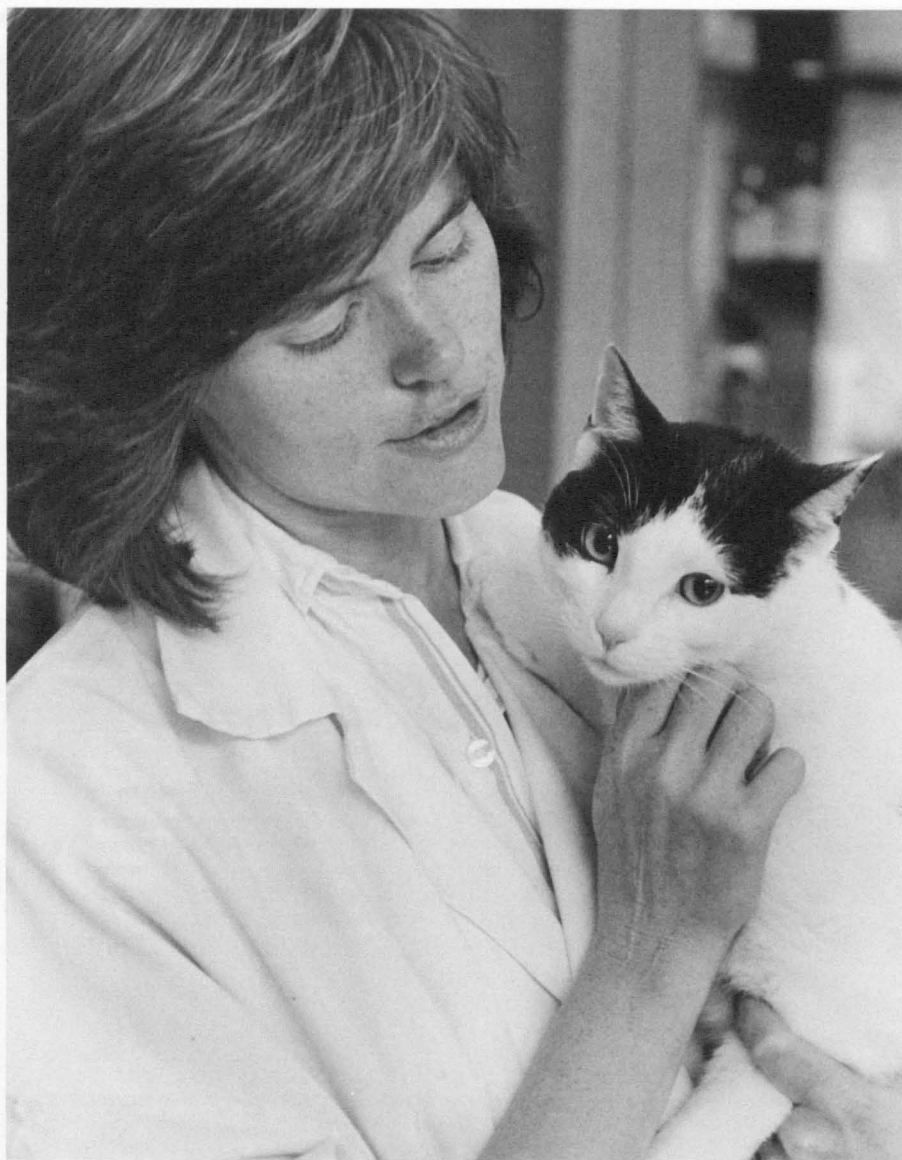
Equine influenza causes outbreaks with significant morbidity whenever horses are brought together. With the successful production of a temperature-sensitive virus able to grow in the upper respiratory tract of intranasally inoculated ponies, Dr. Dorothy Holmes is well on the way to producing an improved equine influenza virus vaccine that is free of undesirable side effects and provides protection for a longer period of time.

Dr. Judith Appleton has undertaken a clonal analysis of the horse's immune response to influenza virus by investigating three aspects of the regulation of antibody responses to the virus: the genetic control, the way the viruses induce antibody production, and the specificity of the antibodies.

Vaccines for Avian Disease

Dr. Benjamin Lucio-Martinez is looking at infectious bursal disease and at the difficulty of vaccinating young birds before they contract the disease but after they lose the protection of maternal antibodies. The Department of Avian and Aquatic Animal Medicine's duck research laboratory on Long Island, started in the 1950s to combat duck hepatitis, also supports the poultry industry through the development of vaccines and vaccination strategies.

DIAGNOSTIC TESTS



AIDS-like Disease Found in Cats

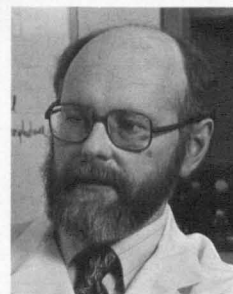
Dr. Margaret Barr and Dr. Fred Scott of the Cornell Feline Health Center are studying a newly discovered AIDS-like disease in cats. Their work with feline immunodeficiency virus (FIV), also called feline T-lymphotropic virus (FTLV), may lead to better tests, treatment, or preventive measures for this potentially fatal disease that disables cats' immune systems. Because FIV is similar to the human immunodeficiency virus (HIV), which causes acquired immune deficiency syndrome (AIDS), any new information on the cat virus could help researchers in the fight against AIDS and other related viruses. Research at the Feline Health Center will focus on understanding the pathogenesis of FIV by identifying the early events involved in establishment and spread of virus infection in the cat. In addition, epidemiologic studies are under way to determine the incidence of FIV infection in selected feline populations.

Equine Viral Arteritis

The Equine Viral Arteritis (EVA) virus is able to infect and spread quickly to susceptible animals, especially where proper management and vaccination programs are absent. Dr. Edward J. Dubovi is continuing his work on the production of monoclonal antibodies as diagnostic indicators of EVA. He and his team will also monitor breeding farms and investigate neonatal foal deaths so that they can more precisely direct their efforts in the development of improved diagnostic procedures.

Family of Viruses Studied

Ovine Progressive Pneumonia (OPP) is caused by a family of viruses that includes caprine arthritis-encephalitis virus, equine infectious anemia virus, and HIV, the etiologic agent of human acquired immune deficiency syndrome. No protective vaccine is available for OPP, and current diagnostic tests are often inaccurate indicators of infection. Dr. Roger Avery, Dr. Jim Williams, and other researchers in the Department of Microbiology are now studying this disease with the ultimate aim of developing a test that uses part of the virus's own genetic material to probe for infection—a test that would be able to detect the presence of the disease even if an infected animal failed to develop antibodies against it.



Dr. Roger Avery

CANCER STUDIES



Marek's Virus and Tumors

Dr. Bruce Calnek and coresearcher Dr. Karel Schat believe they are on the verge of discovering why and how Marek's disease virus causes tumors. Using new approaches for studying transformation *in vitro*, along with techniques for transfection with pieces of viral DNA, they hope to learn what it is in this herpesvirus that transforms a cell to a neoplastic state and why some virus strains are weakly oncogenic and others strongly oncogenic. Dr. Calnek has also examined the immune responses of chickens genetically resistant and genetically susceptible to Marek's disease. His examination revealed that genetically susceptible chickens often show a strong immune response against infection by the virus, perhaps by increasing the number of T lymphocytes available as targets cells for infection and transformation. Knowing what happens in the immune response to infection may lead to an understanding of the chain of events leading to tumor formation; that, in turn, will increase our overall understanding of disease mechanisms and why vaccines against Marek's disease work.

Hepadnaviruses and Tumors

Dr. Christoph Seeger is investigating the way hepadnaviruses replicate their genome, an unusual mechanism that is similar to the one employed by human immunodeficiency virus (HIV) and retroviruses in general. As with retroviruses, hepadnavirus infection can lead to tumor formation in humans and in animals.

Halting Cancer's Spread

Dr. Bendicht Pauli and researchers in the Department of Pathology are pursuing programs in basic cancer cell biology that will provide the backbone for an extended oncology group with the Department of Clinical Sciences in future years and an intensive collaboration with the viral oncology groups in the Departments of Microbiology and Animal Sciences. The overall goals of the group are to contribute to the better understanding of how cancer begins and spreads and to design new therapeutic strategies directed toward an interruption of cancer progression and toward a total eradication of transformed tumorigenic cells.

Identifying Precancerous Cells

In the Department of Physiology, Dr. Andrea Quaroni is collaborating with Dr. Milton M. Wiser at Buffalo General Hospital, Dr. Efrem Herrera at Roswell Park Memorial Hospital, and researchers at University Hospital, Siena, to identify "crypt cell" antigens in order to determine and diagnose precancerous conditions in the human colon.

Liver Cancer and Hepatitis

Dr. Bud C. Tennant's research will yield information on the role of the hepatitis B virus in hepatitis and on its connection with liver cancer. An NIH award of more than \$8.9 million will support Dr. Tennant's study of a similar virus and disease that affect woodchucks.



Dr. Bud C. Tennant



HARRY M. ZWEIG MEMORIAL FUND FOR EQUINE RESEARCH: 1988 AWARDS ANNOUNCED

In 1988 \$443,700 from the Harry M. Zweig Memorial Fund will support thirteen equine research projects at Cornell's College of Veterinary Medicine. The fund's distribution committee, meeting in November, chose from projects proposed by Cornell faculty members. Selection criteria included the significance of the problem to be studied, the potential benefit to the state's equine industry, and the scientific merit of the project as evaluated by equine experts throughout this country and Canada.

The Zweig Fund honors the memory of Dr. Harry M. Zweig, a respected, instrumental figure in the advancement of the state's equine industry. In May 1978 the New York State legislature established the Zweig Fund, setting aside for equine research at the College of Veterinary Medicine 2 percent of the money allocated to state breeding and development funds from the pari-mutuel handle at New York State tracks.

The following are the selected projects, researchers, and funding amounts for 1988:

- \$52,700 to Dr. Douglas Antczak for "Immunogenetic Studies of the Horse"
- \$44,500 to Dr. Judith Appleton for "Clonal Analysis of Equine Immune Response to Influenza Virus"
- \$32,000 to Dr. Barry Ball for "Culture and Transfer of Equine Trophoblastic Vesicles"
- \$15,000 to Dr. Edward Dubovi for "Continuing Studies on the Diagnosis and Pathogenesis of the Equine Arteritis Virus"
- \$37,000 to Dr. Joanne Fortune for "Steroidogenesis by Equine Preovulatory Follicles"
- \$49,800 to Dr. Robin Gleed, Dr. Richard Hackett, and Dr. Alan Dobson for "Bronchial Artery Blood Flow in Horses"
- \$23,700 to Dr. Harold Hintz for "Effect of Vitamin E on Membrane Integrity in the Horse at Work and Maintenance"
- \$25,000 to Dr. Dorothy Holmes for "Development of an Improved Equine Influenza Vaccine"
- \$30,000 to Dr. Donald Lein for "Application of New Technology to Evaluate and Predict Fertility of Breeding Stallions"
- \$30,500 to Dr. George Lust and Dr. Susan Fubini for "Osteoarthritis in Horses: Development of a Serodiagnostic Test"
- \$35,500 to Dr. David Slauson for "Mechanisms of Equine Leukocyte Interactions with Endothelium"
- \$50,000 to Dr. Donald Smith for the acquisition of equipment for the Equine Performance Testing Center
- \$18,000 to Dr. John Timoney for "Interaction of *Streptococcus Equi* with the Equine Nasopharynx"

Left: In 1987 Dr. Hollis Erb, shown here with Charlie, her doberman pinscher, was appointed head of the Section of Preventive Medicine.



In an operation lasting six hours, surgeons worked to correct Susie's heart abnormalities.

SURGEONS HELP SUSIE, THE "BLUE BABY" BULLDOG

Cardiac surgeons from the State University of New York's Health Science Center at Syracuse worked with the College of Veterinary Medicine's veterinary surgeons to repair congenital defects in the heart of a six-month-old English bulldog. The operation, rarely attempted in dogs, corrected four heart defects known as tetralogy of Fallot. Human babies with the condition are sometimes called "blue babies" because of the appearance of their poorly oxygenated blood. Correcting tetralogy of Fallot in dogs will probably never be a routine procedure in veterinary medicine because of the extraordinary expense involved, explains veterinary cardiologist Sydney Moise. But other procedures in human surgery can be adapted to veterinary medicine. According to Dr. Moise, each year Cornell's small animal clinic sees forty to fifty cases of common heart defects in dogs, among them pulmonic stenosis, ventricular septal defects, and subvalvular aortic stenosis. Many of those cases could be successfully treated if veterinary surgeons knew the latest procedures.

FIRST WILDLIFE MEDICINE PROFESSORSHIP ENDOWED AT CORNELL

What is believed to be the first endowed professorship in wildlife medicine in the United States has been established at Cornell's College of Veterinary Medicine by a gift from an internationally known whale doctor.

"We need to know much more about the care and management—the nutrition and breeding, the environment and medical needs—of wild animals, including birds," says veterinarian Dr. Jay Hyman of Pearl River, New York, explaining why he endowed the Jay Hyman Professorship in Wildlife Medicine. "Learning more about the health of wild birds and animals will enable us to do a better job of sustaining all the species that live on the globe," says Dr. Robert D. Phemister, dean of the College of Veterinary Medicine. "Veterinarians have a special responsibility for the comparative aspects of medicine—the way diseases behave in different species. What we learn about diseases of wild animals can be applied to other species as well."

When Dr. Hyman earned his D.V.M. degree at Cornell in 1957, veterinary education focused on veterinarians' most likely patients, farm animals and household pets. He opened and for several years successfully operated a small-animal veterinary practice in New York City, treating thousands of cats, dogs, and domesticated birds. And he offered the best care he could for pet snakes, ocelots, kinkajous, and the occasional mongoose.

Then Dr. Hyman's interest shifted to animals in their natural habitat, and he learned marine biology "on the job" at

the New York Aquarium, beginning to specialize in whales and porpoises. In 1968 he became one of the first veterinarians to devote all his time to the care and study of whales. He took his veterinary skills wherever marine mammals were injured, sick, or stranded.

The Hyman professorship will be devoted to research and teaching about wild animals and birds of all kinds. Wildlife-medicine research is the key to reintroducing nearly extinct animals to their natural environment, Hyman said. Maintaining the last remaining stock of an endangered animal in captivity is difficult enough, he noted. But those efforts will be of little use if veterinarians don't know when the animals—or their environments—are ready for their return.

Except for those working with zoos and public aquariums, most veterinarians will not make wildlife medicine a full-time career, according to Phemister. What will happen is that graduates of Cornell's veterinary college will be better equipped to treat the occasional wild animal—"from eagles to skunks," as Hyman puts it—that they see as part of their more routine practices.



In one of his projects, Dr. Harold Hintz studies ponies to determine equine nutritional needs.

EQUINE NUTRITION AND PHYSIOLOGY SOCIETY HONORS HINTZ

Dr. Harold Hintz has received the Distinguished Service Award in Equine Science from the Equine Nutrition and Physiology Society. The award is designed to recognize outstanding contributions to equine animal science and is the most prestigious honor the society can bestow on one of its members. This is only the second time the award has been given since the society was founded in 1968.

A professor of animal nutrition in the College of Agriculture and Life Sciences with a joint appointment as a professor of animal nutrition in the College of Veterinary Medicine, Dr. Hintz was recognized by the award committee for his "outstanding character and ability in teaching and research and for the distinguished service he has provided to the society." Dr. Hintz's research interests include calcium and phosphorus metabolism in horses, nutritional problems and requirements in horses, colic, and the examination of various feeds. With support from the Travers Fund, he is examining the effect of training and diet on energy utilization in racehorses. He is the author of *Horse Nutrition: A Practical Guide*, and a coauthor of *The Horse*. Dr. Hintz is a founding member of the Equine Nutrition and Physiology Society and the society's current president. He is also a member of the American Society of Animal Science, the American Association of Veterinary Nutritionists, and the American Institute of Nutrition. He received the American Feed Manufacturers Award in 1984.

PEW CHARITABLE TRUST SUPPORTS VETERINARY MEDICINE

Dean Robert Phemister and Drs. Francis Kallfelz, Drew Noden, David Robertshaw, Donald Smith, and Daniel Tapper participated in a veterinary education leadership conference in Greensboro, North Carolina, February 1-5, 1988. The conference was sponsored by the Duke University Institute of Policy Sciences and Public Affairs as part of the Pew National Veterinary Education Program and was designed to enhance leadership qualities and broaden management skills in the area of institutional change, renewal, and strategic planning.

The Pew National Veterinary Education Program is a four-year program that seeks to strengthen colleges of veterinary medicine by helping them better understand the broad changes occurring in health care and in education and by preparing them to meet those changes strategically. Twenty-seven veterinary schools in the United States and four veterinary schools in Canada are participating.

Funding for the program, in the amount of \$5.5 million, is being provided by the Mabel Pew Myrin Trust, one of seven charitable funds in the Pew Charitable Trusts established by the children of Joseph N. Pew, founder of Sun Oil Company. In addition to sponsoring the weeklong leadership conferences, the Pew National Veterinary Education Program will support the creation of a panel of experts to assess the state of veterinary medicine, provide institutional grants of up to \$35,000 each to veterinary schools to support the development or improvement of strategic plans for meeting the demands on veterinary medicine, and give awards of up to \$1 million to a minimum of three schools to help them

put their strategic plans into effect.

The program is codirected by Dr. William R. Pritchard, professor and former dean, School of Veterinary Medicine, University of California, Davis, and Dr. Edward H. O'Neil, administrative dean, School of Dentistry, University of North Carolina at Chapel Hill.

DR. HARVEY RECEIVES 1988 DISTINGUISHED TEACHER AWARD

His appreciation of his students' abilities and the pleasure he finds in teaching have earned Dr. Jay Harvey the Norden Distinguished Teacher Award for the second time at the College of Veterinary Medicine. First honored in 1981, Dr. Harvey was again selected for the honor by students in the D.V.M. program at the college.

In addition to instructing and supervising students on the Small Animal Clinic's surgery service, Dr. Harvey teaches the small animal surgery and medicine course to third-year students and the general medicine and surgery course to second-year students. Asked why he prefers academic life to private practice, Dr. Harvey explained that he likes the atmosphere of a teaching hospital. "I like working with other people with similar interests, seeing the types of cases we treat," he said. What makes it all worthwhile, though, is working with the students. Said Harvey, "Students are why we are here. I enjoy them." He's continually amazed at how well rounded today's students can be and at their ability to focus on veterinary medicine while maintaining a broader scope of interests. He encourages his students to build on that ability.

Dr. Harvey is an associate professor in the Department of Clinical Sciences. He received his D.V.M. degree from Kansas State University in 1971, then completed an internship at the Animal Medical Center in New York City in 1972 and a residency at the University of California, Davis, in 1974. He entered private practice in Pennsylvania in 1974, then returned to the Animal Medical Center in 1975 as a staff surgeon. He worked there until 1979, when he joined the faculty of the College of Veterinary Medicine at Cornell. Dr. Harvey is a diplomate of the American College of Veterinary Surgeons and the 1981 recipient of the Norden Distinguished Teacher Award.

NEW DIRECTOR IN THE DIAGNOSTIC LABORATORY

Dr. Donald H. Lein has been named director of the Diagnostic Laboratory. As the laboratory's assistant director since 1980, Dr. Lein was already very familiar with the daily running of the laboratory, with its staff, and with its ongoing programs. Dr. Lein completed his undergraduate studies in 1953 at Cornell's College of Agriculture and Life

Sciences before earning a D.V.M. degree at the College of Veterinary Medicine in 1957. He received a Ph.D. degree in pathology from the University of Connecticut in 1975, and he is board-certified by the American College of Veterinary Pathologists. His field of specialization and research is theriogenology, covering reproductive, comparative, and diagnostic pathology; reproductive physiology and endocrinology; herd health; and preventive medicine.

In the Diagnostic Laboratory, Dr. Lein has been responsible for the coordination of laboratory tests, clinical interpretation and diagnoses, and the reporting of field-animal health problems. Says Lein, "We're involved in a continuing process to increase the laboratory's abilities and efficiency. Critical evaluation and growth guarantees our service to the agriculture industry, to veterinarians, and to their clients. Our goal is to provide service to the residents of New York State in a prompt, helpful, courteous, and efficient manner."



Dr. Donald Lein



Dr. Jay Harvey and Sullivan

TRAVERS FUNDS 1988 EQUINE RESEARCH

With \$45,000 raised through the efforts of the Travers Committee during the 1987 Travers Celebration in Saratoga Springs, four equine research projects have been funded at the College of Veterinary Medicine:

With \$8,000 in funding, Dr. Kathleen Freeman and coinvestigator Dr. Rory Todhunter will conduct a parallel study of synovial fluid and synovial membrane morphology with that of cartilage and subchondral bone in equine joint disease.

Dr. John Lowe and Dr. Pamela Wilkins received \$10,000 for a study of postischemic reperfusion injury of the equine large colon.

Dr. Normand Ducharme and Dr. M. Susan Hackett received \$8,000 for a study of the sources of extrinsic innervation of the equine larynx using horseradish peroxidase.

Dr. Ducharme and Dr. Richard Hackett will use \$19,000 from the Travers Fund to study laryngeal function in horses exercising on a high-speed treadmill.



CENTRAL PLANNING COMMITTEE SHAPES COLLEGE'S FACILITIES

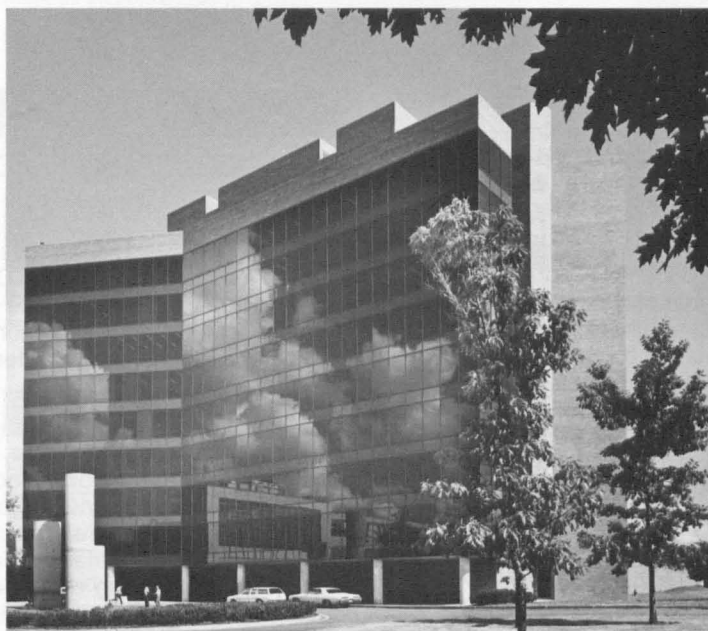
In response to the College of Veterinary Medicine's request for funds to plan substantial expansion and renovation of its existing facilities, the New York State legislature approved an appropriation of \$5.7 million. The money will provide for the programming and for the architectural, engineering, and project management of the college's facilities master plan. The entire project is expected to cost about \$75 million.

Preliminary planning that lead in 1985 to the facilities master plan was done by the architectural firms Russo and Sonder, and Davis and Brody. In mid-May of 1987 Dean Phemister formed the Central Planning Committee and appointed Dr. Bruce Calnek as chair. The committee's task is to solicit college input and determine needs for new facilities.

Members of the Central Planning Committee chair subcommittees that represent various constituencies in the College of Veterinary Medicine:

Dr. Robert Avery, for the Basic Sciences Committee; Dr. Gordon Campbell, for the Academic Committee; Dr. Robert Playter and Dr. Donald Smith, cochair for the Clinical Sciences Facilities Committee; Dr. Wayne Schwark, for the Common Environment Committee; and John Lambert, for the Administration Committee. Robert Webster will serve as the liaison between the college and the New York State Construction Fund, the architects, and the university.

The Central Planning Committee began by visiting colleges of veterinary medicine to see how well other designs for facilities and building renovations meet teaching, research, and service needs. The committee was particularly interested in how the administrative and planning staffs at those colleges developed their programs, what the faculty members liked and disliked about their facilities, and what they would design differently. By



mid-November the committee had visited four veterinary colleges.

Representatives from the architectural firms have accompanied the Central Planning Committee on most of its travels and contributed their ideas. The same two architectural firms that developed the facilities master plan will collaborate on its implementation. Staff and faculty members are also being asked for their ideas on everything from circulation, traffic patterns, and laboratory configurations to public access areas and lounges.

According to the architects, the entire building and renovation process will take more than five years. The first two years will be spent on planning, developing test schematics, and working out problems, so that final schematics can be prepared. The development of construction documents may take another year, before plans are ready to go out for bids from construction firms. The architects estimate that construction will take two years, with renovation of existing facilities to follow.

DR. SCHAT HONORED FOR AVIAN RESEARCH

Dr. Karel A. Schat, associate professor of avian and aquatic animal medicine, has received the Bart Rispens Memorial Award for excellence in avian research. The award was presented at the World Veterinary Poultry Association meeting held during the 1987 meeting of the World Veterinary Association in Montreal.

The award, presented to the first author of the best scientific paper or papers published in the preceding two years in the *Avian Pathology*, was established in the memory of Dr. Bart Rispens, a well-known Dutch avian researcher, who developed one of the first three original vaccines for Marek's disease. Shortly after receiving his veterinary degree, Dr. Schat trained with Dr. Rispens at the Centre Veterinary Institute. It was at Dr. Rispens's laboratory that Dr. Schat began his own work on Marek's disease.

Dr. Schat was selected as the recipient of the sixth Bart Rispens Memorial Award for his paper entitled "Pathogenesis of Infection with Attenuated Marek's Disease Virus Strains" (*Avian Pathology* 14 [1985]: 127-46). The paper reported on Dr. Schat's investigation of the effect of attenuation on the pathogenesis of infection. The paper indicated that attenuation reduces the ability of the Marek's disease virus to infect lymphocytes, which are the target cells for transformation. That information has important consequences for understanding the processes of attenuation and tumor development.



VIDEO CAMERAS USED TO ANALYZE HOUSE-SOILING CATS

Dr. Katherine Houpt has turned to videotape to discover the cause of the most frequently reported problem with house cats—forsaking their litter box to soil the house.

To learn why some cats prefer carpet to litter box, Dr. Houpt, director of the Cornell Animal Behavior Clinic, is trying to catch them in the act with video cameras. One camera is aimed at the litter boxes maintained by pet owners who have volunteered their homes for the behavioral study. Another camera automatically records activity in the inappropriate spots where the cats urinate or defecate.

Back in the laboratory, Dr. Houpt and her colleagues are studying the videotapes for clues to two of the great mysteries of feline-human relationships: What on earth is wrong with the designated litter box? And what are cats trying to tell their owners when they soil elsewhere?

"So far, we know that some cats don't like to use dirty litter boxes, and some don't like the dark or cramped places," said Dr. Houpt. The problem is more complex than that, however. Other factors contributing to the problem, Dr. Houpt said, are urinary tract disorders and social stress. "Cats in pain from bladder infections may forsake the litter pan, then continue to urinate elsewhere even when the infection has been cured. A new carpet, a new cat, or a new baby are social stresses that also trigger episodes of house soiling."

The reward for pet owners who tolerate the intrusion of video cameras is free follow-up treatment to cure their house-soiling cats.

LLOYD'S OF LONDON REWARDS EQUINE INTEREST

An award of \$1,000 has been made by Lloyd's of London to Kim J. Anderson, a fourth-year student in the D.V.M. program at Cornell. This is the second year a Cornell veterinary student has been honored by the association. Lloyd's makes the award to students in their final year at American universities who have demonstrated an interest in working with Thoroughbred horses.

Lloyd's Equine Research and Education Committee makes funds available to interested students as part of a joint education and research program to benefit the American veterinary industry involved with Thoroughbred horses. The committee, composed of Lloyd's Underwriters, Lloyd's Brokers, and Lloyd's Kentucky Agents, was established with funds from the three organizations. Nominations of students to receive awards are made by the veterinary colleges, and applications with letters of recommendation are submitted for consideration by Lloyd's of London.



Dr. Katherine Houpt
and a patient in one
of her behavioral
studies



Dr. Sharon Center and Mary

BEECHAM AWARD FOR RESEARCH EXCELLENCE GOES TO CLINICIAN

Dr. Sharon Center is the 1988 recipient of the Beecham Award for Research Excellence, 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. Center's research involves the use of a serum bile acids assay to assess hepatic function and has demonstrated the usefulness of the test for clinicians in private practice, in teaching, and in research.

It was as a clinician on the medicine service of the Small Animal Clinic, testing for and treating liver disease, that Dr. Center realized that currently accepted tests for hepatic function did not lend themselves to common practice situations. Subsequent research on and rejection of various testing

techniques led her to adapt a serum bile acid assay for clinical use. The testing procedure is simple and reliable because samples do not deteriorate during transport to the laboratory. In addition to adapting this assay to small companion animals, Dr. Center has used the test to assess liver function in large animals and in woodchucks infected with woodchuck hepatitis, as part of an active research program at the College of Veterinary Medicine. The Gastroenterology Laboratory at Cornell's College of Veterinary Medicine is now considered the standard for the test.

An associate professor in the Department of Clinical Sciences, Dr. Center combines teaching responsibilities with clinical work on the medicine service of the Small Animal Clinic. She is a 1975 graduate of the School of Veterinary Medicine at the University of

California, Davis, and first joined the staff of the College of Veterinary Medicine in 1975 as an intern. In 1977 Dr. Center entered private practice in California, returning to Cornell three years later as a medicine resident. In 1981 she was appointed as an instructor and a postdoctoral research associate at Cornell. Dr. Center has authored several book chapters and numerous scientific articles concerning the diagnosis and management of liver disease in the small-animal patient. She is a member of the American Veterinary Medical Association, the American Animal Hospital Association, the American Association of Veterinary Clinicians, and the Comparative Gastroenterology Society and is a diplomate of the American College of Veterinary Internal Medicine. She received the Norden Distinguished Teacher Award in 1985.

THE WESTMINSTER KENNEL FOUNDATION AWARDS SCHOLARSHIP

Margaret B. Ohlinger '90 was the guest of the Westminster Kennel Club at its annual dog show at New York City's Madison Square Garden, February 8 and 9. Margaret Ohlinger, who was invited as the Cornell recipient of a Westminster Kennel Foundation Scholarship for 1987-88 along with recipients from two other veterinary schools, was introduced to the crowd just before "Best in Show" on Tuesday night. The notification of the scholarship award was made by William H. Chisholm, trustee with Mrs. Robert V. Lindsay and William Rockefeller of the Westminster Kennel Foundation. Margaret Ohlinger is a second-year student in the D.V.M. program. She has trained and shown her own Chesapeake Bay retriever to earn the title of breed champion as well as the Companion Dog and Working Dog Excellent Certificates.

The scholarships are awarded to students enrolled in qualified veterinary schools in the United States as selected by the foundation and as funds are available. Each selected veterinary school was asked to choose one student based on the financial need and scholastic performance of the candidate. The amount of the award is equal to no more than half the cost of tuition, books, instruments, and room and board expenses.

LASHER GIFT FUNDS PATHOGEN-FREE POULTRY FACILITY

The College of Veterinary Medicine at Cornell will soon open a new and much needed specific-pathogen-free poultry production facility, thanks in large part to the generosity of Dr. Hiram N. Lasher '42, an internationally recognized leader in the poultry biologics industry. On a recent visit to the college, Dr. Lasher and his wife, Bertha, presented their check for \$100,000 to Dr. Bruce Calnek, chair of the Department of Avian and Aquatic Medicine, and to Dean Robert Phemister. The gift was made in the memory of one of the Lasher's seven children, Steven Hiram Lasher, who died at the age of twenty-nine from a heart attack. The specific-pathogen-free (SPF) facility will produce chickens free of all known avian pathogens that might affect research into avian diseases and vaccine production.

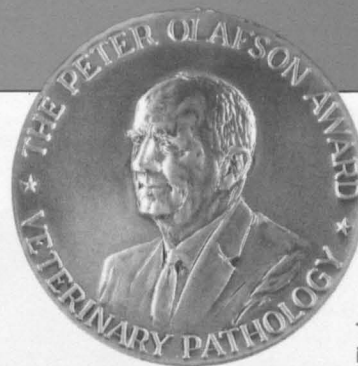
Dr. Lasher received his D.V.M. degree from Cornell University in 1942 and after a brief period in private practice became a poultry pathologist with the State Board of Agriculture in Delaware. In 1950 he founded Delaware Poultry Laboratories, a company later acquired by Sterling Drug and renamed Sterwin Laboratories. Dr. Lasher became president and director of Sterwin Laboratories in 1970 and over the next ten years guided the company to the position of a top producer of poultry vaccines. In July 1979 he went on to found and become president of Inter-Continental Biologics in Millsboro, Delaware. Recognized internationally as one of the most knowledgeable professionals in all phases of the poultry biological business, Dr. Lasher recently formed Lasher Associates, a consulting and laboratory service with

clients that include major firms in the United States, France, England, Japan, and Israel.

Dr. Lasher and his laboratories are credited with the first commercial introduction of many vaccines, among them vaccines for tenosynovitis, bursal disease (Gumboro), JMK bronchitis, Holland strain bronchitis, Marek's disease (one of three), improved Newcastle, and tissue culture fowl pox. In the mid-1950s he collaborated with USDA professionals in the development of the first standard requirements for poultry biologics. Dr. Lasher was also responsible for the planning, design, and construction in Delaware of two of the few state-of-the-art biological plants.



Dr. Bruce Calnek looks on as Dr. Hiram N. Lasher presents a check to Dean Robert Phemister for the new specific-pathogen-free poultry production facility.



The Olafson Medal in Pathology

OLAFSON MEDAL IN VETERINARY PATHOLOGY

At the August 1987 Short Course in Pathology, Dr. Donald R. Cordy was awarded the Olafson Medal in Veterinary Pathology after nomination by noted pathologists in the United States and selection by a panel of advisers at the College of Veterinary Medicine at Cornell. The Olafson Medal is given in recognition of outstanding indi-

vidual commitment by a veterinary pathologist in 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 Dr. Olafson's family, friends, and former students.

Dr. Donald R. Cordy is an emeritus professor of veterinary pathology at the University of California, Davis. A member of the American College of Veterinary Pathologists, Dr. Cordy is noted for work on the pathology of communicable animal diseases and on animal neuropathology.

Dr. Cordy received a specially cast gold medal with a bas-relief profile of Dr. Peter Olafson. Dr. Olafson received a D.V.M. degree from the College of Veterinary Medicine and was head of the Department of Pathology and Bacteriology for twenty years. Through his research and teaching, Dr. Olafson was influential in shaping the discipline of veterinary pathology in the United States. His publications established the etiology of hyperkeratosis in cattle, defined bovine virus diarrhea, and offered pioneering investigative work in bovine listeriosis and in muscular dystrophy in lambs and calves. Olafson was a dedicated teacher and trained many of today's leading pathologists.

FACULTY AND STAFF CHANGES



Dr. Hussni O. Mohammed, a new faculty member in the Section of Epidemiology

New Appointments

Hellmut G. Augustin-Voss, *postdoctoral associate*
Barry A. Ball, *instructor*
Michelle Bamberger, *postdoctoral associate*
Robert A. Bullis, *senior research associate*
Lawrence G. Carbone, *director, laboratory operations*
Chao-Fu Cheng, *senior research associate*
Thomas J. Divers, *visiting associate professor*
J. Robert Duncan, *visiting fellow*
Jon W. Erickson, *postdoctoral associate*
Kathleen P. Freeman, *instructor*
Robert F. Gilmour, Jr., *associate professor*
Tae Young Ha, *visiting fellow*

John W. Hermanson, *assistant professor*
Margaret M. Hinshelwood, *postdoctoral fellow*
Maria-Barbera Honnebier, *visiting fellow*
Robert E. Kaderly, *associate professor*
Fidelma A. Kennedy, *courtesy assistant professor*
Hae Shik Kim, *visiting fellow*
Martial Kubina, *postdoctoral associate*
Jen-Hsou Lin, *visiting professor*
Gerald D. Mechor, *assistant professor*
Christine L. Miller, *lecturer*
Hussni O. Mohammed, *assistant professor*
Wolfgang M. Muck, *visiting fellow*
Dean A. Myers, *postdoctoral fellow*
Alan J. Nixon, *assistant professor*
Brigitte Otto, *postdoctoral associate*
James R. Owiny, *postdoctoral associate*

Thomas L. Pannabecker, *postdoctoral fellow*
William J. Phillips, *postdoctoral associate*
Catherine A. Picut, *postdoctoral fellow*
Richard E. Rawson, *postdoctoral associate*
David Robertshaw, *professor and chair, Department of Physiology and Section of Physiology*
Christine A. Rossiter, *extension associate*
Jan M. Spitsbergen, *assistant professor*
Steffen E. Steffenrud, *postdoctoral associate*
Juergen Steinmeyer, *postdoctoral fellow*
Maja M. Suter, *instructor*
Patricia G. Tamke, *instructor*
Philip A. Wood, *adjunct assistant professor*
David J. Zimmer, *postdoctoral fellow*
Rachid Zini-Filali, *visiting professor*

Promotions and Title Changes

Wayne I. Anderson, *research associate* (from senior resident)
 Betty H. Baldwin, *director, laboratory operations* (from research support specialist)
 Barry A. Ball, *assistant professor* (from instructor)
 Julia T. Blue, *associate professor* (from assistant professor)
 Sharon A. Center, *associate professor* (from assistant professor)
 Edward J. Dubovi, *associate professor* (from assistant professor)
 Clare M. S. Fewtrell, *associate professor* (from assistant professor)
 Jorge P. Figueroa, *senior research associate* (from veterinary assistant)
 Pedro A. Figueroa, *veterinary assistant* (from visiting fellow)
 Kathleen P. Freeman, *assistant professor* (from instructor)
 Willard J. Gould, *assistant professor* (from instructor)
 Yrjo T. Grohn, *assistant professor* (from visiting assistant professor)
 Charles Guard, *associate professor* (from assistant professor)
 Mary S. Hackett, *veterinary assistant* (from instructor)
 Richard P. Hackett, *associate professor and head, Large Animal Clinic* (from associate professor)
 Dorothy F. Holmes, *senior research associate and acting director, Equine Infectious Diseases Laboratory* (from senior research associate)
 Fadia R. Homeidan, *research associate* (from postdoctoral associate)
 Robert E. Kaderly, *associate professor and chief, Section of Surgery* (from associate professor)
 Lance F. Karcher, *instructor* (from resident)
 Donald H. Lein, *associate professor and director, Diagnostic Laboratory* (from acting director)
 Benjamin Lucio-Martinez, *senior research associate* (from visiting professor)
 Thomas J. McDonald, *research associate* (from research support specialist)
 Douglas D. McGregor, *professor, director of James A. Baker Institute for Animal Health, and associate dean for research* (from professor and director)
 Paul J. Millard, *research associate* (from research support specialist)
 Ronald R. Minor, *professor* (from associate professor)

Hannu M. Mykkanen, *visiting associate professor* (from visiting fellow)
 Donald H. Schlafer, *associate professor* (from assistant professor)
 Danny W. Scott, *professor and head, Small Animal Clinic* (from associate professor)
 John C. Semmler, *assistant dean for public affairs* (from assistant dean for external programs and research administration)
 Geoffrey W. G. Sharp, *professor and chair, Department of Pharmacology* (from professor, chair, and director of the Division of Biological Sciences)
 Mary C. Smith, *associate professor and head, Ambulatory Clinic* (from associate professor)
 Maja M. Suter, *assistant professor* (from instructor)
 Alfonso Torres, *adjunct associate professor* (from associate professor)
 Ching-Hua Wang, *research associate* (from postdoctoral associate)
 Gregory A. Weiland, *associate professor and acting chair, Department of Pharmacology* (from associate professor)

Completed Appointments

Barry S. Block, *visiting associate professor*
 Siraya Chunekamrai, *postdoctoral associate*
 Daniel A. Hammer, *postdoctoral associate*
 Christine E. Hatfield, *instructor*
 Mark C. Heit, *visiting fellow*
 David F. Kelton, *instructor*
 Jill E. Parker, *instructor*
 Jan E. Raiha, *visiting fellow*
 Maija P. Raiha, *visiting fellow*
 Jarmo S. Salonen, *visiting fellow*
 Jun-Shi Sun, *visiting fellow*
 David E. Wennerstrom, *assistant professor*

Resignations

Jeffrey E. Barlough, *lecturer*
 Robert G. Buerger, *instructor*
 Shah N. Buriro, *visiting professor*
 Myung-Dae Byun, *visiting associate professor*
 Jerry J. Callis, *adjunct professor*
 John S. Chandler, *postdoctoral fellow*
 David A. Covell, Jr., *postdoctoral fellow*
 Raymond H. Cypess, *professor*
 J. Robert Duncan, *visiting fellow*
 Per Olof G. Edlund, *postdoctoral fellow*

David L. Graham, *professor*
 Sajjad A. Haider, *associate professor*
 Jeremy A. Henley, *postdoctoral associate*
 Barbara S. Hook, *visiting fellow*
 Roger S. H. Hsu, *postdoctoral associate*
 Chaobin Hu, *visiting associate professor*
 Patricia M. Kane, *postdoctoral associate*
 Masataka Korenaga, *postdoctoral associate*
 Betty Ann Kilkenny, *director, laboratory operations*
 Bernard A. LeBlanc, *visiting fellow*
 Stephen D. Litwin, *adjunct professor*
 Thomas F. Lomangino, Jr., *director, laboratory operations*
 Pamela Luther, *instructor*
 Joseph P. McCann, *postdoctoral associate*
 Christine L. Miller, *lecturer*
 William J. Mitchell, Jr., *instructor*
 Donald G. Morgan, *adjunct associate professor*
 Maire O'Connor, *senior extension associate*
 Dale D. Olm, *instructor*
 Roger L. Papke, *postdoctoral associate*
 Edward R. Poore, *senior research associate*
 Pamela A. Powers, *assistant professor*
 Rama Rajaram, *postdoctoral fellow*
 Gary D. Ross, *instructor*
 Sonija M. Shelly, *assistant professor*
 Shirazali G. Sunderji, *adjunct assistant professor*
 Charles R. Wallace, *postdoctoral fellow*
 John S. Walton, *visiting associate professor*
 Kenneth E. Wolf, *courtesy professor*
 Marilyn J. Wolfe, *assistant professor*
 Janet Wright, *research associate*
 Toshihiko Yada, *postdoctoral associate*
 James F. Zimmer, *assistant professor*

Retirements

Edgar L. Gasteiger, *professor* (to professor emeritus)
 Kyu M. Lee, *professor*
 Frederick W. Lengemann, *professor* (to professor emeritus)
 George C. Poppensiek, *James Law Professor of Comparative Medicine* (to professor emeritus)

Deaths

None

TABLE 1
Continuing Education, 1987-88

<i>Program</i>	<i>Participants</i>	<i>Hours</i>
Pathology Short Course	31	40
Eightieth Annual Conference for Veterinarians	402	15
Summer Institute for Doctors of Veterinary Medicine	67	9

TABLE 2
Library Use, 1987-88

On campus	
Reserve books (in-library use)	10,230
Books lent (home use)	25,365
Reference questions answered	7,229
Audiovisuals and software used	9,141
Computer searches performed	1,507
Total, on campus	53,472
Interlibrary	
Books lent	110
Photocopy items provided	671
Books borrowed	102
Photocopy items received	1,238
Total, interlibrary	2,121

TABLE 3
Library Holdings, 1987-88

Bound volumes	
At beginning of year	75,558
Acquisitions	1,333
Less withdrawals	1,035
Total bound volumes	75,856
Audiovisual items	31,885
Periodicals and annuals	1,302

TABLE 4
Degrees Awarded, 1987-88

D.V.M. (with distinction: 4)	80
M.S.	5
Ph.D.	15

TABLE 5
Interns and Residents, 1987-88

Teaching Hospital	
Interns	15
Residents	23
Senior residents	1
Pathology	
Residents	7
Senior residents	2
Total	48

TABLE 6
Graduate Students at the College of Veterinary Medicine, 1987-88

Candidates for the Ph.D. degree	79
Candidates for the M.S. degree	22

TABLE 7
Predoctoral Student Enrollment, 1987-88

Candidates for the D.V.M. degree	
Class of 1988	80
Class of 1989	79
Class of 1990	77
Class of 1991	81
Total	317
Cornell undergraduates taking courses in the college (full-time equivalents)	107

TABLE 8
Clinical Patients and Diagnostic Examinations, 1987-88

	Horses	Cattle	Sheep & Goats	Swine	Dogs	Cats	Birds	Others	Total
Medical and surgical patients	1,675	607	108	7	8,575	3,580	389	279	15,220
Ambulatory Clinic patients	1,736	37,048	695	673					40,142
Clinical pathology specimens	8,069	3,664	485	50	15,106	5,196		2,500*	35,070
Diagnostic Laboratory tests	25,169	397,538	9,225	2,746	22,164	8,775	1,262	8,613	475,492
Necropsies	332	401	79	75	448	242	55	370	2,002
Surgical pathology specimens	619	473	100	39	4,855	1,096	95	224	7,501
Laboratory animal examinations									
Aquatic animal accessions								4,746†	4,746
Marine Biological Laboratory									
Fish Diagnostic Laboratory								88	88
Total									
Poultry Disease Laboratories									
Ithaca							2,409		2,409
Eastport							1,934		1,934
Kingston							824		824
Total							5,167		5,167
Pet, Exotic, Wild Bird									
Diagnostic Service									
Quality Milk Promotion Services									
(mastitis control program)		127,791	390					15	128,196
Grand Total									713,624

* This number includes birds for clinical pathology.

† This number represents 4,746 specimens or groups of specimens and 990 accessions.

TABLE 9
Qualifications of Accepted Applicants, Class of 1992

	Number of Students	Percentage of Class
Amount of preveterinary preparation		
Four years of college	73	91
More than four years of college (graduate level)	7	9
Institution previously attended		
Cornell University	36	45
Other	44	55
Field of preparatory study		
Animal science (or related)	29	36
Biological sciences (or related)	32	40
Other	19	24

TABLE 10
**Geographic Distribution of Accepted
 Applicants, Class of 1992**

Legal Residence	Number
New York	64
Connecticut	3
Delaware	1
Florida	1
Maine	1
Maryland	2
New Jersey	7
Vermont	1

TABLE 11

Summary of Grant, Contract, and Gift Expenditures by Source of Funding*

Source	1987-88	1986-87
Federal		
Department of Defense		
Grants and contracts	\$87,525	\$35,223
Cornell Biotechnology Institute	474,591	42,160
Department of Energy	0	1,889
Environmental Protection Agency	166,459	10,037
National Institutes of Health	4,840,857	4,125,006
National Science Foundation	77,152	32,634
Department of Agriculture		
Grants and contracts	503,270	456,579
Federal appropriations	265,593	227,349
Total, federal grants and contracts	\$6,415,447	\$4,930,877
State		
Cornell Biotechnology Institute	\$242,615	\$175,838
Department of Environmental Conservation	40,476	75,851
Harry M. Zweig Memorial Fund	396,361	374,357
New York State agriculture and markets contracts	4,263,999	4,471,893
New York State Racing and Wagering Board	3,033,762	2,944,215
New York State Sea Grant Institute	28,688	2,910
Other state agencies	2,016	0
Total, state grants and contracts	\$8,007,917	\$8,045,064
Industry, foundations, gifts		
Industry		
Grants and contracts	\$1,034,418	\$1,117,488
Cornell Biotechnology Institute	54,727	398
Foundations	347,355	310,258
Alumni, associations, nonprofit organizations	357,198	421,341
Endowments	190,419	176,885
Total, industry, foundations, gifts	\$1,984,117	\$2,026,370
Grand total	\$16,407,481	\$15,002,311

* Table 11 is a summary of grant, contract, and gift expenditures of the College of Veterinary Medicine at Cornell for the fiscal years July 1, 1986, through June 30, 1987, and July 1, 1987, through June 30, 1988. The amounts reported exclude expenditures for indirect costs. Previous annual reports have shown grants and contracts awarded for current and subsequent years by department. This revised format indicates annual levels of expenditures by source.

TABLE 12

Admission Summary, Class of 1992

Area	Applicants	Interviewed	Accepted
New York	205	120	64
Contract states	126	53	15
Other	126	12	1
Total	457	185	80

Dr. Dorothy Holmes, director of the Laboratory for Equine Infectious Diseases



FINANCIAL STATEMENTS

TABLE 13
Sources of Funds (in Thousands)

	1987-88	1986-87
State appropriation	\$14,431	\$13,250
Grants and contracts	16,407*	15,002*
College income	8,406	7,631
Total	\$39,244	\$35,883

* Includes Hatch or regional allocations of \$266,000 in 1987-88 and \$227,000 in 1986-87, which were reported as federal appropriations in previous years.

TABLE 14
Uses of Funds (in Thousands)

	1987-88	1986-87
Instruction and departmental research	\$5,656	\$4,910
Teaching Hospital	5,424	5,231
Organized research	15,962	13,527
Extension and public service	7,530	7,711
Academic support	609	594
Student services	303	342
Institutional support	2,556	2,465
Plant maintenance and operation	832	722
Student aid	372	381
Total	\$39,244	\$35,883

Patient care in the Teaching Hospital involves a wide range of therapeutic and diagnostic services.



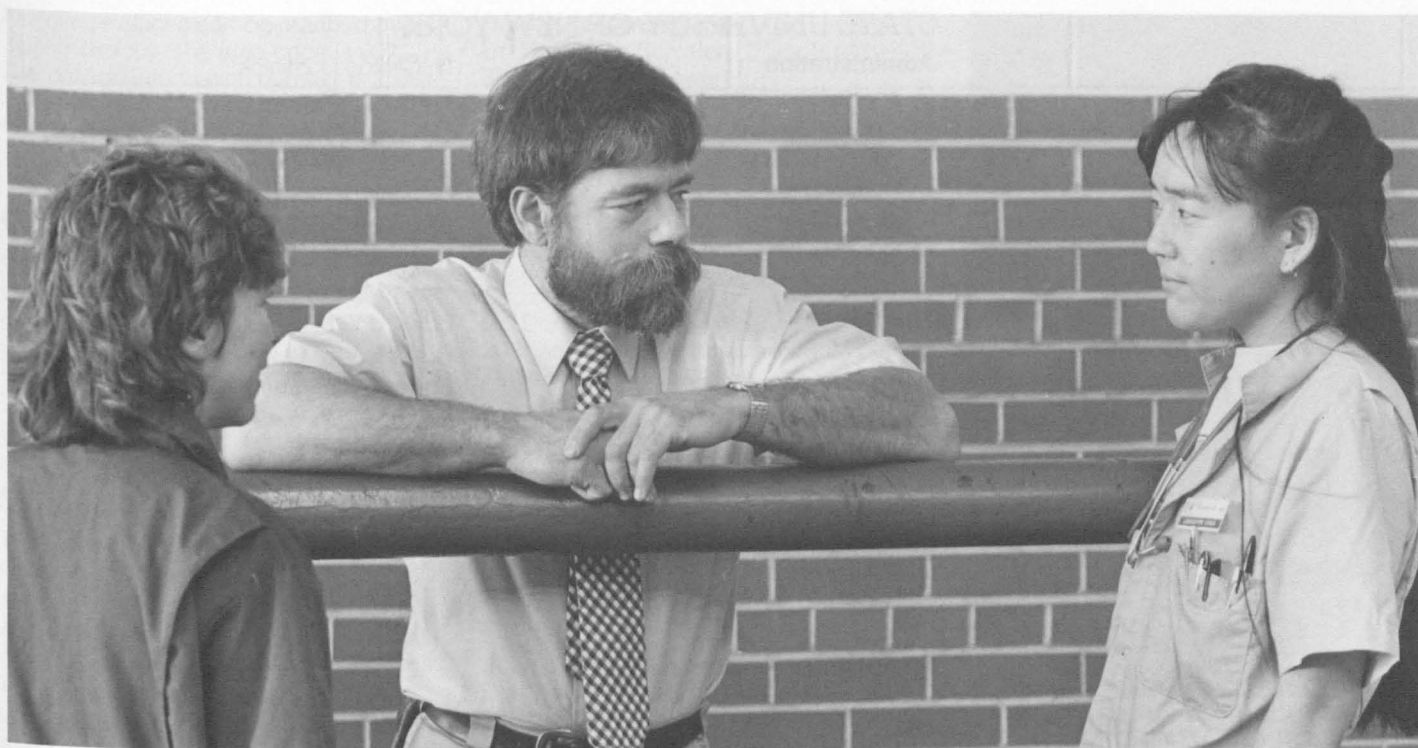
Tables 13 and 14 are summaries of the sources and uses of funds of the College of Veterinary Medicine at Cornell for the fiscal years July 1, 1986, through June 30, 1987, and July 1, 1987, through June 30, 1988. These figures do not include expenditures for salary fringe benefits, estimated for 1987-88 at \$5,475,708, or for general support services provided by the university.

Dr. Judith Appleton works with monoclonal antibodies in her research on equine influenza at the James A. Baker Institute of Animal Health.





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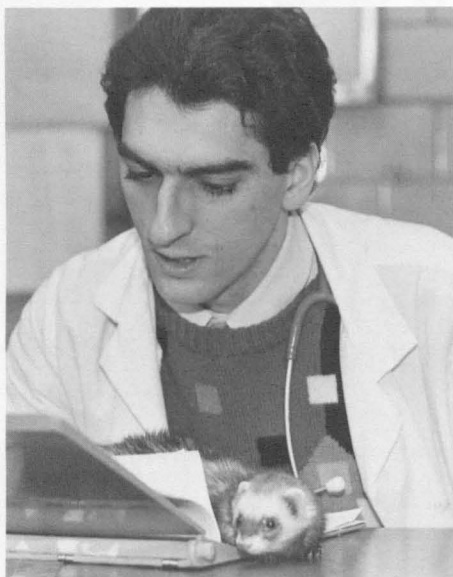
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Above: Dr. Charles Guard talks with students in the Large Animal Clinic. On the recommendation of the Curriculum Committee, which Dr. Guard chairs, all students will attend lectures and discussions on ethics.

Left: Autumn on the Cornell University campus

* These lists are current as of September 1, 1988.

† Ex officio.



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 (one vacancy)

Exotic pets like this ferret are being seen more frequently than ever in private practice.

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All college offices can be reached by dialing directly. The area code is 607. The college information number is 253-3000. An operator is on duty from 8:00 a.m. to 5:00 p.m. Monday through Friday.

GENERAL INQUIRIES

General inquiries should be directed to
Office of Public Information
College of Veterinary Medicine
Cornell University
Ithaca, New York 14853-6401
Telephone: 253-3740

STATISTICAL SUPPLEMENTS

The following supplements, containing detailed statistical material, are available:

Report of Necropsies
Report of Parasitological Examinations
Poultry Disease Diagnostic Laboratories

Requests for any of the above should include the name of the document desired and should be addressed to

Annual Report Statistical Supplements
College of Veterinary Medicine
Cornell University
Ithaca, New York 14853-6401

SPECIAL PROGRAMS AND UNITS

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

Admissions and Student Affairs
Ms. Marcia James Sawyer
C117 Schurman Hall
Telephone: 253-3700

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

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

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

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

Computing Facility
Mr. 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. Charles E. Short
G2 Research Tower
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
Dr. Richard Hackett (interim)
Large Animal Clinic, Teaching Hospital
Telephone: 253-3224

Extension Service (Bovine)
Dr. Michael A. Brunner
204 Diagnostic Laboratory
Telephone: 253-3900

Extension Service (Bovine/Epidemiology)
Dr. Christine Rossiter
205 Diagnostic Laboratory
Telephone: 253-3900

Extension Service (Equine)
Dr. John E. Lowe
209 Diagnostic Laboratory
Telephone: 253-3900

Extension Service (Swine)
Dr. Barbara Straw
203 Diagnostic Laboratory
Telephone: 253-3900

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

Graduate Programs Office
Nanette Blakely
225 Research Tower
Telephone: 253-3276



Students learn the basics of animal health care early in the four-year D.V.M. program.

Laboratory Animal Services, Division of, and Center for Research Animal Resources

Dr. Fred W. Quimby
221 Research Tower
Telephone: 253-3520

Library (Flower Veterinary Library)
Ms. Susanne Whitaker
C201 Schurman Hall
Telephone: 253-3510

Poultry Diagnostic Laboratories
Dr. Bruce Calnek
E113 Schurman
Telephone: 253-3365

Public Affairs
Mr. John Semmler
G2 Research Tower
Telephone: 253-3744

Quality Milk Promotion Services (Mastitis Control Program)
Dr. Philip M. Sears
144 Langmuir Laboratory
Telephone: 255-8202

Teaching Hospital at the College of Veterinary Medicine
Dr. Robert F. Playter
G129 Teaching Hospital
Telephone: 253-3030
Large Animal Clinic: 253-3100
Small Animal Clinic: 253-3060

LABORATORY LOCATIONS IN NEW YORK STATE

Avian Disease Laboratories:

Ithaca, New York
Eastport, New York

Quality Milk Promotion Program, Regional Laboratories:

Kingston, New York (eastern region)
Sardinia, New York (western region)
Canton, New York (northern region)
Earlville, New York (central region)

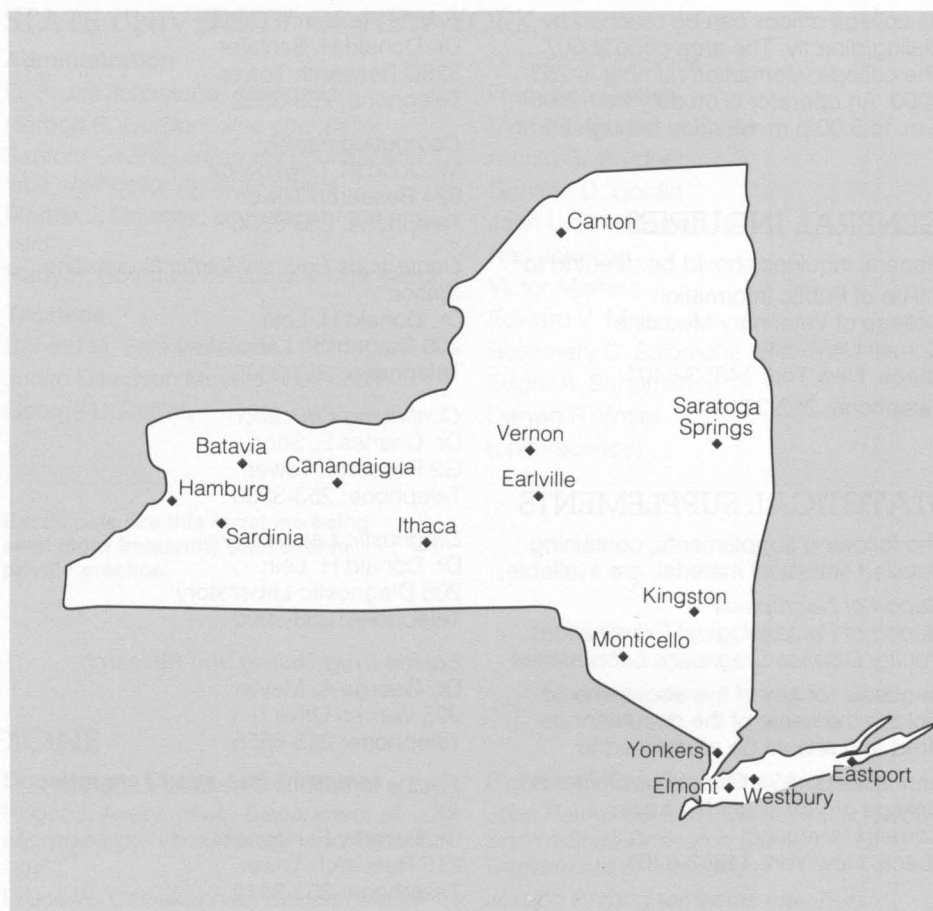
Equine Drug Testing and Research Program, Track Locations

Standardbred Tracks:

Batavia Downs, Batavia, New York
Buffalo Raceway, Hamburg,
New York
Midstate Raceway, Vernon Downs,
Vernon, New York
Monticello Raceway, Monticello,
New York
Saratoga Raceway, Saratoga
Springs, New York
Yonkers Raceway, Yonkers,
New York

Thoroughbred Tracks:

Aqueduct Racetrack, Ozone Park,
New York
Belmont Racetrack, Elmont,
New York
Finger Lakes Racetrack,
Canandaigua, New York
Saratoga Racecourse, Saratoga
Springs, New York



COLLEGE OF VETERINARY MEDICINE CORNELL UNIVERSITY

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use a computer to demonstrate how embryos
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Title page: Dr. Alexander deLahunta teaches
applied anatomy to students in the D.V.M.
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