



C O R N E L L

Veterinary Medicine

Spring 1996

Clue to SIDS May Come from Study of German Shepherds

When their veterinarian said Shasta could die within the year, the Hoffman family of Antioch, California, faced a tough decision.

Should they give up the six-month-old German shepherd for research into a canine disorder that may parallel some forms of human Sudden Infant Death Syndrome (SIDS)? Or should they let their own kids enjoy the seemingly healthy puppy while she lived?

"It was really hard," recalls Robyn Hoffman. "Shasta was our 'baby.' We had just taken her to the vet clinic to be spayed. She seemed fine. Then they called and said that when they gave Shasta anesthesia, they found

an irregular heartbeat."

Cardiac arrhythmias in sleeping dogs are pointing to one possible cause of SIDS in humans. College researchers have found that some German shepherds have an inherited abnormality that predisposes them to sudden death at an early age.

German shepherds with this cardiac problem



behave normally during their waking hours. They run, jump, and fetch with the best of them. Only when they lie down or go into REM (rapid eye movement) sleep do the potentially fatal arrhythmias—including the wildly racing heart beats called tachycardia—begin. Some puppies never wake up. Yet, in a provocative similarity to human SIDS, other dogs "outgrow" the risk of death.

"Just as with babies who succumb to SIDS, routine postmortem examinations do not reveal a cause of death," says N. Sydney Moise, DVM, MS. A veterinary cardiologist and associate professor of clinical sciences, Moise heads the canine study, which has been funded for the past four years by the National Institute for Child Health and Human Development. "We hear sporadic reports from German shepherd owners and

Dr. Sydney Moise is studying a group of German shepherds that have an inherited cardiac abnormality that predisposes them to sudden death at an early age. The disorder is provocatively similar to SIDS (Sudden Infant Death Syndrome) in humans.

breeders across the United States, as well as Great Britain, Italy, and France," she says. "Some are losing one pup in a litter; in other litters, they all die between four and eight months of age."

So Moise asked breeders to donate siblings of dogs that died suddenly in their sleep, and she started tracing pedigrees. She deliberately bred dogs with the inherited predisposition for the abnormality. That concentrated the genes—although the researchers still don't know

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Dean's Message—

from Franklin M. Loew '61, DVM '65

After receiving several recommendations, I recently found time to read the best-selling novel, *The Horse Whisperer*. First-time novelist Nicholas Evans's book is about a mysterious man who helps a young girl and her horse, as well as the girl's mother, recover from a tragic accident that left them all with psychological scars.

The College of Veterinary Medicine is featured in the first part of the story, as the referral center to which the grievously injured horse is sent following an accident that takes place near Chatham, New York, southeast of Albany.

The local veterinarian, named "Harry Logan" in the novel, is described as a late 1960s Cornell graduate, and the horse's principal faculty doctor at the college is named "Dorothy Chen." Neither name is real, so there is much speculation around here about whether author Evans, who lives in England, based the characters on real people. If so, who are they? And how did he acquire such an accurate understanding of equine

veterinary medicine and of our college, even down to the renovations and construction of the past few years? There is an amusing, if curmudgeonly, comment on whether our facility should be called the Large Animal Hospital (i.e., a big one) or the Hospital for Large Animals, and if it's the latter, why not use that name? I thank Mr. Evans for his accurate and complimentary portrayal of our college, and I think he will be pleased to know that our new hospitals are now called the Companion Animal Hospital (for dogs and cats, and other small animals), the Equine Hospital, and the Farm Animal Hospital.

I enjoyed *The Horse Whisperer* very much and believe that many of our graduates and horse-loving friends will find it compelling.

The second edition of the *Cornell Book of Cats* will be out in late 1996, and other recent (1995)



or forthcoming (1996) books by our faculty members include

Adaptive Mechanisms in the Ecology of Vision by Ellis Loew (with four others) (Chapman & Hall Ltd., 1996)

Diseases of Dairy Cattle by William Rebhun (Williams & Wilkins, Lea & Febiger, 1995)

Domestic Animal Behavior for Veterinarians and Animal Scientists by Katherine Houpt (Iowa State University Press, 1996)

Life Before Birth by Peter Nathanielsz (W. H. Freeman & Co., 1996) [Nathanielsz' 1992 book, *Life before Birth and a Time to Be Born*, was translated into Spanish, French, German, and Italian editions in 1995.]

Miller's Guide to the Dissection of the Dog by Howard Evans and Alexander de Lahunta (W. B. Saunders, 1996)

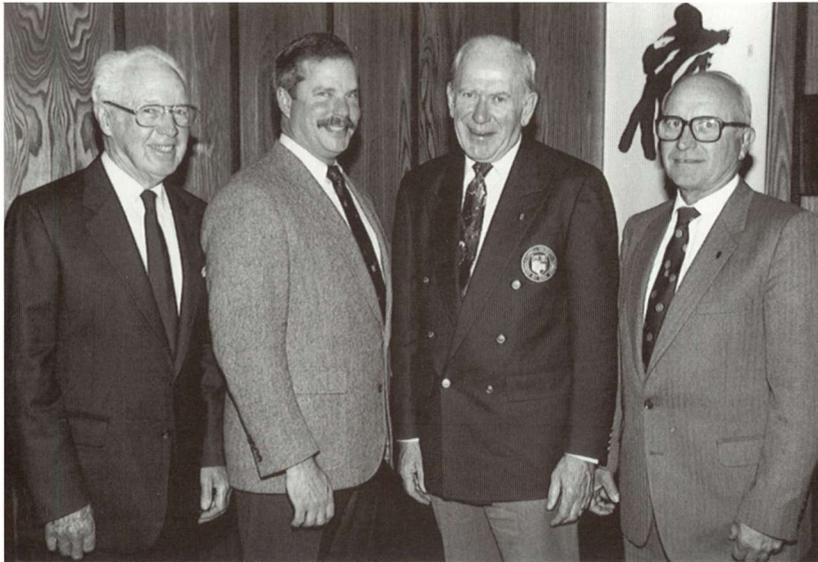
Textbook of Veterinary Anatomy by Wolfgang Sack (with two others) (W. B. Saunders, 1996)

Veterinary Neuropathology by Brian Summers, John Cummings, and Alexander de Lahunta (Mosby-Year Book, 1995) ■



The 30th annual Open House drew thousands of visitors to the college on April 13. Organized entirely by DVM students, the event provides an opportunity for the public to learn more about animal health and the veterinary profession. In the photo, first-year DVM student Wendy Breckenridge (right) talks with young children about a specimen in the anatomy laboratory.

College Campaign Ends—\$37 Million Raised! University Tops \$1.5 billion



Campaign Committee leaders (L to R): John D. Murray, DVM '39 (vice chair, planned giving); Jay W. Geasling, DVM '75 (co-chair); Robert E. Clark, DVM '52 (co-chair); Richard A. Smith, DVM '51 (vice chair, annual giving)

The Cornell Campaign for the College of Veterinary Medicine officially ended December 31, 1995, surpassing the original \$30 million goal by 23 percent with a total of \$37,170,615 in gifts and pledges. Cornell exceeded its university-wide goal of \$1.25 billion with a record-setting \$1.507 billion raised during the five-year campaign.

At the College of Veterinary Medicine, more than two-thirds of the gifts received in the campaign—nearly \$25 million—were earmarked for endowment.

The largest boost was to endowed student aid funds. Gifts for DVM student scholarships totaled \$10,056,874. Gifts to endow faculty positions totaled \$4,485,014, and \$1,623,793 was designated for graduate fellowships and clinical residency endowments. Another \$8,755,262 in endowment gifts was received for specific programs, academic departments and research/service units, and other purposes at the college.

Eighteen alumni served on the Campaign Committee, and more than 300 Cornell veterinarians nationwide worked on regional committees to secure gifts and pledges from fellow graduates. Thanks to the efforts of those dedi-

cated volunteers, gifts from individuals made up the lion's share of the successful campaign. Alumni gave 42 percent of the total, and friends contributed 41 percent. Grants and gifts from corporations, foundations, and other organizations made up the balance.

Cornell's \$1.5 billion is the most raised to date in any university campaign. Although many donors chose planned giving vehicles to make their commitments, 78 percent of the total \$1.5 billion had been received in cash by the end of December. Fully 27 percent of Cornell's \$1.75 billion endowment is attributable to gifts raised during the campaign. That translates to a 91 percent increase in faculty positions endowed and a 114 percent increase in the number of endowed student aid funds.

Dean Franklin M. Loew '61, DVM '65 says, "Over the past 31 years I've served as a faculty member or dean at two medical schools and two schools of veterinary medicine, but I have never encountered the alumni generosity I find at Cornell. The overwhelming success of this campaign is a direct result of the college's devoted alumni volunteers and its friends and hospital clients. Our students, staff, and faculty are truly grateful." ■

CORNELL Veterinary Medicine

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For more information about the college, visit our site on the World Wide Web at

<http://www.vet.cornell.edu>

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Hornbuckle Brings Community Practice Service Closer to the "Real World"

The Community Practice Service (CPS) is where most Ithacans have their first encounter with Cornell's Veterinary Medical Teaching Hospital. And the first experience most veterinary students have of being the professional "in charge" occurs when those pet owners come through the door. Making sure that clients and students are equally well served rests in the hands of William E. Hornbuckle, DVM, Dipl ACVIM.

When Hornbuckle became coordinator of the CPS four years ago, the service was little more than a final chance for fourth-year students to observe closely an experienced clinician providing the kind of routine health care typical of a private practice. Today students in all four years of the college's new DVM curriculum spend time in CPS. Their duties increase with experience, culminating in a two-week span during which they call the shots.

"I'd always believed that we kept veterinary students in a 'student-state' for too many years," Hornbuckle says of the rationale behind the changes he's made in CPS. "I wanted to give them a chance to be self-expressive and to assume responsibility for patient care and client interactions much earlier in their training. It's responsibility that will bring maturity to their approach to clinical service."

Too, he wanted to deliver them from the sink or swim feelings he remembers all too well from his own early experience. "At Oklahoma State [University College of Veterinary Medicine] I'd spent no primary time with clients and first felt totally inept in dealing with people," Hornbuckle recalls. "I believe it's important in the educational process to expose students early on to an interactive setting where they become comfortable talking with clients. It boosts their self-confidence and lends them the



ALEXIS WENGBERGER

air of competence that reassures clients."

CPS is a real-world experience: time-limited appointments, troubleshooting of service problems, and making follow-up phone calls to up to 50 clients a week. Hornbuckle's approach to animal care emphasizes the importance of follow-through because it is the basis for establishing an economically viable veterinary practice.

Behind the scenes Hornbuckle is responsible for reviewing each case and supervising the student's diagnosis, suggested treatment, and plans for follow-up. If he finds himself at odds with a student's view, Hornbuckle, backed by 25 years of experience in internal medicine, prevails. As in all cases seen in the teaching hospital, the faculty clinician monitors and approves all aspects of patient care, while ensuring that students have ample opportunities to discuss what's best for both the patient and the client.

And in the main, that's what Hornbuckle wants students to recognize—that quality veterinary practice requires placing the client at the center. "All our students are geared toward taking care of animals, but the idea of focusing on the client is a new experience for many of them."

To succeed requires training and

Dr. William Hornbuckle observes as fourth-year DVM student Tracey Trad (right) reviews a case she handled in the Community Practice Service with (L to R) Susan Long, RN & VT, and third-year DVM students Gabrielle Ravina and Rebecca Stronger.

practice in communication skills. One aim of the CPS is to help soon-to-be practitioners become sympathetic listeners and develop effective ways of communicating a diagnosis and recommendations for treatment.

Recently promoted to full professor, Hornbuckle is widely respected by faculty colleagues and referring practitioners and is one of the teachers most often cited as a role model by students and alumni. A recipient of the coveted Norden Distinguished Teacher Award in 1979 and 1992, he believes it takes clear convictions, a light touch, and plenty of practicing what you preach to coach students in communicating effectively with clients. In his view, one of Cornell's top priorities is to produce graduates who enable clients to feel secure, to think to themselves, "That doctor may be young but she sure knows what she's talking about."

For that's Hornbuckle's ultimate goal: to educate veterinarians in whom clients can take heart. ■

Alumni Achievements

Heads are turning these days in the gallery of the new Veterinary Medical Center as college folks and visitors alike gaze up at colorful banners and stop to view an exhibit of watercolor paintings and pastel drawings, all created by **Corinne Kenney, DVM '62**. The banners, 10 in all, are painted with silhouettes of large and small animals and will grace the upper reaches of the two-story, 350-foot-long space for years to come. The drawings and paintings, several of which depict familiar scenes and faces around the college, will be on view until mid-June. After 30 years in private practice, Dr. Kenney now devotes herself full time to the fine arts.



Dr. Corinne Kenney '62 in the gallery of the new Veterinary Medical Center

At the 89th annual meeting of the College Alumni Association in March, **Stanley Aldrich, DVM '50**, and **Louis Schimoler, DVM '47**, each received the *Daniel E. Salmon Award for Distinguished Alumni*



Dr. Stanley Aldrich '50 (left) and Dr. Louis Schimoler '47, recipients of the College Alumni Association's *Daniel E. Salmon Award for Distinguished Alumni Service*

Service. Named in honor of Cornell's first D.V.M. graduate, the award is made on an intermittent basis to recognize exemplary service to the college and its alumni body.

Both Dr. Aldrich and Dr. Schimoler have served on the Alumni Association Executive Committee. Aldrich was president of the group in 1974 and 1975, and Schimoler was president in 1979 and 1980. Both alumni also have been members of the college's Development Advisory Committee and Campaign Committee, as well as the Cornell University Council. Aldrich, a past president of the AVMA, has also chaired the College Advisory Council and, in 1991, was elected to the National Academies of Practice in recognition of his contributions to the veterinary medical profession.

Jeanne N. Logue, DVM '44, who served on the staff of the ASPCA Hospital in New York City and conducted a private practice for 25 years, has written a biography of one of Cornell's early veterinary students, Dr. Cooper Curtice (1856-1939).

"Curtice did not receive the timely credit and recognition that was due him," Logue observes. Curtice's greatest achievement was helping to eradicate ticks and the disease known as Texas cattle fever. But as he conducted his research, proposed the vector theory of disease transmission, and fought for a tick eradication program, his scientific peers often scorned his new ideas, only to appropriate them later.

Logue's book is published by Texas A&M University Press. She has also written an autobiography of her years as a veterinarian, titled *The Wonder of It All*. She resides in Poughkeepsie, New York.

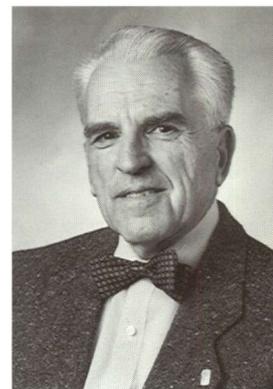


Seeing Double? Dean Franklin Loew (left) shares a light moment with his predecessor, Robert Phemister, as they pose with an oil painting of the former dean. The College Alumni Association commissioned the portrait of Phemister and formally presented it as a gift to the college during the annual continuing education conference in March. The painting, by Ithaca artist William Benson (a 1972 BFA graduate of Cornell), now hangs in the Flower-Sprecher Veterinary Library along with portraits of the college's six other previous deans.

Robert W. Kirk, DVM '46, emeritus professor of medicine, received the second annual Mark L. Morris, Sr. Lifetime Achievement Award in recognition of his 50 years of contributions to the welfare and quality of life for dogs.

Kirk, known worldwide for his teaching and scholarship, is the author of *Current Veterinary Therapy*. In addition he is the author or coauthor of more than 54 books. He is a charter diplomat of both the American College of Veterinary Internal Medicine and the American College of Veterinary Dermatology and a member of the organizing committee for the American Board of Veterinary Practitioners.

He was also a founding member of the National Academies of Practice and remains an emeritus member of that group, which is permitted to have only 100 veterinarians as members.



ALUMNI ACHIEVEMENTS

CONTINUED FROM PAGE 5

Kirk received the award at the Hill's Science Diet® Winner's Circle awards dinner at the Westminster Kennel Club show in New York City in February.

The faculty of the college joined together to applaud the induction of **Stephen J. Roberts, DVM '38, MS, Dipl ACT**, professor emeritus of surgery and theriogenology, into the United States Polo Association Hall of Fame, in Palm Beach, Florida. Roberts, known as "Doc," had been a driving force in establishing polo as an intercollegiate sport in the United States. Called the "dean of college polo," Roberts restarted the polo program at Cornell after World War II. He coached the Cornell team for 25 years, winning eight national titles.

Among his many coaching innovations, Roberts pioneered the "split string" system of using polo ponies, which is common to the college sport today. It requires both teams to use the same horses, eliminating the cost of shipping animals to contests away from home.

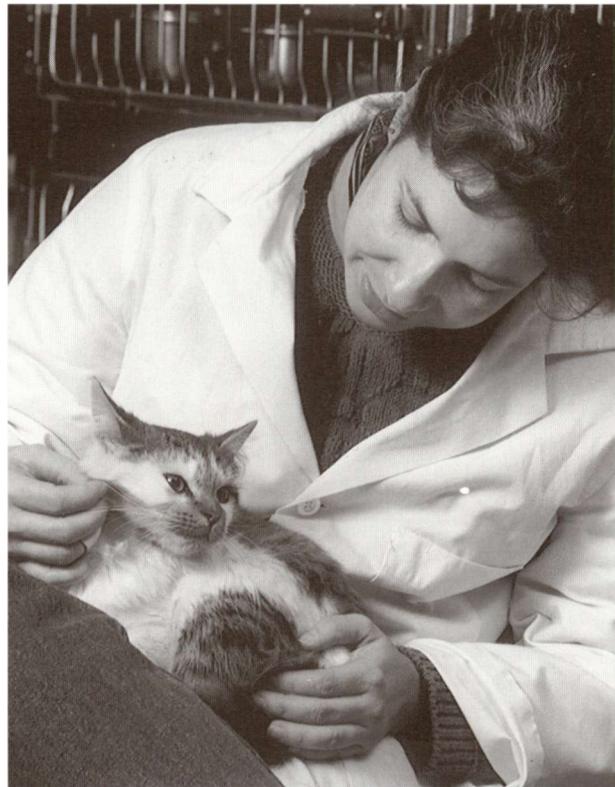
The faculty presented Roberts with a plaque to recognize his induction into the Hall of Fame.



PHOTO COURTESY OF DR. S. ROBERTS

"Doc" Roberts was one of three veterinary students on the Cornell polo team in 1937. The team won the intercollegiate championship that year.

Kittens' Personality May Predict Adult Behavior



Dr. Soraya Juarbe-Díaz examines a patient.

Whether a kitten grows up to be an aloof loner or a participating family member, a confident kitty or a fraidy feline, is something animal adoption agencies and potential pet owners would like to predict. Now animal behavior experts at the college are developing a kitten personality test to help choose a cat, based on expectations of the pet as an adult.

Too many cats are abandoned or returned to animal shelters because their temperament as adults was not what owners expected, says Soraya V. Juarbe-Díaz, DVM, a resident in the Animal Behavior Clinic. "Not everyone wants a cat that sits on your head like a hat. For some people, an aloof cat—one that regards you as a can opener with legs and leaves you alone the rest of the time—is the ideal pet."

Working with kittens and older cats that are up for adoption at the SPCA shelter in Ithaca, Juarbe-Díaz

will try a variety of tests designed to predict behavior of adult cats.

Among the questions are

- How do kittens as young as six weeks old respond to the silhouettes and recorded sounds of a barking dog and a meowing cat?
- Do they resist when they are held on a lap for petting, when they are lifted by the scruff of the neck the way mothers carry kittens, or when they are restrained for a veterinary examination?
- Do they like to be petted?
- When they are placed in an unfamiliar environment, do they explore or do they cower in the corner?
- When a toy is dragged by, do they play like a pussycat or pounce like a predator?

"I'd be happy if five or six of the traits turn out to be useful predictors," Juarbe-Díaz says. She hopes to develop a standardized test that animal shelter personnel—who have some training—can apply. ■

SIDS STUDY

CONTINUED FROM PAGE 1

which genes are responsible.

That's how a puppy named after a snow-capped mountain became "Shasta Science Dog."

"One of the veterinarians at the clinic where Shasta was supposed to be spayed had been an intern at Cornell and said he recognized the arrhythmia," Robyn Hoffman says. With the Hoffmans' permission, Shasta was fitted with a portable, 24-hour-a-day heart monitor. One day's reading was enough for Moïse.

In a provocative similarity to human SIDS, some dogs with the arrhythmias "outgrow" the risk of death.

"Her ECG (electrocardiogram) was perfectly normal when she was awake and excited and happy," Dr. Moïse says. "When she went to sleep, the arrhythmias started. I knew this dog was going to die unless. . ."

Moïse asked if Shasta could participate in the SIDS-related research. The dog would be fitted with an implanted defibrillator to control her racing heart. And she would have puppies of her own. Robyn Hoffman finally decided: "If there was some way our dog or her puppies could save a life, then we had an obligation."

Shasta was flown from San Francisco to Ithaca. Her defibrillator was implanted by research associate James A. Flanders, DVM, with assistance from Eric Fain, MD, a physician and computer specialist from Ventritex, the Sunnydale, Calif., manufacturer of the complex device. Shasta became, from all outward appearances, a normal German shepherd: healthy, vigorous, and fertile.

And she was finally getting a good night's sleep.

Some of Shasta's pups inherited the abnormality. In addition to the dangerous arrhythmias, the affected animals had abnormal sympathetic

nerve innervation to the heart. Collaborating researchers at the University of California at San Francisco confirmed the Cornell veterinarians' hypothesis of uneven distribution of nerve fibers. They produced images of the heart with MIBG (metaiodobenzylguanidine) scintigraphy that showed the incomplete nervous innervation and also corroborated the paucity of nerves. The affected dogs' heart muscles—which should be as full of nerves as Los Angeles is crammed with freeways—look more like road maps of the Yukon.

Another important finding at Cornell was the discovery of abnormal electrical activity in individual heart fibers taken from dogs that had died. The relationship between abnormal electrical activity and lack of innervation is now under study in collaboration with Robert F. Gilmour Jr., PhD, an associate professor of physiology.

"Dogs are like people. The nerves to the heart are not complete at birth," Moïse explains. "But the nerves should continue growing to the heart during the weeks and months after birth. The sudden-death dogs—and even those that survive—never seem to develop a normal nervous system. We're not sure whether this is a problem with the heart or with the development of the nervous system."

Moïse emphasizes that German shepherds are not *the* animal model that completely parallels human SIDS. SIDS is a catchall term for many unexplained, unexpected infant deaths, she says, and how many deaths are heart related is not clear. "However, these dogs give us an opportunity to look at a couple of hypotheses, including the effect of abnormal innervation to the heart," she says.

Moïse and her colleagues have published their findings about German shepherd arrhythmias in journals for human cardiology, physiology, and pediatric medicine.

They've also asked veterinarians to be alert for the inherited abnormality and recommend that breeders keep known carriers out of the gene pool. One ultimate goal is to

identify the genes responsible for the disorder, says Moïse. Genetic screening could keep the sudden-death problem from spreading through the dog population.

Such gene studies may also help the investigation of sudden death in humans. "But first we have to focus on the mechanisms of this disorder," Moïse says, "and we still have a lot to learn."

Shasta had been at Cornell about 18 months when something like a miracle occurred. Her sleeping arrhythmias simply stopped. After repeated tests it was clear that her two-year-old heart was beating normally, asleep or awake, without the aid of the defibrillator. The researchers now know that some of the arrhythmia-affected dogs "outgrow" the problem. Their normal autonomic nervous system still is not complete, but apparently they find other ways to adjust to this deficiency.

So Shasta Science Dog could go home.

The sudden-death dogs—and even those that survive—never seem to develop a normal nervous system.

"By then we had adopted another dog, and they said if Shasta didn't fit in for any reason, she could come back to Cornell," Robyn Hoffman says.

But Shasta fit in as if she'd never been gone, caring lovingly for the Hoffman kids (three by now) and running like a marathoner with their new dog. Robyn Hoffman says she's never seen a dog so protective of children.

Before Moïse and her colleagues put Shasta on the plane to California, they gave her that long-awaited spaying procedure, compliments of the Cornell Companion Animal Hospital. ■

Investigating the Risk of *E. coli* in New York State

In the March issue of *Money Magazine* an investigative report on the erosion of consumer protection regulation leads with the death of a six-year-old Chicago boy from a home-cooked frozen hamburger tainted with *E. coli* 0157:H7. The accompanying photo shows Alex Donley's mother grieving at the foot of his empty bed.

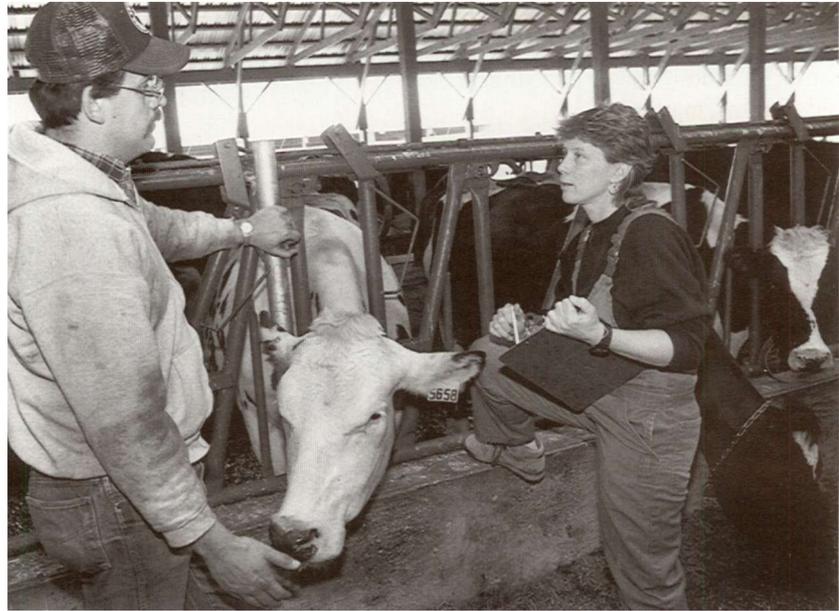
Donley died in 1993, the same year the so-called "Jack-in-the-Box" outbreak of *E. coli* food poisonings in the northwestern United States first brought to the public eye this particular strain of *E. coli* bacteria that causes enterohemorrhagic disease. In addition to severe diarrheal illness, in a small number of those affected (most often children and the aged) *E. coli* 0157:H7 can cause hemolytic uremic syndrome (HUS), leading to permanent kidney damage and even death.

Fear of the *E. coli* pathogen has since lodged in the public (and the press's) imagination. In response, the Diagnostic Laboratory is coordinating a statewide project to survey the prevalence of *E. coli* 0157:H7 in cull dairy cows—the source of 105 million pounds of hamburger produced in New York State each year.

Responsibility for food safety is critical at each step along the continuum from "farm to fork."

The study is designed to develop a more efficient method of testing for the presence of these bacteria in live cattle and to shed light on management practices that may influence the shedding of this bacteria in cattle feces.

It's impractical to test all hamburger for *E. coli* 0157:H7 because the organism is quite rare, says Christine A. Rossiter, VMD, MS, veterinarian and field epidemiologist at the lab and coordinator of



Dr. Christine Rossiter, field epidemiologist in Cornell's Diagnostic Laboratory, and Ted Perry, beef cattle extension associate, gather data during a survey project to survey the prevalence of *E. coli* 0157:H7 in cull dairy cows.

the project. "Last year the federal Food Safety Inspection Service ran a random screen on 5,000 hamburger samples, half from processing plants and half from retail sites, and found only three that were positive for *E. coli* 0157:H7," she says. Responsibility for food safety is critical at each step along the continuum from "farm to fork," she points out. "What we can do is learn more about the organism at the source, which may lead to clues about ways to help decrease its occurrence." To do so requires gathering baseline information about the ecology of the bacteria on the farm level.

An initial pilot study, which surveyed 1,600 culled dairy cows immediately before slaughter, found that only 17 were shedding *E. coli* 0157:H7 from their intestinal tracts. The finding, confirming about a 1 percent prevalence of the organism, was consistent with researchers' expectations. A second sampling of a similar number of animals will be done this summer.

Collecting data during warmer weather may help determine whether seasonality plays a role in the presence of the bacteria.

While collecting fecal samples at a major Northeast packing plant, Rossiter's team is also evaluating the condition of the cows and their transport time and history after they leave the farm. "We have evidence that *E. coli* 0157:H7 may exist at very low levels in many herds and that there appear to be unpredictable bursts of it," says Rossiter. "So we're looking for associations with factors that indicate stress and that might precipitate bursts of shedding."

The second phase of the project is a case-control study of 60 farms chosen from among the farms of origin of the cows that were screened at the slaughter plant. Additional cows will be sampled on these farms, and researchers will look for any risk factors that might be associated with a cow testing positive for *E. coli* 0157:H7. Data such as age, stage of lactation, health status, body condition, housing, environmental conditions, diet, production level, and water sources will be collected on these cows. In addition, the researchers will gather general information about the herd

Hamburger

(size, production, incidence of diseases, cull rate) and the farm (geographic location, type of housing, feed systems, manure management, and culling policy).

Concurrently, specialists in test development in the Diagnostic Laboratory are designing a more accurate and efficient screening test for *E. coli* 0157:H7 in fecal material. Conventional test procedures are highly labor intensive and take three days to complete. Using a gene-based detection system known as multiplex PCR, an initial positive result can be obtained in less than two days.

The study is a model of how educational institutions, state and federal agencies, producers, and industry can work together.

The study is a model of how educational institutions, state and federal agencies, producers, and industry can work together. Much of the sampling and data collection will be performed by veterinarians from the New York State Division of Animal Industry and USDA/APHIS Veterinary Services in New York. The study is coordinated through the National Milk Producers Federation and funded by Beef Board "Check-Off Dollars" and USDA FSIS/APHIS food safety program monies.

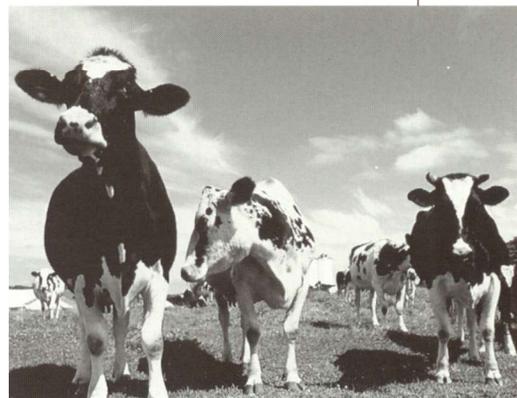
"With everyone working together we hope that a year from now we'll know a lot more about *E. coli* 0157:H7 at preharvest points on the farm and in the pens at the packing plant," says Rossiter. "Then we can select and encourage use of those good management practices that may help reduce the risk of this pathogen getting into the food supply." ■

More Research Needed on "Mad Cow" Disease

More research is needed to understand the infectious agent behind so-called "mad cow" disease, or bovine spongiform encephalopathy (BSE), which may now have infected people in Great Britain, says Brian A. Summers, BVSc, PhD, associate professor of pathology and a specialist in veterinary neuropathology.

"Whatever the agent is that's presumably responsible for transmissible spongiform encephalopathies, it has the most remarkable properties and desperately needs more study," Summers says. The agent appears able on occasion to move among species, including sheep, cats, mink, and antelope. It is very difficult to kill by conventionally used means. It can't be grown in tissue cultures. It does not induce an immune response in the hosts, eliminating the possibility of a blood test for carriers of the diseases; diagnosis must await the appearance of clinical signs. And its incubation time varies greatly among species: decades in humans who contract Creutzfeldt-Jakob Disease (CJD), yet a matter of months in small laboratory animals. There is no treatment, and CJD is fatal in humans.

"The agent may not be an organism in the usual sense of the word but rather a kind of rogue protein," Summers says, referring to the "prion hypothesis," which has gained considerable acceptance as the explanation for the maladies that turn the brain's gray matter into a spongelike mass riddled with empty vacuoles. The disease called scrapie in sheep and goats is the "prototype" spongiform disease and has been known for some 300 years. British cattle are believed to have contracted BSE from meatmeal feed supplements, which were at one time made from brains and other offal of sheep, including those that died of scrapie.



Although there has never been a known case of bovine spongiform encephalopathy (BSE or "mad cow" disease) in the United States, as a precautionary measure the U.S. Department of Agriculture recently ordered the slaughter and cremation of all British cattle brought to the United States before the 1989 ban on imports from the United Kingdom was imposed.

"To get to the bottom of this, we really need to understand the nature of the infectious agent, whether it is a prion or a very small virus or whatever it turns out to be," Summers says. He is not optimistic that full knowledge of such a fundamentally different agent will come soon. "It may take another 20 or 30 years."

But any new information could help answer the public health questions that vex British authorities. "No one knows how sensitive humans are to these infectious agents," Summers says, noting that there are "probably minute quantities of the agent in the muscles of infected British cattle. We seem to have a natural barrier to certain levels of the agent. After all, we have been eating lamb since the Pilgrims arrived and we don't all get scrapie." ■

Help for High School Teachers on Tough Questions about Animal Issues

The whole shebang got started because a group of high school biology teachers admitted they didn't know how to answer their students' questions. It ended up as a multifaceted program aimed at bringing New York's teachers up to speed on the complex role that animals play in human health. It all came to pass because Fred W. Quimby, VMD, PhD, Dipl ACLAM, is a responsive listener.

From the time the Cornell University Institute for Biology Teachers (CIBT) began back in 1990, Quimby, professor of pathology, had taught a summer seminar. Gradually participants began to air worries that they didn't know how to respond to students' objections to dissection labs or explain why animals continue to be used in biomedical research despite advances in *in vitro* testing. Quimby heard them out. And responded—at first with handouts containing facts teachers could use to weigh the practical and ethical issues their students raised.

"Federal regulations and documentation of the facts regarding the history and current use of animals in research, teaching, product development, and safety testing—including the ongoing ethical debates—aren't readily available to teachers," explains Quimby, director of Cornell's Center for Research Animal Resources. This office implements federal regulations on the care and use of animals in research throughout the university. "Teachers admitted to me that they shied away from discussing these subjects because they didn't know enough themselves."

Soon he found that the handouts weren't enough, and he turned to the Health, Safety and Research Alliance of New York (a charitable organization chartered for public education) to finance a handbook of educational materials that illustrate principles of anatomy and physiology through an examination



DAVID GRUNFELD

of human diseases. The backbone of these materials is a curriculum developed by the Massachusetts Society for Medical Research, which Quimby and two high school biology teachers modified to broaden its scope and to coordinate with New York's Regents requirements.

The 86-page workbook, augmented by 31 brightly colored transparencies, brings science home with a look at diseases that high schoolers are likely to encounter among their own families or friends: cancer, heart disease, diabetes, and AIDS. Where appropriate, the role of animals in discerning the nature of these diseases or in developing treatments or prevention is made plain.

For example, cells from a mouse serve as the source of monoclonal antibodies, which are now used in many diagnostic tests. Procedures for successful coronary bypass surgery and balloon angioplasty (performed on 400,000 Americans annually) wouldn't exist were it not for the cat and the dog. The search for an appropriate animal model for studying HIV is imperative because

Dr. Fred Quimby is the director of Cornell's Center for Research Animal Resources, the office that implements federal regulations on the care and use of animals in research throughout the university.

it's been shown that the virus behaves one way during *in vitro* testing and another way *in vivo*.

Most teachers, let alone their students, were unaware of such facts. Quimby's intention, however, wasn't to create a hard sell. After 30 years of volunteering in public school classrooms, he sees the curriculum as a way to promote excitement in the rapidly changing field he loves.

"The New York State Biology Regents Syllabus is updated so infrequently that teachers need a way to keep abreast of the advances in the field," he explains. "Topics were chosen that would be relevant to kids but could also be keyed to the state syllabus."

The question of ethics is addressed head-on through a student survey and a section on suggested discussion topics, backed up by an

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11-page bibliography that includes divergent points of view on questions of animal rights and the use of animals in research and testing. The texts listed are also available on loan, free of charge.

An additional knotty problem that teachers shared with Quimby was the use of animals in biology labs. In lieu of using live vertebrates Quimby brought together four labs designed by CIBT and the Cornell Institute for Regional Biology Mentors that use easily available invertebrates. In one lab students raise *Drosophila*, the common fruitfly, as a means of learning about the effect of temperature on gene expression. In another they learn how to devise their own experiments to discover the feeding behavior of *Arion subfuscus*, the garden slug.

Through the Health, Safety and Research Alliance, Quimby and biology teachers introduce the curriculum to teachers at day-long meetings held around the state. Experts from state agencies involved in public health, wildlife conservation and ecosystems protection, as well as representatives from industry and the veterinary profession present the diverse ways animals benefit New Yorkers. All are willing to take calls and offer additional assistance to teachers throughout the school year.

In addition to the lectures, participants receive a packet of brochures, articles, and resource lists for background and classroom use. A copy of *Animals and Alternatives in Testing* (J. Zurlo, D. Rudacille, and A. M. Goldberg, 1994), which Quimby thinks is the most authoritative book to date on the alternatives to the use of animals in safety testing, is also included.

"The writers of this book point out that, although 99 percent of the drugs that pass laboratory tests don't harm animals, we still need to be sure that they can't cause disease in a whole living animal," Quimby says. "We want teachers to know this from the people whose careers depend on devising alternatives." ■

Research and Service Notes

Cases Sought for Study of Equine Muscle Injury

Researchers in the Neuromuscular Disease Laboratory at the college are seeking cases for a study of horses that have exercise-induced muscle injury. Owners of horses with a history of "tying-up" or "Monday Morning Disease," as rhabdomyolysis is often called, or with other signs of muscle disease, including lack of energy, poor performance, muscle atrophy, a stiff hind limb gait, or ill-defined hind limb lameness, should contact Beth A. Valentine, DVM, PhD, telephone: 607-253-3309 or fax: 607-253-3357.

Equine rhabdomyolysis is one of the most common disorders affecting performance and the ability to exercise. Affected horses can undergo muscle degeneration following even mild exercise; severe cases result in death. Both the cause and effective treatment are unknown.

Valentine's previous research has shown that in many horses rhabdomyolysis is associated with abnormal accumulation of glycogen (a storage form of energy-producing carbohydrates) within locomotory muscles. This disease, known as Equine Polysaccharide Storage Myopathy (EPSM), appears to affect the muscles' energy metabolic pathways.

A promising treatment being investigated in the study is a high-fat, low-carbohydrate diet. This diet may affect the energy metabolism of muscle by bypassing the carbohydrate metabolic pathway and providing energy through the direct metabolism of fat. A secondary goal is to conduct extensive biochemical studies to determine whether EPSM results from a carbohydrate metabolic defect, which may be inherited.

The EPSM study is supported by a grant from New York State's Harry M. Zweig Memorial Fund for Equine Research with assistance



Dr. Beth Valentine with a patient in the EPSM study

from Purina Mills. Expenses for participating in the study, including transportation of horses to and from Ithaca, will be covered by Zweig Fund grant monies. Various breeds of draft horses and light horses, including racehorses, have been identified thus far as having muscle disease caused by EPSM. Horses from locations within 200 miles of Ithaca can be transported to Cornell for treadmill exercise and muscle biopsy. Dr. Valentine will also work with owners and veterinarians outside the region who wish to participate in this study.

Friskies Funds Animal Behavior Residency

A new two-year residency in animal behavior has been established in the college's Veterinary Medical Teaching Hospital. With support from Friskies PetCare, the program has been developed in response to the urgent need for veterinarians who have expertise in treating companion animals that have behavioral problems.

Only 13 veterinarians in the United States are board certified by the American College of Veterinary Behaviorists (ACVB), yet between 30 and 70 percent of the cats and dogs in animal shelters are there because they have behavior prob-

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RESEARCH AND SERVICE NOTES

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lems. These problems include aggression, destructive behavior in the owner's absence, barking, phobias, house soiling, and fabric eating. Sixty percent (between 5 and 20 million) of these surrendered animals are euthanized each year.

The residency program aims not only to train veterinarians to treat behavior problems but to advance understanding of the physiological processes underlying these problems and delineate promising modes of treatment.

The Friskies PetCare Resident in Clinical Animal Behavior will see clinical cases, conduct retrospective and prospective research on factors associated with behavior problems, and evaluate the effectiveness of current behavior modification and drug therapies. The resident will work under the supervision of Katherine A. Houpt, VMD, PhD, who is board certified by ACVB and directs the college's Animal Behavior Clinic.

Health Warning on Handling Iguanas

Iguanas, the most popular reptile among the 7 million plus pet reptiles in the United States, carry exotic forms of *Salmonella* bacteria that can cause life-threatening illness in humans. Because a record number of reptile salmonella cases were referred to Cornell's Diagnostic Laboratory last year, the lab has issued a warning: *Wash your hands after handling iguanas, other reptiles, or anything they may have contacted.*

Like most reptiles, iguanas carry *Salmonella* in their intestinal tracts, says Patrick L. McDonough, MS, PhD, assistant director of bacteriology in the Diagnostic Laboratory. The bacteria are shed in the reptiles' feces, getting on their skin, in their cages, and on other materials they touch. At least 20 different types of *Salmonella* have been identified in iguanas imported from Central and South America. "Iguanas look clean, but you can't see the bacteria," McDonough points out.

The seriousness of the situation in the United States and Canada

should not be overlooked. Studies conducted at the Bureau of Communicable Disease Control in Albany, New York, indicate that more than 2,000 cases of human salmonellosis are acquired from reptiles each year in New York State alone.

National statistics from epidemiologists at the National Center for Infectious Diseases estimate that between 3 and 5 percent of the 2 to 6 million human salmonellosis cases annually can be attributed to reptiles. Many of these cases have been severe. The Provincial Health Officer for Alberta, Canada, reports "... a disconcerting number of salmonella infections in young children that can be traced directly to a pet in the household. While deaths are indeed rare, the number of severe cases of salmonella infections requiring hospitalization in young children is not."

McDonough emphasizes that adults with fully functional immune systems usually get an uncomplicated gastroenteritis (vomiting, fever, diarrhea, cramps) from *Salmonella*. But in high-risk individuals, such as immunosuppressed persons, pregnant women, the very old, and children under age five, salmonellosis poses a severe risk of more complicated disease, including septicemia, meningitis, and abortion.

Laboratory Certified for Canine Thyroid Registry

The endocrinology section of the Diagnostic Laboratory is one of two laboratories in the United States currently certified by the Orthopedic Foundation for Animals to test serum samples for its new Canine Thyroid Registry. The registry monitors autoimmune thyroiditis in dogs—the most common cause of primary hypothyroidism—by testing serum samples for free-thyroxine, thyroid-stimulating hormone, and thyroglobulin autoantibody.

Knowing the status of a dog's thyroid gland and its lineage allows breeders and genetic counselors to decide which matings are most appropriate for reducing autoimmune thyroiditis in their offspring.

Thomas J. Reimers, PhD, professor of endocrinology, directs the section. For more information, contact Dr. Reimers at 607-253-3900.

Use of Hormones in Equine Reproduction

Peter F. Daels, DVM, PhD, assistant professor of theriogenology in the Department of Clinical Sciences, is studying the role of three hormones in equine reproduction.

One recently completed study has added substance to the longstanding belief that progesterone therapy can help prevent abortion in mares whose pregnancy is at risk because of an acute illness such as colic. In mares that are severely ill, progesterone appears to protect the pregnant uterus from the deleterious effects of prostaglandin, a hormone that is often secreted in large amounts during severe illness.

In a second study, Daels is examining the role of opioids, hormones secreted in the brain, in regulating the onset of parturition in mares. Preliminary results indicate that opioids inhibit the release of oxytocin, a potent stimulator of uterine contraction and likely a key player in the initiation of labor. According to Daels, opioids may play an important role in the timing of oxytocin release and onset of foaling. The results of this work will help identify risk factors for premature labor and could lead to new methods for managing premature labor.

In a third ongoing study, Daels is developing a new treatment for inducing reproductive activity in the early spring when mares are still in the nonbreeding season. This treatment radically departs from existing treatments based on GnRH and uses a drug that antagonizes the action of dopamine, a hormone that has been implicated in puberty in rats, seasonal reproduction in ewes, and spawning in fish. Preliminary findings indicate that this new approach will offer a treatment strategy that is at the same time more practical (can be administered by injection or per os), reliable, and potentially much less expensive than the existing treatments. ■

Woodchuck Colony Advances Understanding of Liver Disease

February 2 has a special significance for some researchers at the college, and it's not because scientists think a sleepy rodent on Groundhog Day can predict winter's end. Rather, the groundhog (also known as the woodchuck) is honored here for its indispensable contributions to the study of a liver disease that plagues 250 to 300 million people worldwide.

For more than 15 years, woodchucks born at the specific-pathogen-free colony the college maintains (supported by the National Institutes of Health) have led researchers to make discoveries about treatment and prevention of hepatitis B virus (HBV) infection and the liver cancer it can cause.

"Wild woodchucks in the United States are infected with a virus very similar to HBV. Humans don't get



Animal health technician Joby Crispell holds "Shadow," a five-year-old female woodchuck from the disease-free breeding colony at Cornell that is contributing to advances in hepatitis B virus research. "We're not supposed to make pets of them," she says, "but we all have our favorites."

hepatitis from woodchucks with the woodchuck hepatitis virus (WHV), but the virus and its effect on the liver is similar enough to make the woodchuck the best system we have

for studying viral hepatitis," explains Bud C. Tennant, DVM, Dipl ACVIM, the James Law Professor of Comparative Medicine, who heads the hepatitis research project.

Not only does the woodchuck virus have a nearly identical effect on woodchuck livers to human hepatitis B virus on human livers, but woodchucks offer a critical advantage: time is compressed. Disease processes that take 30 to 40 years in humans occur in three to four years in woodchucks. The only other animal model for HBV studies is the chimpanzee, an endangered species.

Hepatitis B virus infection occurs mainly in Africa and Asia where 20 to 40 percent of humans infected with HBV will develop chronic liver damage or cancer of the liver. ■

Research Highlights

Research with woodchucks at Cornell has already resulted in many advances in understanding liver disease. Among these are

- proof that hepatitis B virus infection is an important cause of liver cancer.
- demonstration that immunization against hepatitis B virus can prevent liver cancer.
- confirmation that immunosuppressant drugs used for human liver transplants increase viral replication of HBV, leading to the loss of the transplanted liver.

Research now under way with woodchucks is expected to yield even more benefits. These include

- determining the role of dietary factors in liver cancer, such as alcohol or aflatoxin found in some cereal grains and peanuts.
- identifying the viral genetic factors responsible for chronic hepatitis B virus infection, an important step because the highest occurrence of liver cancer is seen in chronic carriers of the virus.
- discovering, on the molecular level, exactly how the virus causes liver cancer, as well the role of viral genes in replication of the virus. Some experts believe that interrupting replication could be the best antiviral strategy.
- testing new and improved hepatitis B vaccines.

Facts about *Marmota monax*

Groundhog, woodchuck: what's the difference?

Woodchuck and groundhog are common terms for the same animal, the rodent with the scientific name *Marmota monax*. Most closely related to squirrels, woodchucks actually can climb trees and also swim.

What's so special about February 2?

Celestially speaking, Groundhog Day, February 2, is a "cross-quarter" day, about halfway between the winter solstice in December and the vernal equinox in March, and is celebrated in some cultures as the midpoint of winter. It's not far from the time many groundhogs end their hibernation anyway, around the second week of February.

How much wood could a woodchuck chuck if a woodchuck could chuck wood?

About 700 pounds. Compared to beavers, woodchucks are not adept at moving timber, although some will chew wood. (At Cornell, woodchucks that gnaw their wooden nest boxes are given scraps of lumber.) A wildlife biologist once measured the inside volume of a typical woodchuck burrow and estimated that—if wood filled the hole instead of dirt—the industrious animal would have chucked about 700 pounds' worth.

Sources: College of Veterinary Medicine; N.Y.S. Department of Environmental Conservation; *Mammals of the Eastern United States*, second edition, William J. Hamilton Jr. and John O. Whitaker Jr. Ithaca, N.Y.: Comstock Pub. Associates, 1979.

Viewpoint:

Holly Cheever, DVM '80, on the Alumni Unrestricted Gifts Fund



PHOTO COURTESY DR. H. CHEEVER

I am currently in my sixth year as a member of the Joint Faculty-Alumni Committee on Unrestricted Gifts. This committee, which consists of five alumni and five faculty members, has the challenging and fascinating task of deciding how to allocate the unrestricted gifts received from alumni in the college's annual fund. We meet twice yearly and consider 20 to 30 proposals at each session.

Historically, the five alumni on the committee have covered the spectrum of veterinary practice: rural and urban, male and female, large and small animal practitioners, state veterinarians and entrepreneurs. The faculty members provide invaluable assistance in analyzing the scientific merit of each proposal but always defer to the alumni representatives when the proposal is brought up for a vote, since we best represent the donors' interests.

We follow general guidelines in making our decisions. Projects that combine the three primary aims of the college—teaching, service, and research—tend to be favored over those with a narrower focus. Proposals that provide for student involvement and employment are also given higher priority. One critical aim is to favor the projects of junior faculty who have no alternate sources of funding and who may be relying on this proposal as the core of their career develop-

ment. If a project is service-oriented, we ask how many cases per year it will affect.

Because typically only enough funds exist to cover about half of the requests submitted for each meeting, we usually don't approve projects for which alternate funding is available. We also keep a history of our grants so that no one faculty member receives a disproportionate amount of support over time. An exception to this might be a project or piece of equipment that is an important building block for a previously funded item.

Over the past six years, we have tended to grant requests for the following: materials necessary to get the new curriculum off and running; projects that provide opportunities for students to study overseas in lesser-developed countries; studies that keep Cornell on the cutting edge of clinical research; proposals to bolster the dairy industry in the state; and research that will generate useful techniques and information to benefit private practitioners.

I have found serving on this committee to be a refreshing change from my clinical practice and a wonderful chance to stay in touch with old friends. Most important, it has been an excellent opportunity for learning because each project is discussed in depth before it comes to a vote. The alumni who give so generously to the college should rest assured that the graduates on the committee will continue to represent them to the very best of our abilities. ■

Holly Cheever, DVM '80, is a private practitioner in Guilderland, New York.

Grants Report Alumni Unrestricted Gifts Fund

The Joint Faculty-Alumni Unrestricted Funds Committee met in December 1995 to consider 25 grant proposals. Twelve grants totaling \$90,188 were awarded. The funded projects are described below.

Equipment

Digital camera—for the Veterinary Medical Teaching Hospital to document cases for teaching, medical records, and reports to referring veterinarians

Electromyography equipment—for electrodiagnostic evaluation of small and large animal patients with suspected neuromuscular disease

Electronic ejaculator—for use in clinical cases, teaching, and research in theriogenology

Polycut heavy duty microtome—to embed and section large and undecalcified bones and bone biopsies for clinical and basic orthopedic research that relies on maintenance of tissue ultrastructure

Enhanced Teaching

Aquatic animal medicine teaching materials—new microscopic slide sets, plastinated and museum jar specimens, and computer instructional modules for courses in fish histology and aquatic animal health

On-line resources for clinical teaching—continued development of computer instructional materials, including on-line course handouts, case simulations, and tutorials

Clinical Research

Diagnosis of C. perfringens toxin genes by multiplex PCR—to apply the polymerase chain reaction (PCR) technique to differentiate and study *C. perfringen* types isolated from case materials of intestinal clostridiosis, clostridial myositis, and anterior enteritis in horses, hemorrhagic enteritis in dogs, and acute death in milking cattle

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Gastrointestinal contrast agents in avian radiology—to evaluate the comparative diagnostic quality of barium sulfate and iohexol as a gastrointestinal contrast agent in three companion bird species

Hepatic needle versus wedge biopsy—to determine the diagnostic accuracy of hepatic needle biopsies in various hepatobiliary diseases in small animals and to determine if some diseases are more accurately diagnosed using wedge biopsy specimens

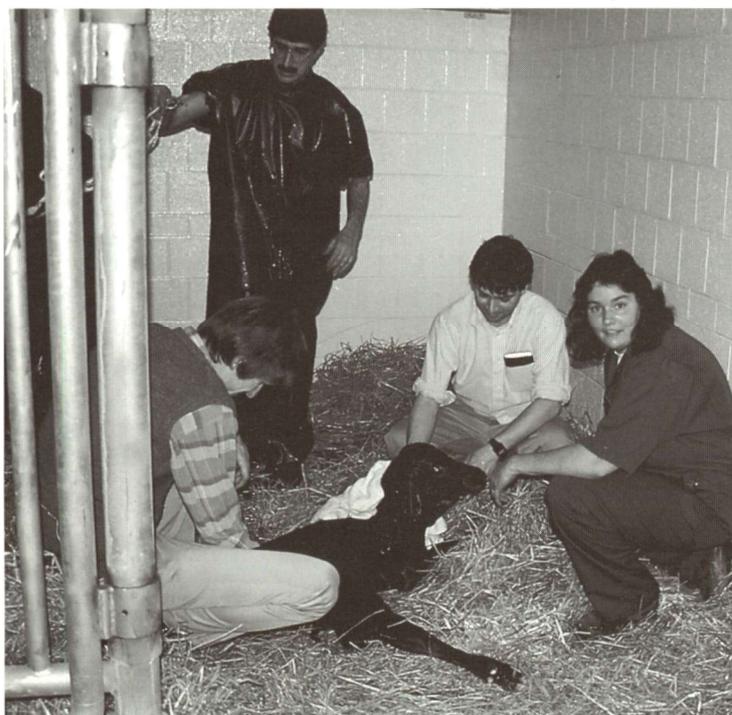
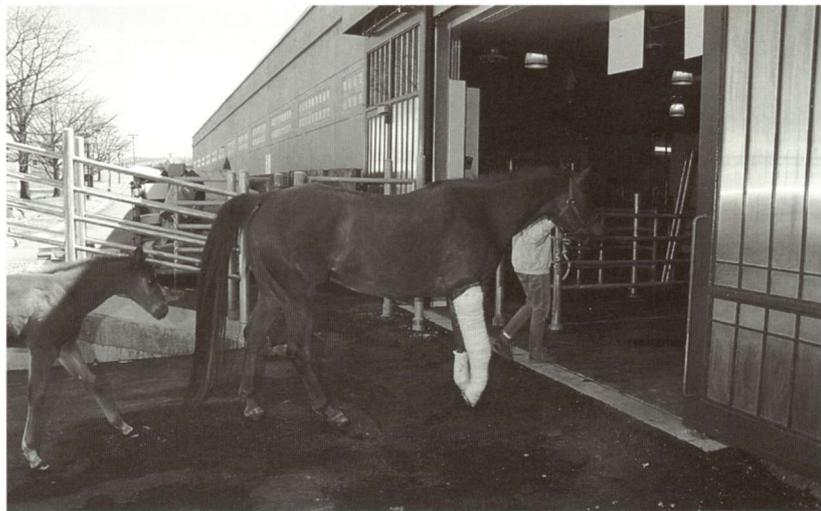
Incidence and significance of bovine endometritis—to use endometrial cytology to establish the incidence of endometritis in postpartum dairy cows and evaluate the impact of endometritis on subsequent reproductive performance

In vitro cultivation of Cryptosporidium parvum—to establish *C. parvum* in a high-yield in vitro cultivation system to produce antigen and evaluate drug, disinfectant, and cytokine effects on viability and growth

Molecular epidemiology of cryptosporidiosis—a pilot study in cooperation with the New York City Watershed Project, to explore molecular epidemiology of cryptosporidiosis related to the zoonotic spectrum of the protozoan parasite ■

On the Move

The long-awaited move into the new Farm Animal and Equine Hospitals in the Veterinary Medical Center took place on the weekend of March 30–31. At right, a DVM student leads a patient and her foal into one of the new equine wards. Look for the full story, with more photos of the new facilities, in the summer issue of *Cornell Veterinary Medicine*.



Our First Baby!

The final move of equipment, staff, and patients into the new Farm Animal and Equine Hospital facilities was well under way on March 31 when the action shifted briefly to a single stall in the bovine unit. Dr. Michael Ball, a resident in large animal medicine, snapped these photos of the first birth in the Cornell Veterinary Medical Center—a female Simbrah calf. Attended by (L to R) Dr. Peter Daels, Dr. Carlos Gradil, Dr. Normand Ducharme, and third-year DVM student Denise Jones, the calf went home with a clean bill of health the following week.

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Veterinary Medicine

College of Veterinary Medicine

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1996 Calendar of Events

(Events are at Cornell unless otherwise noted;
call 607-253-3744 for information.)

June

- 6-9 Cornell Reunion Weekend
- 7 Dedication of new Veterinary Medical Center
- 23-25 International BVD Virus Symposium*

July

- 23 Alumni Reception, Louisville, Kentucky, at the AVMA Annual Meeting
- 26-29 Cornell Eighth Annual Feline Practitioners Seminar*

August

- 3-4 Necropsy Diagnosis for the Veterinary Practitioner*
- 5-9 Olafson Pathology Short Course*
- 9-12 Frontiers in Fetal, Maternal, and Neonatal Health*

September

- 21 Cornell Homecoming, veterinary alumni Tailgate Party at Princeton football game
- 28-29 Solving Canine Behavior Problems*

October

- 4-5 Equine Practitioners Seminar*

*For more information about continuing education programs,
call 607-253-3200.



PHOTO COURTESY OF THE KRASIK FAMILY

Dale Krasik of Pittsburgh sent an e-mail message in December after he found the college's site on the World Wide Web. Writing on behalf of his entire family, he said, "Approximately 15 years ago our dog Niki got hit by a car. To make a long story short, you people operated on her, more than once I might add. Her pelvis was broken in five places and her right rear leg was broken. The doctor told us that when she got to be around five years old, we would probably have to have her put to sleep because she would be arthritic and in pain. Well, I am glad to report that Niki is alive and well. My family is very thankful for your fantastic efforts. I hope this note makes you people as happy as you have made us."

It did, and we're grateful to Dale for writing and later sending the above photo of Niki. If you'd like to visit our site on the Internet, it can be found at <http://www.vet.cornell.edu>.