A routine eye exam at the Small Animal Clinic helps give a puppy a healthy start in life.

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 1990-91 year of the students, faculty, and staff who worked to accomplish that mission and, by doing so, to justify the public's trust.
College of Veterinary Medicine
Cornell University

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

July 1, 1990—June 30, 1991
This document fulfills the reporting requirements of article 115, section 5711 of the New York State Education Law.

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Message from the Dean

We faced both extraordinary challenges and exceptional opportunities in 1990–91. New York State’s well-publicized budget difficulties affected us in two important ways. First, because of the budget reductions, actual state funding was less than we had anticipated. Second, in-year rescissions coupled with the delayed passage of the new state budget added uncertainty to current year operations and to planning for the next fiscal year. As a result, starting as early as August all departments and administrative units worked to find creative ways to increase efficiency and consolidate programs.

For example, by moving the Autotutorial Center into the library, hours of access to the center were increased while the costs of operation were reduced. The recent decision to use the Veterinary Medical Teaching Hospital for professional student instruction year-round will allow more students access to the summer patient load while saving the substantial costs of staffing the hospital during the summer. In addition, the consolidation of college support for animal care, medical illustration, and electron microscopy is expected to lead to improved services while producing operational efficiencies.

Despite these and other accommodations, we will have fewer state dollars and fewer state-supported positions to meet our several missions. During 1990–91 some individuals opted for early retirement under an incentive program made available by the state. Other positions were lost through attrition. Still, it was necessary to terminate several positions, and this was a period of real anxiety for our employees. I am pleased to report, however, that almost all those affected have been successfully reemployed, principally in other parts of the university.

I am most grateful for the extraordinary commitment of our faculty and staff members during these difficult months and am more confident than ever that, with their continuing efforts, our college will achieve preeminent status internationally among schools of veterinary medicine.

In meeting the budgetary challenges, we have not backed off from our commitment to institute fundamental change and improvement in the veterinary medical curriculum. The new Curriculum Committee has been working for almost two years to achieve an educational program that will involve students more actively in their education and give them greater opportunity and responsibility for learning.

The main feature of the new educational program is its interdisciplinary, tutorial-based approach. Newly appointed curriculum design groups are modeling blocks of study in which students must integrate information from various disciplines through case-based exercises and tutorials. Students will learn basic science principles in the context of clinical applications, and they will have greater flexibility and more opportunity to pursue individual areas of interest. The new program offers enhanced opportunities for students to develop critical thinking and problem-solving skills, to acquire and retrieve information, and to see their studies as a connected curriculum rather than individual courses.

Essential to the planned curriculum changes is an enhanced educational support system for faculty members. During the year, the Office of Educational Development was established and Dr. Katherine M. Edmondson was named director. The office provides faculty development programs and guidance and support for teaching innovations as well as advanced computer and biomedical illustration support services. The college's biomedical communications unit is also a component of the office. Faculty members now have an expanding support system for developing their abilities as teachers, which parallels that for developing research capabilities through the College Research Office.

The college is changing on the outside as well. Work on our $82-million expansion began in the fall of 1990 with the relocation
of underground utilities. Construction of
the two-story Veterinary Education Center
has begun, and the projected completion
date is mid-1993. The plans for the largest
component of the project—the Veterinary
Medical Center—have been submitted for
bid, and construction will begin in early
1992. The building will include a new
teaching hospital on the ground floor and
three floors of office and research space.

In October 1990 Cornell University
launched a major five-year fund-raising
campaign. The College of Veterinary
Medicine is a full participant, seeking
$30 million in private support from alumni,
friends, corporations, foundations, and
organizations concerned with animal
health. Since the college was chartered in
1894, a tradition of private philanthropy
has enhanced the quality of our programs
and distinguished our college from peer
institutions throughout the world.

To keep pace with the opportunities
and challenges we will face in our second
century, we must have the financial
resources to compete in the international
veterinary and biomedical marketplace to
recruit and retain outstanding faculty
members. Further, we must ensure that we
will continue to attract the very best
students, regardless of economic back­
ground, and that they will be able to afford
a veterinary medical education at Cornell
without facing unreasonably large debts
upon graduation. In addition, we need
ongoing support for research programs that
benefit both animal and human health.

The goals of the College of Veterinary
Medicine in the Cornell Campaign include
establishing endowments for at least five
prestigious named professorships; doubling
our financial aid endowments for veteri­
inary student scholarships and graduate
fellowships; and obtaining funds to support
basic and clinical research and to enhance
our residency programs.

Guiding the college in this crucial
undertaking is our Campaign Committee,
led by four alumni who are among our
strongest supporters in both their long-
standing generosity and their involvement
in college development activities. Co-
chairing the group are Dr. Robert E. Clark,
D.V.M. ’52, and Dr. Jay W. Geasling, D.V.M.
’75. Serving as vice chair for annual giving is
Dr. Richard A. Smith, D.V.M. ’51. Dr. John D.
Murray, D.V.M. ’39, is vice chair for planned
giving. In addition, more than one hundred
alumni volunteers are working on regional
committees throughout New York State and
the Northeast.

Each year brings an opportunity to
welcome a new class of students and to
congratulate a new group of graduates. We
continue to benefit enormously from the
quality of the individuals who select our
profession and our academic program. Year
in and year out, they are the best qualified
and most select group of students to enter
the veterinary profession in this country.

This year we also had the opportu-
nity to welcome several individuals to new
leadership positions in the college. During
the fall we were joined by Dr. Eugenia G.
Kelman, the new assistant dean for student
services, and Dr. Brian R. H. Farrow, chair
of the Department of Clinical Sciences. Dr.
Kelman has held similar positions at the
Medical School at the University of Texas,
Galveston, and Colorado State University.
Dr. Farrow is known internationally for his
work as a veterinary neurologist and
internist at the University of Sydney, where
he spent most of his professional life.

Dr. Farrow’s arrival allowed Dr.
Donald F. Smith to devote full attention, as
associate dean for veterinary education, to
implementing the new academic program
and Dr. S. Gordon Campbell to resume a
professorial role in the Department of
Microbiology, Immunology and Parasitol­
ogy. Dr. Campbell will continue to oversee
international activities in the college as
director of international programs.

In January, two faculty members
were promoted to major leadership
positions. Dr. Cornelia E. Farnum was
named chair of the Department of Anatomy,
and Dr. Francis A. Kallfelz was appointed
director of the Veterinary Medical Teaching
Hospital. Dr. Farrum has been a leader in
the development of our new veterinary
academic program in addition to teaching a
major segment of first-year anatomy and
conducting fundamental research on the
mechanisms of bone growth. Dr. Kallfelz
has served the college with distinction for
nearly thirty years as a teacher, research
scientist, and clinician in an array of
disciplines, including nuclear medicine and
clinical nutrition and metabolism.

In closing, I express on behalf of the
entire college community our deep sense
of loss over the passing of one of our most
distinguished faculty members and alumni.
Professor Emeritus Ellis P. Leonard—
surgeon, author, historian, teacher, and
colleague—died in Ithaca in February at the
age of 86 following a brief illness. He will
be sorely missed. A memorial fund to
benefit the Roswell P. Flower Library,
which he so deeply admired, has been
established in his name.

Robert D. Phemister
Dean
In Step with a Changing Profession

Preparations are well under way to offer the class entering in 1993 a markedly different veterinary education than that of their predecessors. In the new interdisciplinary block system approach

- First-year students in the D.V.M. degree program will perform physical examinations, with supervision, on patients.
- Clinical rotations are a year-round option for seniors.
- Case-based tutorials, supplemented as appropriate with lectures, laboratories, and discussion sessions, will be the cornerstone for portions of the basic science curriculum.
- Approximately 50 percent of the required courses can be selected from among a range of options.
- Scheduled classes will often be held only in the morning, and the afternoon will be devoted to independent study.
- Examinations may be oral or in the form of small-group presentations.

That's not to say that lecture classes will be no more or that multiple choice exams will disappear. But in moving away from a reliance on traditional educational methods, the revised academic program will offer a broad comparative education while developing a student's skills in accessing information, in critical thinking, and in problem solving. It will require students to assume more responsibility for their own education, to define and then pursue in depth areas of personal interest. The goal is to foster greater independence of thought and action and to motivate and prepare graduates to continue self-directed learning throughout their careers.

A Year of Progress, a Year of Change

July 1990

Dr. Howard E. Evans, professor emeritus of veterinary and comparative anatomy, receives the Outstanding Achievement Award from the American Association of Veterinary Anatomists. The award acknowledges outstanding contributions in teaching, research, or service to the discipline of veterinary anatomy.

Dr. Bud Tennant, James Law Professor of Comparative Medicine, is elected to a six-year term as member of the American Veterinary Medical Association's Council on Research. For almost a decade Dr. Tennant has studied the link between the hepatitis B virus group and liver cancer.

Dr. Alan Dobson begins a six-month residence as a Quatercentenary Research Fellow at Emmanuel College, Cambridge. It's one of the first such fellowships awarded to a recipient at a veterinary college.

August

Dr. Fredric Scott D.V.M. '62 is named honorary first fellow of the Academy of Feline Medicine. The honor recognizes Dr. Scott's work in feline medicine, particularly his role in the development of Cornell's Feline Health Center, where he has been director since 1974.
Case-based Exercises at the Core of Interdisciplinary Learning

Meet Harry Shaker's Lamb. By the end of a week's tutorial with the sick lamb, students will have learned a lot about parasitology, host specificity, and the nature of the immune response—all while they discover that it has toxoplasmosis. (Along the way they might even get the pun!)

Harry Shaker's Lamb is the title of a case-based exercise in which the student is put in the role of a veterinarian presented with a case. Six to eight students will work on a case together. The group will meet with a faculty member, whose role is to facilitate discussions of the basic scientific principles the case highlights as well as related issues, such as herd management, veterinary medical ethics, and clinician-practitioner communication. This format, along with lectures and laboratories, is how many of the foundation courses—the backbone of a student's knowledge—will be taught.

In the next one and one-half to two years, weekly case-based exercises will be designed for use in several interdisciplinary blocks. If approved by the faculty, the blocks will replace the core courses, which have been taught in individual disciplines. Students successfully completing cases in the block called The Animal Body, for example, will have not only learned anatomy, but also developed beginning skills in giving physical examinations, reading radiographs, and handling surgical instruments.

The case-based exercises will teach basic science by capitalizing on students' enthusiasm for the "real stuff" of veterinary practice. The interdisciplinary block format will show them, from the beginning, the importance of integrating information from various disciplines.

Foundation course work will be limited to just more than half of a student's graduation requirements, allowing the students to pursue individual interests and the faculty to introduce new courses that present the latest advances in veterinary science. Students will be given some latitude in choosing the remainder of their courses. Those requirements will be planned to ensure sufficient exposure to both the breadth and the depth of each discipline and to a variety of species.

The development of diagnostic skills prior to actual clinical experience is another feature of the new curriculum.

Clyde, a Rottweiler puppy with multiple sclerosis, is the subject of one of the computerized tutorials students will use to understand the disease process and practice clinical reasoning skills. The computer program provides illustrations of Clyde and all aspects of his disease—from gross specimens to histologic slides. It also includes additional information about the disease from textbooks, journal articles, and other sources. Such computer programs will be available to illustrate a variety of diseases.

Computer-assisted Assessment

With innovations in teaching come innovations in assessment. Unique among these are computer-linked case-based exercises that assess student performance. To determine a diagnosis, students request test results and other information from the computer. They also gather information elsewhere, for example, from slides, smears, or radiographs. The combined information allows them to refine further their list of differential diagnoses. When the students reach a diagnosis, the computer then assesses their efficiency in determining it. Oral examinations and formal class presentations, alternatives to paper and pencil tests, also will become more common.

Beyond the Classroom—Summers Well Spent

Today's veterinary students are among the strongest advocates for curriculum reform. In addition to avidly discussing their ideas and sharing their enthusiasm throughout the year, ten second- and third-year students spent the summer working alongside faculty members developing new teaching materials. Among those are case-based exercises, computer tutorials, and models for teaching horse anatomy. Their efforts, they say, are an investment made in behalf of students to come.

Another summer opportunity, open to students who have completed their first year of study, is the Leadership Training Program for Veterinary Students. Sponsored
by the Mellon Foundation, Merck and Company, Inc., and the Robert F. Woodruff Foundation, the program's goal is to interest students in careers in academic institutions, government, and industry through hands-on experience in a research laboratory. It is the largest such program in the country.

**Faculty Members Lead the Way**

The faculty voted to endorse fundamental changes in the curriculum in October 1989. A nine-member Curriculum Committee was elected to carry out their mandate. More than forty faculty members visited schools of veterinary and human medicine around the country to survey advances in curriculum, teaching style, and educational technology that could be successfully adopted here.

The Curriculum Committee is helping develop the interdisciplinary block system. Thirty faculty members are participating in six curriculum design groups. The groups are developing the content, teaching methods, and subject and concept interrelationships most appropriate to each block.

Two key administrative appointments were made. Dr. Donald F. Smith, former chair of the college's Department of Clinical Sciences, was appointed associate dean for veterinary education. He is overseeing the implementation of the curricular changes. Dr. Katherine M. Edmondson, a professional educator, was named director of the Office of Educational Development.

The Office of Educational Development supports teaching just as the college's Research Office assists faculty members in their research endeavors. Its staff of specialists in curriculum and instruction, computer technology, and biomedical illustration and communication help faculty members expand their teaching repertoire and ideas and create new teaching materials—whether tailor-made computerized courseware or a revamped lecture—to reflect the diversity of student learning styles.

Twice a month throughout the year, the Office of Educational Development sponsors the faculty seminar "Food for Thought." This series presents demonstrations of innovative teaching techniques—from basic educational concepts and how to structure tutorial assignments to the uses of computer animation. It also gives the faculty a forum for talking together about the fundamentals of education.

At the heart of the sweeping changes occurring in the college is the commitment to prepare students to meet the challenges of veterinary practice in the twenty-first century. In the curriculum design groups, in the "Food for Thought" series, and in the hallways and cafeteria, faculty share, discuss, and at times, passionately debate the most effective way to do that. The steps forward, already taken, are the first of many to come.

**September**

The class of 1994 enters the D.V.M. program, distinguished by the following statistics:

- **Males:** 25
- **Females:** 55
- **Minority students:** 17
- **Cornell undergraduates:** 31
- **Average years of education:** 4.63
- **Number of applicants:** 447
- **Percentage accepted:** 18

The New York State Veterinary Medical Society celebrates its 100th anniversary at a gala annual meeting. The college joins New York State veterinary practitioners for the weekend festivities, capping off a year of celebration activities.

**October**

Campaign Kickoff. Cornell University begins a five-year, university-wide campaign to raise $1.25 billion. The goal of the Cornell Campaign for the College of Veterinary Medicine is $30 million. The college begins a major fund-raising effort to secure gifts from alumni and friends for student aid, professorships, graduate fellowships, and program enhancement.

Dr. Eugenia Kelman is appointed assistant dean for student services. The new position consolidates various student services under a single administrative unit within the college.

Dr. Katherine M. Edmondson is named director of the Office of Educational Development. Dr. Edmondson, who holds master's and doctoral degrees in curriculum and instruction, joins the college as it is expanding curricular and educational initiatives.
It is most remarkable that galanin inhibits the secretion of insulin at four sites, when activity at any one of those alone would have a major inhibiting effect.

—Dr. Geoffrey Sharp

November

Construction begins on the college's new facilities. First step: relocate utility lines.

December

Dr. Harold Hintz, professor of animal nutrition, is one of the first inductees into the Equine Research Hall of Fame, University of Kentucky. This honor recognizes his major influence on the direction of and advancements in equine nutrition.

January 1991

Dr. Robert E. Clark D.V.M. '52 receives the Daniel Elmer Salmon Award for Distinguished Alumni Service at the Eighty-fourth Annual Meeting of the Alumni Association. This award recognizes his exemplary efforts in behalf of the college and the alumni. Dr. Clark has served as president of the Alumni Association, has chaired the College Development Committee, is a member of the University Council, and is co-chair of the Cornell Campaign for the College of Veterinary Medicine.

Dr. Francis Kallfelz D.V.M. '62, professor of clinical nutrition, is appointed director of the Veterinary Medical Teaching Hospital.

The Foundation of Caring

Cornell's College of Veterinary Medicine is one of the most successful veterinary colleges in the country in competing for the limited resources that support biomedical research. Major funding for both research and training in the college is provided by the National Institutes of Health, the National Science Foundation, and the U.S. Department of Agriculture. The state of New York, foundations, industry, and individual benefactors also provide substantial support, including support that cannot be readily obtained from federal agencies.

Although the college has traditionally excelled in the areas of infectious diseases and reproductive biology, its research endeavors encompass the full spectrum of veterinary medicine. Interdisciplinary projects constitute an ever-increasing portion of that effort. A recent award from the National Institute of Child Health and Human Development is supporting interdisciplinary research conducted by a clinical cardiologist and an electrophysiologist. Their cooperative studies of ventricular arrhythmia and sudden death in German Shepherd dogs may disclose the cause of at least some cases of sudden infant death syndrome in humans and lead to the development of rational strategies for its prevention.

Diabetes: Insulin-inhibiting Mechanism Discovered

After three years of intense activity in studies related to mature onset (type II) diabetes, researchers in the Department of Pharmacology have made a startling discovery about a mechanism that inhibits the secretion of insulin.

Affecting large numbers of people and animals, diabetes is a disease of the pancreas in which the control of blood sugar goes awry. One cause of the disease is insufficient secretion of insulin by the beta cells in the pancreas. Dr. Geoffrey Sharp and his

Using a profusion machine to learn more about insulin-secreting cells
colleagues have focused their studies on how a newly discovered peptide called galanin—known to have a strong controlling influence over insulin secretion—does its job. They discovered that this single peptide restricts insulin secretion in not just one but four, and possibly five, different ways.

They found that galanin, produced in the sympathetic nerve endings leading to the pancreas, interacts with a receptor on the outer surface of the beta cells in the pancreas. The receptor transmits signals from galanin to proteins inside the cell called G proteins. The G proteins then carry the signal to at least four different sites within the cell, each of which is responsible for a distinct aspect of the control of insulin secretion: two different ion channels, the site of an enzyme activity, and the site of the insulin release mechanism.

Of the many G proteins inside the beta cell, the researchers have identified two that are responsible for the actions of galanin. Their finding is a major contribution to a full understanding of insulin secretion and its control.

**Clues to Prematurity: Fetal Brain Signals Onset of Labor**

Premature birth, the leading cause of birth defects and infant mortality in the United States, presents a huge financial burden both to the families affected and to society. In medical care alone, it costs as much to look after four premature babies as it does to provide adequate prenatal care to 150 women.

The key to preventing prematurity is understanding how normal births occur. With support from the National Institute of Child Health and Human Development, the college's Laboratory for Pregnancy and Newborn Research sponsors eleven research programs related to fetal development in the late stages of pregnancy.

Knowing what triggers the onset of birth is fundamental to determining why labor may sometimes begin too soon. Dr. Peter Nathanielsz, professor of veterinary physiology, and his colleagues have shown for the first time that the birth process in a mammal is initiated by the fetus, not the mother. Working with sheep, they found that after the fetal brain assesses the lamb's readiness for the challenges of the outside world, one tiny section of the fetal brain—the paraventricular nucleus—sends a signal to the ewe. Because the reproductive systems in sheep and humans are very similar, it is likely that the same mechanism is involved in triggering human labor.

Investigating the major problems of prematurity, researchers in the laboratory have known that premature labor is frequently associated with maternal abuse of drugs, particularly cocaine. In fact, cocaine is used by 10 percent of pregnant women in this country. A study conducted by Dr. Nathanielsz and his colleagues showed that cocaine causes the uterine blood supply to the placenta to constrict so severely that the fetus gets less than half of the oxygen and the nutrients it needs.
Unlocking Infertility: The Genetic Key

Dr. Vicki Meyers-Wallen, assistant professor in the Department of Clinical Science, is investigating the genetic basis of two inherited disorders of the reproductive tract with a grant from the National Institutes of Health. Persistent mullerian duct syndrome (PMDS) and XX sex reversal cause abnormalities in the anatomy of the reproductive system that can adversely affect fertility in humans and animals.

The dog is the only animal model available for studying PMDS in humans. Because there are many similarities between genes across species, determining the gene that causes PMDS in dogs would be a major step toward discovering the genetic basis of the disorder in humans. Dr. Meyers-Wallen’s work could eventually lead to effective tests to detect carriers in both animals and humans.

XX sex reversal is known to cause infertility in seven breeds of dogs. Several breeds have been identified in the college’s Reproduction Clinic for Companion Animals.

Understanding How Viruses Work

In 1978 a virus that had never been seen before in dogs was identified as the cause of a highly contagious, sometimes fatal disease. Since that time the structure of the virus, known as canine parvovirus, has changed twice in the dog population of the United States.

Virologist Dr. Colin Parrish and his colleagues Shwu-Fen Chang, Lisa Strassheim, and Uwe Truyen at the college’s James A. Baker Institute for Animal Health are taking advantage of this unusual occurrence to learn about the basic nature of viruses—how they work, how they evolve over time, how they vary in host range, and how changes in molecular structure and sequence can determine their various properties. Their answers will shed light on the emergence and treatment of viral infections in both animals and humans.

As a result of two years of collaboration between researchers from the Baker Institute and Purdue University, the three-dimensional crystalline structure of canine parvovirus has been identified. The team also is close to identifying the structure of a similar and equally common virus in cats—feline panleukopenia.

Using X-ray crystallography, monoclonal antibody testing, DNA sequence analysis, and other techniques used in molecular biology and biochemistry, Dr. Parrish and his collaborators are comparing the fundamental properties of the two viruses and determining how those properties affect their behavior. Their initial finding is that critical differences between the cat and dog viruses occur on the surface of the coat protein (capsid) of the virus. Now they are investigating how differences at this location affect the ability of the virus to infect a cat or a dog.

The researchers have also found that the two strains of canine parvovirus that have emerged since 1979 differ from the original virus in changes on the surface of the capsid. These surface differences involve antigenic changes, but they may have other functional significance as well—for example, in host range or pathogenicity. Although currently used vaccines, many of which were developed at the Baker Institute, are still effective, the group’s work will help determine whether a new vaccine is warranted.

February

Dr. Ellis P. Leonard D.V.M. ’34, professor emeritus of veterinary surgery, died February 7 in his Ithaca, New York, home. He was eighty-six years old. An alumnus of the college, Dr. Leonard was a noted historian of veterinary medicine, and in his long and distinguished career he greatly influenced the practice of veterinary medicine in the United States.

March

Construction aided by mild weather. Preparations begin for the next phase of the $80-million expansion project.

April

Wildlife Symposium. College students host 300 participants from across the country for the Zoo and Wildlife Symposium, which explores zoo, marine, avian, and other exotic animal medicine disciplines.

Dr. Marian J. Truszczynski, the 1991 George C. Poppeniek Visiting Professor in International Veterinary Medicine, discusses the effect of central Europe’s changing socioeconomic system on veterinary medicine in a public lecture at the college.
Dogs are the prime sentinel for monitoring the spread and distribution of Lyme
disease in the human population.
—Dr. Richard Jacobson

Making a Healthier World for Humans and Animals

The college's Diagnostic Laboratory is dedicated to promoting the
health of domestic and wild animals and keeping New York State's
agriculture and food industries strong. In addition to diagnostic
testing, it provides consultative, extension, and field services to
veterinarians working with agricultural, companion, performance,
zoological, and exotic animals and with wildlife. The laboratory
serves the people of the state through its food quality assurance
testing programs and by providing health services to their animals.

The college's Veterinary Medical Teaching Hospital is at the
forefront in providing the best possible medical and surgical care
for large and small domestic animals and for exotic species. Central
to its mission is a commitment to superb communication with
clients and veterinarians. The hospital provides veterinary care to
the local community through its Community Practice Service, and it
is a referral center for veterinarians throughout the Northeast,
offering the latest advances in equipment and procedures.
Specialty services include cardiology, neurology, internal medicine,
orthopedic and soft tissue surgery, dentistry, ophthalmology,
dermatology, and theriogenology.

Lyme Disease: Natural Exposure Model Opens Doors to Prevention and Testing

A five-member research team coordinated by the college's Diagnostic Laborato-ry continues to make significant advances in the study of Lyme disease—a debilitating bacterial infection that, upon
reaching the chronic phase, is untreatable in domestic animals and humans. Last year 8,500 people were diagnosed with Lyme disease.

The group, headed by Dr. Richard Jacobson, associate professor of immunoparasitology, has successfully developed a

Lyme disease research: providing answers, allaying fears.
natural exposure model for studying the pathogenesis of the disease in dogs—the only model of naturally induced Lyme disease being used in research in this country. The model is particularly valuable because the progress of the disease in dogs closely mimics the disease in humans. It is especially useful as researchers investigate new vaccines and diagnostic tests for Lyme disease.

Earlier this year Dr. Jacobson's group made available to the veterinary community evaluative data on the first vaccine released for use in dogs. The researchers are now conducting efficacy studies of the vaccine using the natural exposure model.

Because *Borrelia burgdorferi*, the bacteria that causes Lyme disease, is unusually slow growing and may cross-react with other organisms commonly present in the bodies of both humans and domestic animals, developing valid diagnostic tests has been particularly laborious. After extensively evaluating the three most commonly used testing systems, the researchers are increasingly confident that the existing serological diagnostic tests for dogs and horses are reliable. Work is under way to isolate antigens unique to the *Borrelia* organism so more highly sensitive tests, for both animals and humans, can be developed.

Community Practice Service: Caring for Pets—and Owners

The Community Practice Service, a clinical unit of the college's Veterinary Medical Teaching Hospital, provides routine health care, medical management, and selected surgical procedures to small animals and exotic pets whose owners live in the Ithaca area. During a week on the service, senior students conduct interviews and physical examinations, and each student establishes treatment plans for up to thirty cases. It's the ideal setting for students to develop skills in client-practitioner communication.

Coordinated by Dr. William Hornbuckle, a specialist in internal medicine in the Veterinary Medical Teaching Hospital, a team of five faculty members gives students immediate feedback on the effectiveness of their interaction with clients. Students then talk again with the client during a follow-up telephone call. The new curriculum's expanded rotation schedule will allow students to spend twice as much time benefiting from this on-the-job training.

Stemming the Tide of Rabies in the Northeast

With a history of success in developing eradication programs for infectious diseases, the college's Diagnostic Laboratory is taking a leading role in preventing the rapid spread of rabies, a centuries-old disease that can be fatal to both animals and humans. Collaborating with the New York State Departments of Public Health, Environmental Conservation, and Agriculture and Markets and the New York State Veterinary Medical Society, the laboratory, under the direction of Dr. Donald H. Lein, is studying the most promising method for controlling and eventually eradicating rabies: oral bait vaccines.

This method of vaccinating wildlife involves distributing an oral vaccine in a food that's attractive to the animals. A wax amule containing a recombinant DNA vaccine virus carrying a noninfectious portion of the rabies virus is placed inside a jacket of dried fish meal polymer. To protect the public and other wildlife species from contact with the vaccine, the bait is put inside a foul-scented resealable plastic storage bag, which raccoons are adept at opening. The pouches are then distributed throughout areas where raccoon populations are large.

In the study, researchers will assess the effectiveness of recombinant DNA modified live vaccines, the different methods of bait dispersal, and the safety of the vaccine to domestic and other wildlife species. The goal is to see if oral bait vaccine will prevent the spread of rabies to new areas. If so, it could then be used to eradicate the disease in endemic areas. Talks are currently under way to study and establish a coordinated oral bait vaccination program involving northeastern states and the eastern provinces of Canada.

Success in using oral bait to vaccinate raccoons against rabies could lead to vaccination programs for wildlife against other infectious diseases such as distemper. The method might also prove useful for dispersing contraceptives to control the size of wildlife populations.

The Reproduction Clinic for Companion Animals: Overcoming the Barriers to Fertility

The Reproduction Clinic for Companion Animals in the college's Veterinary Medical Teaching Hospital was established a year ago by Dr. Vicki Meyers-Wallen to assist small-animal owners and breeders. The clinic provides diagnosis and treatment of infertility disorders in both male and female animals. Breeding management of female cats and dogs with atypical reproductive cycles, as well as for those requiring specialized insemination techniques, are also available.

Dr. Meyers-Wallen's research and expertise in inherited reproductive disorders allows the clinic to offer genetic counseling, which assists breeders in maintaining their breed line by culling out animals carrying deleterious genes. Her work also enables clinicians to differentiate between genetic and environmental causes of neonatal death.

The clinic offers a telephone consulting service to veterinarians on fertility, infertility, and neonatal disorders.

Controlling Food Animal Diseases

The college's Diagnostic Laboratory serves New York State's food animal producers through its Veterinary Field Service Extension Program, which administers the five-year-old Three Disease Program. The Three Disease Program offers diagnostic testing to certify that herds are free of Johne's disease (paratuberculosis), bovine leukemia virus (BLV), and bluetongue—a requirement for the export of animals and embryos to many foreign markets.

Funding for the Three Disease Program was initially eliminated from the governor's 1991-92 budget. As a result of a comprehensive lobbying effort by the agricultural community, however, the highly regarded program was reinstated.

Researchers in the program have developed a new blood test to screen
quickly and inexpensively for Johne's disease, which is widespread in dairy, sheep, and goat herds. Animals suspected of having the disease are then tested by the more definitive but costly fecal sample culture.

The same blood sample can be used to test for BLV, which is prevalent in cattle, and for bluetongue, which while common in other parts of the country, does not appear to occur in the Northeast. According to senior extension associate Dr. Michael Brunner, the results of testing for bluetongue through the Three Disease Program, along with the results of similar testing programs in neighboring states, should be sufficient eventually to declare the Northeast a bluetongue-free region, increasing the marketability of Northeast cattle.

With the development of a new DNA probe, the Diagnostic Laboratory now offers a service to combat the spread of the pathogenic strains of *Escherichia coli* that cause diarrhea in calves. DNA probes can define an individual *E. coli* isolate in terms of its virulence factors. This knowledge makes it possible to judge the effectiveness of commercial vaccines that have a limited spectrum of protection. If a vaccine is judged to be ineffective, the Diagnostic Laboratory can take a particular *E. coli* isolate and tailor a vaccine to protect the animal.

**Equine Performance Testing Center: Assessing the Role of Lung Disease in Poor Performance**

With continued support from the Horsemen's Benevolent and Protective Association, New York Division, Cornell's Equine Performance Testing Center is expanding its services to owners and trainers of athletic horses. Respiratory physiologist Dr. Dorothy Ainsworth, who joined the center's staff this year, is beginning a study on the role of the lower respiratory tract in athletic performance.

Using the center's high-speed treadmill, Dr. Ainsworth is developing techniques for evaluating lung compliance—that is, the flexibility of the lungs and airway resistance—during exercise. Limited lung compliance as a result of disease requires the horse to work harder just to breathe, thus potentially contributing to poor performance when racing.

In a second study, she is looking at the consequences of lung disease in young horses. By conducting respiratory function tests over time on a group of horses that contracted *Rhodococcus equi* pneumonia within the first three to five months of life, Dr. Ainsworth hopes to determine if those horses will become competitive performance horses as adults. She also expects to learn if they are at greater risk of developing other pulmonary disorders later in life.

Research on the effect of lung damage on the respiratory muscles, particularly the diaphragm, has implications for human athletes as well. Dr. Ainsworth hopes to learn whether lung disease results in diaphragmatic fatigue, and if so, whether that limits a horse's performance. Her conclusions may hold true for human athletes as well, given the similar physiology of both respiratory systems.
A Partnership for Support

Established in 1894 as the first statutory college at Cornell, the College of Veterinary Medicine has a long history of academic independence and achievements, made possible by a unique combination of support from public and private sources.

An annual appropriation from the New York State legislature provides approximately one-third of the operating budget for the College of Veterinary Medicine. This funding, along with income from tuition and fees, is used to meet expenditures for most faculty and staff salaries, facilities and maintenance, and basic equipment for the teaching hospital, classrooms, and research laboratories.

Grants and contracts, awarded on a competitive basis by state and federal agencies, fund many research studies that have important implications for the health of food animals and people. In 1990–91, income from these sources made up approximately 30 percent of the college budget.

For more than a century, a tradition of gifts from the private sector—from friends, alumni, corporations, foundations, and other organizations—has contributed to the college’s margin of excellence in teaching, research, and public service. Although private support makes up a comparatively small percentage of the college budget, such gifts are vital in providing the necessary funds to initiate and develop new programs. Important advances in companion animal medicine are made possible largely by gifts from individuals and organizations concerned about improved health for dogs, cats, and other pets. Over the years, college alumni have been among our most loyal and generous donors. In 1990–91, 40 percent of our alumni made gifts to the College of Veterinary Medicine.

Major Donors and Sponsors in 1990–91

Support from donors and sponsors at every level is vital to our work in creating a healthier future for animals and people. Unfortunately, space in this publication does not permit a complete listing of all who made gifts to the College of Veterinary Medicine in 1990–91. We recognize on the following pages those alumni, friends, corporations, foundations, organizations, and public agencies who have provided support in the past year at a level of $500 or more.

For further information regarding gifts to the College of Veterinary Medicine at Cornell and opportunities for the support of its many programs, please contact the Office of Public Affairs (607-253-3744).
Other Cornell University Alumni

Gary A. Beller '60
Robert V. Booth '30
Mollie P. Butler '40
Richard P. Erali '69
Naomi B. Esmon '69
Howard E. Evans '44
Albert Fried '52
Robert P. Gordon '70
Wilson Greatbatch '50
Jean Way Schoonover '41
Mr. and Mrs. Harwood Warriner '26
Hilda G. Way '19
Stephen H. Weiss '57
Pearl Zimmerman '35

Friends

Mr. and Mrs. Joseph Alderisio
Sandra A. Bass
Mr. and Mrs. Peter G. Behr
Kate H. Bicknell
Mr. and Mrs. Warren Bicknell III
Wendy H. Bicknell
Mr. and Mrs. Donald Blackburn
Mr. and Mrs. Walter Bladstrom
Katherine R. Blyth
Harold Boeschenstein
Mr. and Mrs. Albert C. Bostick, Jr.
Frances M. Bonsal
Warwick P. Bonsal
Atherton Bristol
Mary J. Bushnell and family
Mr. and Mrs. Seth Chichester
Carol Conner
Estate of Evelyn Cross
Nina C. Danielsen
Mr. and Mrs. Roger D. Ditman
Dorothy R. Donnelley
Gaylord Donnelley
Elizabeth H. Engel
Estate of Arthur Eschner
Thomas A. Famiagletti and family
Zipporah S. Fleisher
Marion K. Ford
Mr. and Mrs. Elmar H. Frangenberg
Mr. and Mrs. Peter J. Frenkel
David P. Gallagher
Eleanor S. Gillis
Dorothy B. Goodlatte
Mr. and Mrs. Roland S. Gregg
Estate of Laura S. Hamilton
Donna E. Hausman
Kathleen L. Hawkins
Albert J. Hettinger
Paul W. Hodges
Mr. and Mrs. Wesley W. Hoffmaster
Kate Ireland
R. Livingston Ireland
Agnes M. Johnson
Murriel H. Kentnor
John B. Kuhns
Dorothy L. Lakritz
Jacqueline W. Lindsay
Estate of Sara Littlejohn

Mr. and Mrs. Ellice McDonald, Jr.
Daniel K. McIntosh
Mr. and Mrs. Alfred Morra
Estate of Catherine Mortenson
Seeley W. Mudd
Estate of Margaret A. Mulligan
Estate of Emily A. Nordfeldt
Dorothy M. Palmer
Evra R. Peck
Janet Prince
Adelaide C. Riggs
Mr. and Mrs. Dale M. Schulz
Mr. and Mrs. Charles W. Seits
Estate of Elizabeth B. Snyder
Joan Spievak
Laura O'Neill Thorn
Dietrich Von Bothmer
Joyce B. Von Bothmer
Mr. and Mrs. Robert W. Winthrop II
Thomas Y. Yarborough
Carlene M. Zimmerman

Corporations and Businesses

American Livestock Insurance Corporation
Applied Microbiology, Inc.
Best Friend Pet Tags
Biopure Corporation
Cambridge Bioscience
Chevron
Ciba-Geigy
Dreamstreet Holsteins, Inc.
Eastern Artificial Insemination Cooperative
Eastman Kodak Company
Farmos Group, Ltd.
H. J. Heinz
Hills Pet Products, Inc.*
ImmuCell Corporation
Laboratoires Virbac
Lloyd's Underwriters, Brokers & Agents Equine Research and Education Program
Marshall Farms USA
Medizone International, Inc.
Merck & Company, Inc.*
MSD-AGVET
Ortho Pharmaceutical Corporation
Personal Products Corporation
Pfizer Corporation*
Pilgrims Pride
Ralsion Purina Company
Rhone Merieux Laboratoire Iffa
Schering Aktiengesellschaft
Sciex
Shell Oil Company
SmithKline Beecham
Solu Basle
Solvay Animal Health
Sterling Drug, Inc.*
Syntex*
Toxin Technology
Toyo Jozo Company
Venture Systems Corporation

Waltham Center for Pet Nutrition
(division of Mars)
Zonagen
*Matching gift company

Foundations

American Liver Foundation
The Argonaut Charitable Foundation
Asarco Foundation
The Cotrell Foundation
Geraldine R. Dodge Foundation
Gaylord and Dorothy Donnelley Foundation
Fowler-Milburn Foundation
d Dorothy Russell Havemeyer Foundation
The Herzog Foundation, Inc.
Hoffmann LaRoche Foundation
The Humphrey Foundation
The Jaqua Foundation
The Jeffrey Trust
James A. MacDonald Foundation
The Milwaukee Foundation
Morris Animal Foundation
Owen Cheatham Foundation
Pew Charitable Trusts
Pharmaceutical Manufacturers Association Foundation
Mrs. Cheever Porter Foundation
Daniel and Trudy Regan Foundation
The Dorothy Schiff Foundation
Marilyn M. Simpson Charitable Trusts
Thrasher Research Fund
The Vanneck-Bailey Foundation
The Westminster Kennel Foundation
Harold Wetterberg Foundation
Robert H. Winn Foundation for Cat Research
Robert W. Woodruff Foundation

Other Organizations

Alumni Association, College of Veterinary Medicine
American Cancer Society
American Diabetes Association
American Heart Association
American Horse Shows Association
American Kennel Club
The Amyotrophic Lateral Sclerosis Association
Auxiliary to New York State Veterinary Medical Society
Binational Agriculture Research and Development Fund
Black Diamond Cat Club
Capital Cat Fanciers
Carolina Sophisticats
Connecticats
Council for Tobacco Research
Devon Dog Show Association
Eastern New York Thoroughbred Breeders
Finger Lakes Kennel Club
Fort Worth Feline Fanatics
Genesee Valley Breeders Association
Glen's Falls Kennel Club
Great Dane Club of America
Great Lakes Fishery Commission
Greater Lowell Kennel Club
Harrisburg Kennel Club
Horsemen's Benevolent and Protective Association, New York Division
Houston Cat Club
The International Cat Association
Junior Collie Club of Central New York
Kanadasaga Kennel Club
Lincoln State Cat Club
Long Island Duck Research Cooperative
The Mad Catters
Monticello (NY) Kennel Club
Muscular Dystrophy Association of America
National Association of Animal Breeders
National Capital Cat Show
New York Thoroughbred Breeders
North American Horse Association
North Shore Animal League
Ox Ridge Kennel Club
Penn Ridge Kennel Club
Pet Industry Joint Advisory Council
Plainfield Kennel Club
Putnam Kennel Club
Pyrenean Fanciers of the Northeast
Quad City Cat Club
Saw Mill River Kennel Club
Southeastern Egg and Poultry Association
Springfield Kennel Club
Susque-Nango Kennel Club
Tonalawa Kennel Club
Troy Kennel Club
Unicef
Westchester/Rockland Veterinary Medical Association
World Health Organization
On the farm with the Three Disease Program: a melding of service and research.
Table 1. Roswell P. Flower Library, 1990–91

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bound volumes at beginning of year</td>
<td>78,259</td>
</tr>
<tr>
<td>Acquisitions</td>
<td>2,615</td>
</tr>
<tr>
<td>Less withdrawals</td>
<td>462</td>
</tr>
<tr>
<td>Total bound volumes</td>
<td>80,412</td>
</tr>
<tr>
<td>Audiovisual items</td>
<td>29,619</td>
</tr>
<tr>
<td>Periodicals and annuals</td>
<td>1,361</td>
</tr>
<tr>
<td>CD-ROM titles</td>
<td>48</td>
</tr>
<tr>
<td>Microcomputer software titles</td>
<td>346</td>
</tr>
</tbody>
</table>

Table 2. Qualifications of Entering Students, Class of 1995

Amount of preveterinary preparation

<table>
<thead>
<tr>
<th>Preparation</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three years of college</td>
<td>9</td>
</tr>
<tr>
<td>Four years of college</td>
<td>41</td>
</tr>
<tr>
<td>More than four years of college</td>
<td>30</td>
</tr>
</tbody>
</table>

Institution previously attended

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cornell University</td>
<td>37</td>
</tr>
<tr>
<td>Other</td>
<td>43</td>
</tr>
</tbody>
</table>

Field of preparatory study

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal science (or related)</td>
<td>37</td>
</tr>
<tr>
<td>Biological sciences (or related)</td>
<td>40</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 3. Geographic Distribution of Entering Students, Class of 1995

<table>
<thead>
<tr>
<th>Legal Residence</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>60</td>
</tr>
<tr>
<td>Contract states</td>
<td></td>
</tr>
<tr>
<td>Connecticut</td>
<td>2</td>
</tr>
<tr>
<td>Delaware</td>
<td>2</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>1</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>1</td>
</tr>
<tr>
<td>New Jersey</td>
<td>6</td>
</tr>
<tr>
<td>Other states</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
</tr>
</tbody>
</table>

Table 4. Admission Summary, Class of 1995

<table>
<thead>
<tr>
<th>Area</th>
<th>Applicants</th>
<th>Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>188</td>
<td>60</td>
</tr>
<tr>
<td>Contract states</td>
<td>90</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>163</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>441</td>
<td>80</td>
</tr>
</tbody>
</table>

Table 5. Degrees Awarded, 1990–91

<table>
<thead>
<tr>
<th>Degree</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.V.M. (with distinction)</td>
<td>82</td>
</tr>
<tr>
<td>M.S.</td>
<td>4</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 6. Student Enrollment, 1990–91

<table>
<thead>
<tr>
<th>Candidates for the D.V.M. degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class of 1991</td>
</tr>
<tr>
<td>Class of 1992</td>
</tr>
<tr>
<td>Class of 1993</td>
</tr>
<tr>
<td>Class of 1994</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Table 7. Graduate Students at the College of Veterinary Medicine, 1990–91

<table>
<thead>
<tr>
<th>Candidates for the Ph.D. degree</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidates for the M.S. degree</td>
<td>94</td>
</tr>
<tr>
<td>Candidates for the M.S. degree</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 8. Interns and Residents, 1990–91

<table>
<thead>
<tr>
<th>Teaching Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interns</td>
</tr>
<tr>
<td>Residents</td>
</tr>
<tr>
<td>Pathology</td>
</tr>
<tr>
<td>Residents</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

* As of August 15, 1991
Table 9. Clinical Patients and Diagnostic Examinations, 1990–91

<table>
<thead>
<tr>
<th>Category</th>
<th>Horses</th>
<th>Cattle</th>
<th>Sheep and Goats</th>
<th>Swine</th>
<th>Dogs</th>
<th>Cats</th>
<th>Birds</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical and surgical patients</td>
<td>1,565</td>
<td>516</td>
<td>29</td>
<td>25</td>
<td>7,416</td>
<td>2,742</td>
<td>474</td>
<td>379</td>
<td>13,146</td>
</tr>
<tr>
<td>Ambulatory Clinic patients</td>
<td>2,014</td>
<td>34,581</td>
<td>2,636</td>
<td>288</td>
<td></td>
<td></td>
<td></td>
<td>21</td>
<td>39,540</td>
</tr>
<tr>
<td>Clinical pathology specimens</td>
<td>5,784</td>
<td>3,684</td>
<td>278</td>
<td>35</td>
<td>13,522</td>
<td>3,077</td>
<td>244</td>
<td>4,140</td>
<td>30,764</td>
</tr>
<tr>
<td>Diagnostic Laboratory tests</td>
<td>30,576</td>
<td>220,948</td>
<td>9,477</td>
<td>2,458</td>
<td>31,268</td>
<td>12,102</td>
<td>4,028</td>
<td>10,360</td>
<td>321,217</td>
</tr>
<tr>
<td>Necropsies</td>
<td>308</td>
<td>340</td>
<td>87</td>
<td>63</td>
<td>314</td>
<td>185</td>
<td>107</td>
<td>509</td>
<td>1,913</td>
</tr>
<tr>
<td>Surgical pathology specimens</td>
<td>607</td>
<td>483</td>
<td>92</td>
<td>43</td>
<td>4,368</td>
<td>993</td>
<td>66</td>
<td>190</td>
<td>6,842</td>
</tr>
<tr>
<td>Laboratory and animal examinations</td>
<td>92</td>
<td></td>
<td></td>
<td>239</td>
<td>82</td>
<td>222</td>
<td></td>
<td>1,329</td>
<td>1,964</td>
</tr>
<tr>
<td>Fish Diagnostic Laboratory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>107</td>
<td>107</td>
</tr>
<tr>
<td>Poultry Diagnostic Services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4,611</td>
<td>4,611</td>
</tr>
<tr>
<td>Ithaca (410 accessions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>985</td>
<td>985</td>
</tr>
<tr>
<td>Eastport (214 accessions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality Milk Promotion Services</td>
<td>3</td>
<td>121,362</td>
<td>1,028</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1,073</td>
<td>123,468</td>
</tr>
</tbody>
</table>

22
Table 10. Summary of Grant, Contract, and Restricted Gift Expenditures by Source of Funding

<table>
<thead>
<tr>
<th>Source</th>
<th>1990–91</th>
<th>1989–90</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Federal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Defense</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cornell Biotechnology Institute</td>
<td>$384,649</td>
<td>$391,358</td>
</tr>
<tr>
<td>Department of Education</td>
<td>0</td>
<td>15,900</td>
</tr>
<tr>
<td>Environmental Protection Agency</td>
<td>0</td>
<td>6,621</td>
</tr>
<tr>
<td>National Institutes of Health</td>
<td>5,274,204</td>
<td>5,304,907</td>
</tr>
<tr>
<td>National Science Foundation</td>
<td>168,864</td>
<td>253,706</td>
</tr>
<tr>
<td>Department of Agriculture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grants and contracts</td>
<td>302,241</td>
<td>367,305</td>
</tr>
<tr>
<td>Federal appropriations</td>
<td>312,824</td>
<td>386,340</td>
</tr>
<tr>
<td><strong>Total, federal grants and contracts</strong></td>
<td>6,442,782</td>
<td>6,726,137</td>
</tr>
<tr>
<td><strong>State</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cornell Biotechnology Institute</td>
<td>$43,994</td>
<td>$90,161</td>
</tr>
<tr>
<td>Department of Environmental Conservation</td>
<td>142,327</td>
<td>86,155</td>
</tr>
<tr>
<td>Harry M. Zweig Memorial Fund</td>
<td>425,125</td>
<td>479,067</td>
</tr>
<tr>
<td>New York State Agriculture and Markets</td>
<td>3,097,607</td>
<td>3,197,634</td>
</tr>
<tr>
<td>New York State Racing and Wagering Board</td>
<td>3,178,591</td>
<td>3,308,272</td>
</tr>
<tr>
<td>New York State Sea Grant Institute</td>
<td>2,412</td>
<td>32,430</td>
</tr>
<tr>
<td>Other state agencies</td>
<td>0</td>
<td>641</td>
</tr>
<tr>
<td><strong>Total, state grants and contracts</strong></td>
<td>$6,889,756</td>
<td>$7,973,060</td>
</tr>
<tr>
<td><strong>Total, federal and state grants and contracts</strong></td>
<td>$13,332,538</td>
<td>$14,699,197</td>
</tr>
<tr>
<td><strong>Private support (restricted)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grants and contracts</td>
<td>1,069,510</td>
<td>1,008,633</td>
</tr>
<tr>
<td>Cornell Biotechnology Institute</td>
<td>4,171</td>
<td>9,617</td>
</tr>
<tr>
<td>Foundations</td>
<td>223,775</td>
<td>197,395</td>
</tr>
<tr>
<td>Alumni, friends, associations, nonprofit organizations</td>
<td>823,441</td>
<td>495,182</td>
</tr>
<tr>
<td>Endowments</td>
<td>239,293</td>
<td>228,379</td>
</tr>
<tr>
<td><strong>Total, private support (restricted)</strong></td>
<td>2,360,190</td>
<td>1,939,206</td>
</tr>
<tr>
<td><strong>Total, grants, contracts, and gifts</strong></td>
<td>$15,692,728</td>
<td>$16,638,403</td>
</tr>
</tbody>
</table>

Table 10 is a summary of grant, contract, and restricted gift expenditures of the College of Veterinary Medicine at Cornell for the fiscal years July 1, 1989, through June 30, 1990, and July 1, 1990, through June 30, 1991. The amounts reported exclude expenditures for indirect costs as well as expenditures of unrestricted gifts.
Table II. Sources of Funds (in Thousands)

<table>
<thead>
<tr>
<th>Source</th>
<th>1990–91</th>
<th>1989–90</th>
</tr>
</thead>
<tbody>
<tr>
<td>State appropriation*</td>
<td>$16,587</td>
<td>$16,172</td>
</tr>
<tr>
<td>Federal and state: grants and contracts</td>
<td>13,332</td>
<td>14,699</td>
</tr>
<tr>
<td>Private support (restricted)</td>
<td>2,360</td>
<td>1,939</td>
</tr>
<tr>
<td>College income†</td>
<td>13,076</td>
<td>11,006</td>
</tr>
<tr>
<td>Total</td>
<td>$45,355</td>
<td>$43,816</td>
</tr>
</tbody>
</table>

*The 1990–91 expenditures reflect a change in the State University of New York’s fiscal year from April through March to July through June. New York State allocated the “fifth quarter” (April through June 30, 1991) based on 1990–91 appropriations before any budget reductions.

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

Table 12. Uses of Funds (in Thousands)

<table>
<thead>
<tr>
<th>Category</th>
<th>1990–91</th>
<th>1989–90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instruction and departmental research</td>
<td>$5,969</td>
<td>$6,295</td>
</tr>
<tr>
<td>Teaching Hospital</td>
<td>5,863</td>
<td>6,125</td>
</tr>
<tr>
<td>Organized research</td>
<td>17,196</td>
<td>17,046</td>
</tr>
<tr>
<td>Extension and public service</td>
<td>8,550</td>
<td>8,911</td>
</tr>
<tr>
<td>Academic support</td>
<td>722</td>
<td>686</td>
</tr>
<tr>
<td>Student services</td>
<td>792</td>
<td>377</td>
</tr>
<tr>
<td>Institutional support</td>
<td>3,864</td>
<td>2,854</td>
</tr>
<tr>
<td>Plant maintenance and operation</td>
<td>1,525</td>
<td>932</td>
</tr>
<tr>
<td>Student aid</td>
<td>874</td>
<td>590</td>
</tr>
<tr>
<td>Total</td>
<td>$45,355</td>
<td>$43,816</td>
</tr>
</tbody>
</table>

Tables II and 12 are summaries of the income and expenditures of the College of Veterinary Medicine for fiscal years July 1, 1989, through June 30, 1990, and July 1, 1990, through June 30, 1991. These figures do not include expenditures for fringe benefits, estimated for 1990–91 at $6.5 million, and general support services provided by the university. In previous years, private support was included in grants and contracts in table II.
Faculty and Staff Changes

New Appointments
Dorothy M. Ainsworth, assistant professor
Stephen E. Bloom, professor
Rodney Dietert, professor
Nathan L. Dykes, assistant professor
Geoffrey Eddlestone, senior research associate
Brian R. H. Farrow, professor and chair, Department of Clinical Sciences
Jun-Lin Guan, assistant professor
Thomas H. Kawula, assistant professor
Eugenia G. Kelman, assistant dean for student services
Roy Levine, assistant professor
James Marsh, associate professor
Edward J. Pearce, assistant professor

Promotions and Title Changes
Kathy A. Beck, chief, Section of Radiology, Veterinary Medical Teaching Hospital
Robin G. Bell, professor (from associate professor)
Katherine M. Edmondson, director, Office of Educational Development
Cornelia E. Farnum, chair, Department of Anatomy
Francis A. Kalffelz, director, Veterinary Medical Teaching Hospital (from interim director)
N. Sydney Moise, associate professor (from assistant professor)
Maurice E. White, professor (from associate professor)

Retirements
William Hansel, professor
Dorothy F. Holmes, senior lecturer
John E. Lowe, associate professor
Gerald D. Ryan, senior lecturer
Herbert F. Schryver, associate professor

Deaths
Ellis P. Leonard, professor emeritus

Resignations
Robert E. Kaderly, associate professor
Robert F. Playter, professor
Roy V. Pollock, assistant professor
Christoph Seeger, assistant professor
Barbara E. Straw, associate professor
Etta M. Wertz, assistant professor
Administrators and Advisers

Cornell University
Administration
Frank H. T. Rhodes, president
Malden C. Nesheim, provost

State University of New York
Administration
D. Bruce Johnstone, chancellor

College of Veterinary Medicine
Administration
Robert D. Phemister, dean
Donald Smith, associate dean for veterinary education
Douglas D. McGregor, associate dean for research and graduate education
Eugenia G. Kelman, assistant dean for student services
John A. Lambert, assistant dean for administration
John C. Semmler, assistant dean for public affairs
Neil L. Norcross, secretary of the college

Sandra P. Berry, director, Biomedical Communications
S. Gordon Campbell, director, International Programs
Gloria S. Crissey, Registrar and director, Financial Aid
Katherine M. Edmondson, director, Educational Development
Elizabeth A. Fontana, director, Development
Rita W. Harris, director, Personnel
H. Donald Hinman, director, Biomedical Electronics
John M. Lewkowicz, director, Computing Facility
Charles Pearson, director, Financial Services
Fred W. Quimby, director, Center for Research Animal Resources
John E. Saidla, director, Continuing Education
Robert Webster, director, Facilities Administration
Susanne K. Whitaker, librarian, Flower Veterinary Library

Department Chairs and Directors
Roger J. Avery, chair, Department of Microbiology, Immunology and Parasitology
Bruce W. Calnek, chair, Department of Avian and Aquatic Animal Medicine
Cornelia E. Farnum, chair, Department of Anatomy
Brian R. H. Farrow, chair, Department of Clinical Sciences
Francis A. Kallfelz, director, Veterinary Medical Teaching Hospital
Donald H. Lein, director, Diagnostic Laboratory
Douglas D. McGregor, director, James A. Baker Institute for Animal Health
Bendicht U. Pauli, chair, Department of Pathology
David Robertshaw, chair, Department of Physiology
Geoffrey W. G. Sharp, chair, Department of Pharmacology

Advisory Council 1990–91
Richard C. Grambow, D.V.M. '57, chair
Donald P. Berens
Donald R. Davidsen, D.V.M. '59
Stephen J. Ettinger, D.V.M. '64
Ralph W. F. Hardy
Patricia T. Herr, D.V.M. '60
John Patrick Jordan
Stephen J. Kleinschuster
Robert E. Malouf
John L. Mara, D.V.M. '51
John W. McCann, D.V.M. '46 (deceased)
Bernard W. Potter
Kenneth J. Rotondo, D.V.M. '75
James L. Seward
Richard J. Sheehan, D.V.M. '63
Kent R. Van Kampen
Bruce Widger, D.V.M. '51
Harold M. Zweighaft, D.V.M. '56

Emeritus Advisory Council Members
Joseph P. King (deceased)
Stephen H. Weiss

Diabetes research: implications for animals and humans.
Further Information

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

General Inquiries
Direct general inquiries to
Office of Public Affairs
College of Veterinary Medicine
Cornell University
Ithaca, New York 14853-6401
Telephone: 607-253-3744

Laboratory Locations in New York State
Avian Disease Laboratories:
Ithaca
Eastport
Quality Milk Promotion Program, Regional Laboratories:
Canton (northern region)
Cobleskill (eastern region)
Geneseo (western region)
Ithaca (central region)

Equine Drug Testing and Research Program, Track Locations:
Standardbred Tracks:
Batavia Downs, Batavia
Buffalo Raceway, Hamburg
Midstate Raceway, Vernon Downs, Vernon
Monticello Raceway, Monticello
Saratoga Raceway, Saratoga Springs
Yonkers Raceway, Yonkers

Thoroughbred Tracks:
Aqueduct Racetrack, Ozone Park
Belmont Racetrack, Elmont
Finger Lakes Racetrack, Canandaigua
Saratoga Racecourse, Saratoga Springs
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