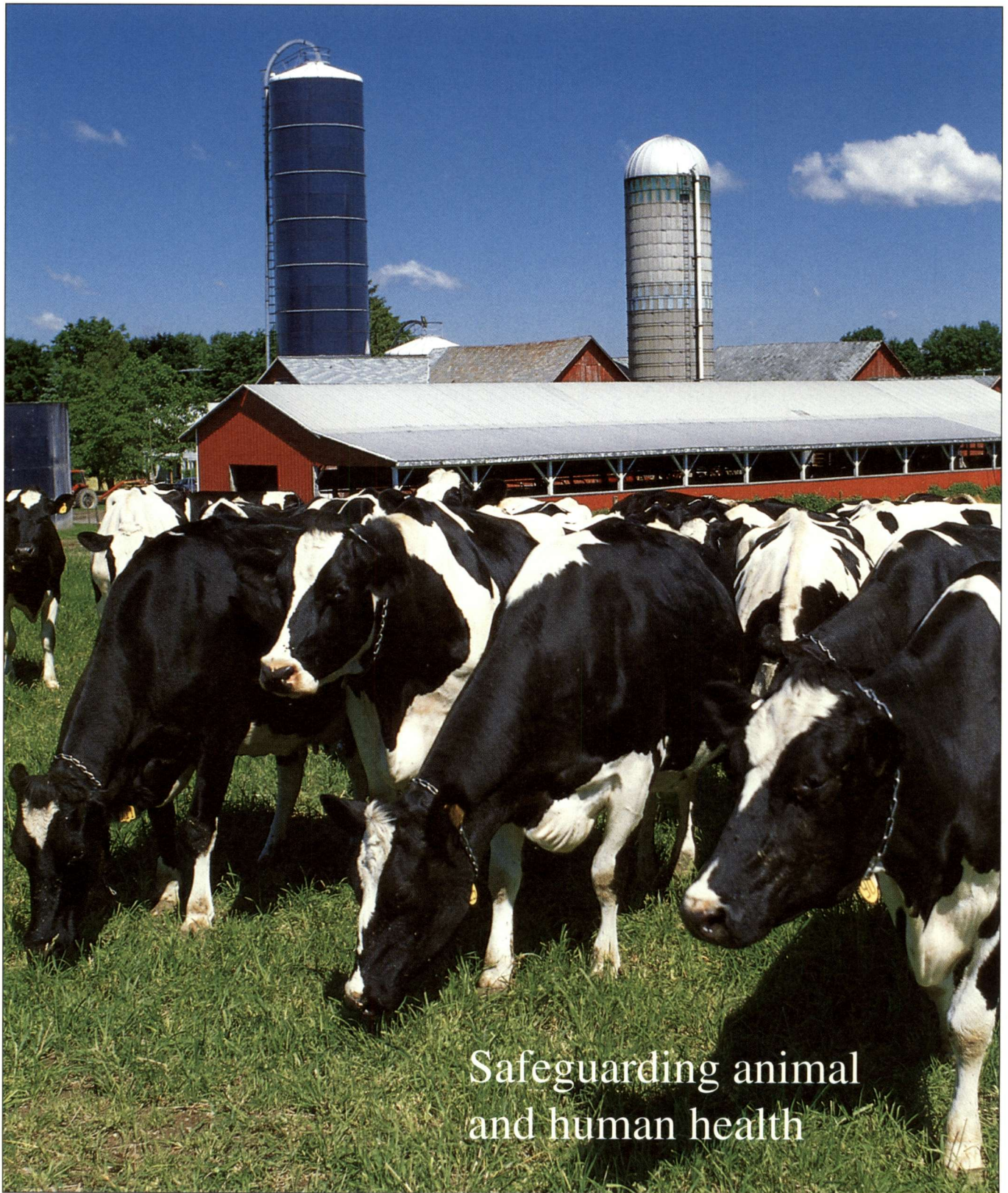


CORNELL UNIVERSITY
Veterinary
Medicine

SPRING 2002



Safeguarding animal
and human health

CORNELL

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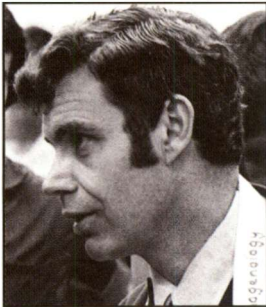


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biosecurity

"Homeland security", as a phrase and a concept, has been permanently imprinted on our psyches in the months since the illusion of distance between America and the other side of the world collapsed on September 11. We all realize, certainly, that our security rests in the hands of the intelligence and enforcement agencies of the federal government, and with the military. Less well appreciated, however, is the critical importance of the veterinary profession in safeguarding our economic and public health.

Veterinarian Mary Smith, an associate professor in the Department of Population Medicine and Diagnostic Sciences, visits an area farm.



Matthew Fondeur/Cornell University Photography

From field to laboratory, Cornell veterinarians play a major role.

It is, unfortunately, no secret that enormous harm could be done to the U.S. economy or to animal and public health through the introduction of any of a list of common or foreign pathogens onto farms or into the food or water supply. Many bioterrorist threat agents are also important animal pathogens. But to veterinarians in the field, an outbreak is an outbreak, regardless of source. The need for surveillance and monitoring of livestock herds and poultry flocks has always existed, and many veterinarians, particularly those working in public health and diagnostics, were focused on the subject long before September 11. Their hope is that government leaders and the nation as a whole will now also understand the importance of establishing and maintaining the infrastructure necessary to prevent or contain outbreaks of animal disease.

Veterinarians from Cornell's Animal Health Diagnostic Laboratory have been visiting farms for more than ten years to assess biosecurity risks and educate farmers in ways to protect their livestock, the food they produce, and their local environment from pathogenic and chemical contamination. Six hundred New York farms currently participate in the New York State Cattle Health Assurance Program (NYSCHAP), a voluntary program established four years ago under the auspices of the New York State Department of Agriculture and Markets as an outgrowth of the AHDL's Three Diseases Program. The program allows for strong collaboration between the field veterinarians, who can observe problems and evaluate at a herd level the effectiveness of interventions at various control points, and the AHDL researchers who work on developing and refining diag-

nostic tests. The program now serves as a model for efforts at Cornell and elsewhere to institute a national cattle-health assurance program.

The steps that need to be taken to strengthen the veterinary line of defense have lately been the topic of much discussion at Cornell. At the end of November the College of Veterinary Medicine hosted Canada's Minister of Agriculture and Agri-Food, the Honourable Lyle Vanclief, and a panel of distinguished experts from academic and public veterinary medicine for a half-day conference on agroterrorism and biosecurity. And in March Alfonso Torres, the College's newly arrived associate dean for veterinary public policy and director of the AHDL, led off Cornell's Conference for Veterinarians with a comprehensive review of the risks to animal and public health and the safeguarding systems that are in place, or

still needed, to protect us all.

Minister Vanciel in his keynote address emphasized the need for partnership between the U.S. and Canada at the federal level in ensuring the security of our food systems. The Canadian Food Inspection Agency, which reports to the minister, consolidates food inspection, human and animal disease surveillance, and food safety research, while those functions are less well integrated in the U.S. Vanciel cited Senator Hillary Rodham Clinton's proposal, outlined in an earlier address at Cornell, to create a centralized agency to bring together the food inspection units of the USDA and the FDA and increase security measures relating to food safety.

The minister also stressed the need for cooperation between all levels of government and between government, industry, and the academic community, themes that were examined from the state and provincial level during the roundtable discussion that took place following his address. The panelists emphasized as well the responsibility of veterinary practitioners to educate farmers about best management practices, and the need to ensure that all

Give that Chicken a Gold Star

The College's Animal Health Diagnostic Laboratory runs two poultry laboratories in the state, which offer diagnostic services to commercial producers of chickens, ducks, and turkeys. The goal is to assure the health of the birds and the safety of the poultry food products. In addition, the Avian Disease Control Program, part of the Department of Microbiology and Immunology, provides continuous surveillance of poultry diseases, helping to reduce costs of production. A major concern to scientists and poultry industry officials is avian influenza, prevalent in the live-bird markets in New York City and a serious threat for the poultry industry. Some low-pathogenic avian influenza virus has the potential to mutate and become highly pathogenic. An outbreak of a highly pathogenic form of avian influenza, if unchecked, would devastate the U.S. poultry industry because of mortality, loss of production, and loss of international markets. Surveillance is key. Early detection of highly pathogenic avian influenza will help to prevent incidents like the 1997 human outbreak of avian influenza in Hong Kong, which resulted in the deaths of six of 18 infected people.

veterinarians are trained to recognize potential cases of foreign animal diseases and take appropriate measures to report and contain them.

The first step in managing a real or suspected disease outbreak is to have a rapid, definitive diagnosis. Currently only the federal laboratories at Plum Island in New York and in Ames, Iowa are equipped with the reagents to test for foreign animal diseases, many of which are zoonotic, or capable of transmission between animals and humans. According to Torres, there is growing discussion about decentralizing some of the federal laboratories' authority. "USDA is beginning to give reagents or equipment to a few key laboratories to expand the capability of the federal government," he says. "For example, the laboratories in Wyoming and Colorado received additional training, equipment, and reagents to test for chronic wasting disease, a BSE-like disease that is a problem in wildlife in that region. So they can do exactly what the federal laboratory in Ames does, but for that one disease only. The concept is that we will have laboratories that by either their location or the nature of their expertise are made a reference laboratory

The veterinary profession in this country had its roots in the protection of the public health. Unfortunately, many of us in academia lost sight of that legacy during the past few decades. The events of the last 15 months have caused us at Cornell to re-examine our roles as veterinarians and as a veterinary college in the control of zoonotic diseases and in safeguarding public, or human, health. We now have not only an opportunity, but an obligation, to position the profession closer to the center of those human health issues that relate to animals and the environment.

Donald F. Smith, Dean, College of Veterinary Medicine, Cornell University

Consider for a moment that, here as we sit in the very heart of New York state, within 750 miles is virtually half of the population of both the United States and Canada. Therefore, the work that we do, the research that we do, and obviously the food that we produce or that travels through this area take on a significance that bears a national security implication... The need for us to be working together across borders has never been greater.

Nancy Lorraine Hoffmann, New York State Senator (R-48th District), Chairwoman of the New York Senate Agriculture Committee



It's a very complicated pattern we're weaving right now, not so much in bioterrorism and agroterrorism in this country but agroterrorism and bioterrorism in all civilized countries... We're doing everything that we can to make sure that all of our veterinarians in the United States are well trained, well educated, and well fixed... to recognize, diagnose, and contain any outbreak that may occur. Realize that there are an awful lot of small-animal practitioners in the United States and very few food-animal production veterinarians.

James H. Brandt, DVM, President, American Veterinary Medical Association

Seventy percent of the new and emerging diseases of people are zoonotic, i.e. shared between other animals and people.... When it comes to bioterrorism it seems to me that it will be medical people who are on the front lines for detection and control... On the very front lines will be private veterinarians working with public veterinarians and with veterinarians in diagnostic laboratories... And we're going to need those people well educated and with the proper diagnostic laboratories if we're going to contain these types of diseases.

Alan Meek, DVM, MSc, PhD, Dean, Ontario Veterinary College, University of Guelph



Clinicians from Cornell's ambulatory service advise a client.

for one or a few diseases, or a regional laboratory for a large group of diseases in a geographic area.”

Although Torres says that Cornell’s laboratory has served as a “de facto” reference laboratory for anthrax and a few other diseases at one time or another, it is an officially designated reference laboratory (one that is equipped and authorized by dint of its expertise to give a confirming diagnosis) for only one disease, bovine brucellosis. But that could change if Cornell had the funding to build a new diagnostic facility, something that is desperately needed. Dean Donald Smith, Torres, and many others in the College see great potential for the AHDL to assume a national leader-

ship role both as the Northeast’s regional laboratory and as a reference laboratory for zoonotic diseases. “Cornell has the only accredited veterinary diagnostic laboratory in the Northeast outside of Pennsylvania, so we serve a very important function in the region,” says Smith. “Very few laboratories have the expertise or do the volume of testing that we do. We have a service component that is very important and that extends to all species, which is quite unusual.”

The federal government has been reluctant to decentralize foreign animal disease diagnostics because of the risk – far greater than the risk of a real outbreak – that a laboratory might report

either a false-positive or a false-negative result. The ability to perform confirmatory tests depends upon access to live agents whose use is restricted to the federal laboratories and/or the proper facilities for strict biocontainment of experimentally inoculated animals. In addition, there is serious concern that word of a suspected outbreak might escape and cause undue panic.

The odds of finding a real case of a foreign animal disease are vanishingly small, but the damage done by a rumor can be devastating. Torres says that government veterinarians typically investigate about 400 suspected cases of foreign animal diseases per year, a figure that doubled last year due to increased



The Hon. Lyle Vanclief, Canada's Minister of Agriculture and Agri-Food, talks with New York state senator Nancy Lorraine Hoffmann and Susan Henry, dean of Cornell's College of Agriculture and Life Sciences, following the roundtable discussion on biosecurity held November 30 at Cornell.

vigilance. Nothing unexpected has turned up. But the news last summer, at the height of the foot-and-mouth disease epidemic in the U.K., that a sus-

pected case of a vesicular disease was being investigated in North Carolina sent the hog futures market of the Chicago Mercantile Exchange into a four-

hour freefall. "We need to balance expediency with proper controls and quality control," says Torres.

The idea of establishing a network of regional diagnostic laboratories has also been discussed a great deal, says Torres. In his former capacity as deputy administrator for veterinary services at USDA APHIS, he helped shape a joint proposal, which the USDA and the state diagnostic laboratories recently submitted to Congress, calling for the creation of a National Animal Health Laboratory Network. Under the proposal, state animal-health laboratories would share responsibility for animal-disease diagnosis and surveillance with the federal laboratories. This network would represent the animal-health counterpart of the recently created public-health laboratory response network that is coordinated through the Centers for Disease Control.

While the proposal states that the basic infrastructure is in place to establish the network, it lists some important deficiencies that need to be addressed:

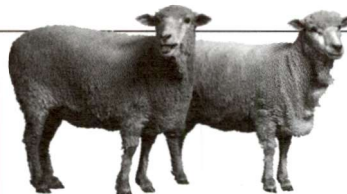
- the establishment of a secure communication, reporting, and alert system;
- standardized, rapid diagnostic techniques;
- modern equipment and experienced personnel trained in the detection of

Veterinary public health and veterinary detection diagnoses and response systems will play a dominant role in the control of potential bioterrorism threats and agents. In New York, the cooperation of a network of professionals — we have over 1400 accredited veterinarians in the field — provides a sensitive surveillance and response mechanism in cooperation with the New York State Veterinary Diagnostic Laboratory. The facilities of the state diagnostic laboratory in conjunction with the Cornell University College of Veterinary Medicine provide state-of-the-art resources for diagnosis in response to potential disease threats.

Nathan Rudgers '82, New York State Commissioner of Agriculture and Markets

In many departments in our two colleges, we have colleagues working on technologies that are speeding the detection of food-borne pathogens and also toxic chemicals and ensuring that we have rapid responses to outbreaks of this sort. Long before September 11 we were...developing technologies through our nanobiotechnology initiative and genomics here on campus that will speed and improve those technologies... Never has it been more important to underline the importance and the connection between human and animal health, and the connection of human and animal health to the food supply system.

Susan Henry, PhD, Dean, College of Agriculture and Life Sciences, Cornell University



We cannot, as a profession, expect to effectively manage international risks in veterinary public health and food safety on a national basis... We deal in a very real world where biological vectors do not respect political boundaries, nor do some people... We are challenged to share intelligence, to be transparent, to deal with the global community because we are part of the global community.

Brian Evans, DVM, PhD, Canadian Food Inspection Agency, Chief Veterinary Officer of Canada

I think that a dialogue has to be struck between the farming community and the veterinary profession and the government as to what are reasonable expectations in terms of indemnification. You have to encourage the farmer to report the disease if he or she suspects there is something awry, but clearly no one can afford the total loss that a farmer is going to incur. We have to make it clear to all farmers that it's in their best interests and the best interests of the whole industry that such events as may occur — potential infectious agents appearing on the farm — are reported early.

Alan Kelly, BVSc, MRCVS, PhD, Dean, School of Veterinary Medicine, University of Pennsylvania

emergent, foreign, and bioterrorist agents;

- a national training, proficiency-testing, and quality-assurance system;
- federal and state facility upgrades to meet biocontainment requirements; and
- periodic scenario testing.

In addition to initial funding of \$70 million, the proposal asks for an annual appropriation of \$22 million to maintain the network. These funds would be distributed to the states through block grants to enhance state laboratory infrastructure and to the National Veterinary Services Laboratory for network coordination. Only one laboratory per state would be approved for funding. In New York, that would be the AHDL at Cornell.

Another goal for Torres is to coordinate a program of animal disease surveillance within the state of New York. "We are trying to learn from the West Nile virus experience," he explains. "We are trying to have a better linkage, at least in New York, between the wildlife people, the animal-health people, and the public-health people so that if something happens in a dog or cat population, for example, we can all be in tune, because this could be the next new disease." ■

The Best Milk in Town



As a statewide mastitis-control program that is nationally and internationally known for its research efforts, the Quality Milk Promotion Services unit of the College's Department of Population Medicine and Diagnostic Sciences offers diagnostic services to the dairy and whole-milk industries of New York. The goal is to assure the health of dairy cattle and the safety of the milk supply. Dairy farmers from neighboring states that ship milk to New York milk plants also benefit. Of the 7,500 New York State dairy farms, approximately 2,500 are visited annually, and approximately 138,000 milk samples are aseptically collected for bacteriological diagnosis of mastitis. Milking equipment evaluation, milking and dry-cow management, housing conditions, equipment maintenance, and mastitis control practices are discussed and recorded. The unit also offers an annual milk-quality course to the College's veterinary students.

About the Animal Health Diagnostic Laboratory

Cornell's Animal Health Diagnostic Laboratory is the only accredited, full-service diagnostic laboratory in New York, New Jersey, and New England. The AHDL offers testing and consultation services in bacteriology, parasitology, virology, automated serology, toxicology, endocrinology, clinical pathology, and hematology, as well as field service for testing. The laboratory performs diagnostic services for patients of the Cornell University Hospital for Animals as well as those of veterinary practitioners in New York State and nationally.

Representing a partnership between Cornell and the New York State Department of Agriculture and Markets, the AHDL is the state diagnostic center for animal disease control and the official laboratory for the state of New York. It provides laboratory testing, education, consulting, outbreak investigation, and prevention programs for the veterinary community, companion animal owners, the livestock industry, and zoos. Faculty members also conduct research to understand difficult diagnostic problems and to develop the most

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In the United States alone there are over eight billion birds produced a year. That's a small part of the world production. Now where do those birds come from? From three or four primary breeders for the bird industry. If an industry...has this premise, it will have an impact beyond the borders of that state, beyond the borders of the nation.

Recently there was an outbreak of influenza in Connecticut. It was recognized, the disease was eradicated, but within a couple of days Brazil urged Japan to close the borders for import of poultry products from the United States — all poultry production from the United States.

The introduction of disease, even in one location in the United States, could have tremendous economic impact on the nation's agricultural production.

Karel (Ton) Schat, DVM, PhD '78, Professor of Microbiology and Immunology, Cornell University

Teaching is an important mission for our faculty, not only for the veterinary students here, but also for the veterinarians of the state or the region. There are more than 50 foreign animal diseases that we have either eradicated or never had here in the United States. Veterinarians need to know about them.

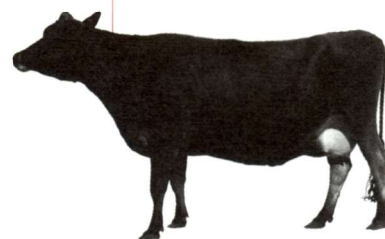
But the need for education also goes beyond the practitioners, to the producers. The farmer is going

to be the first one to see a sick cow, and the farmer needs to understand biosecurity issues on the farm. So I think we have an obligation to help the state and the region with this teaching. The New York State Cattle Health Assurance Program is a beautiful avenue for that; the Quality Milk program is a beautiful avenue for that; we have a lot of things in place.

Alfonso Torres, DVM, MS, PhD, Associate Dean for Veterinary Public Policy and Director of the New York State Animal Health Diagnostic Laboratory, Cornell University

Every veterinarian who walks onto a farm is an expert in biosecurity. Are they educating the industry in biosecurity, in welfare issues?... I'd like to know that they're having discussions with every farmer, that every time they walk onto a farm to deal with an issue they have a broader strategic discussion about what's in the farmer's best interest.

Brian Evans, DVM, PhD, Canadian Food Inspection Agency, Chief Veterinary Officer of Canada





curriculum vitae

DONALD H. LEIN

Don Lein grew up on a dairy and livestock farm in Lancaster, New York. He came to Cornell in 1951 for two years of pre-veterinary studies before enrolling in the College of Veterinary Medicine. After receiving his DVM in 1957, Lein spent eight years in a group mixed practice in Machias, New York, where he treated dairy cattle, horses, sheep, and swine and ran a small-animal hospital as well. He returned to Cornell in 1965 as a senior research associate working for reproductive pathologist Kenneth McEntee, who was then head of the large-animal clinic. Much of Lein's work was with bulls, but he also did reproductive studies with horses, birds, dogs, and cats. His interest in *Campylobacter venerealis*, a then-common venereal disease in bull studs that he succeeded in eliminating, prompted him in 1968 to pursue a PhD in pathology at the University of Connecticut; he returned in 1974 as an associate professor of theriogenology with a joint appointment in pathology. In 1980 he was recruited by AHDL director Ray Cypess as associate director; in that capacity he developed the laboratory's extension service and the endocrinology laboratory. He was named director of the AHDL in 1987. He also served as the first chairman of the Department of Population Medicine and Diagnostic Science from 1998 to 2000. He retired in January 2001 but stayed on to direct the AHDL until the arrival of Alfonso Torres in February 2002.

Lein is a diplomate of the American College of Veterinary Pathologists and a Distinguished Practitioner of the National Academy of Practice in Veterinary Medicine. He holds membership in many professional societies and industry associations and has held office and served on national advisory boards and committees for many organizations and government agencies.

Ask Don Lein to tell you about himself, and he'll tell you about committees of 45 people, organizations with a thousand members, and consortia of every sort. It seems almost impossible for him to describe any of his undertakings without wading into a crowd of colleagues, cattle producers, and national politicians. On the other hand, it does make sense that someone with his training in epidemiology would be so focused on the herd.

Lein stepped down last year as di-

Don Lein is the quintessential optimist. Nothing deters him from his passion for excellence in service to the agricultural and veterinary communities or from his deep-seated concern for the public health. He has enormous breadth of knowledge about agricultural, environmental, and veterinary issues and can sit down and talk with farmers, politicians, conservationists, or veterinarians with the same remarkable ease. This ability coupled with his commitment to long-range goals has made him very effective in influencing progress on a national scale. — Donald F. Smith, Dean

rector of the Animal Health Diagnostic Laboratory, which he had headed for 14 years. He had served as the laboratory's very active associate director for seven years before that. From 1998 through 2000 he also chaired the newly configured Department of Population Medicine and Diagnostic Sciences. This professor emeritus of pathology and theriogenology may have retired from his day-to-day duties, but he has not retired from the scene, and especially not from the national scene.

In his retirement year, Lein took part in the major safeguarding review done of the Veterinary Services division

“a cons



Lein in 1976

ummmate veterinarian”

of USDA / APHIS (Animal and Plant Health Inspection Service). He chaired one of four sub-committees, the one concerned with emergency response.

He is currently second vice-president of the U.S. Animal Health Association; he will be president in two years. He is a board member and the secretary of the National Institute of Animal Agriculture, "an organization of organizations". He served as president of the American Association of Veterinary Laboratory Diagnosticians, an organization that his predecessor in the AHDL, Sidney Nusbaum, raised to national status. Lein has continued to build the organization, which now has 1500 members.

Lein has begun a six-year term on the Council on Public Health and Regulatory Medicine of the AVMA. He is remaining on the Wildlife Services Committee of the USDA for "at least" another two years. This mention sparks a rundown of the issues surrounding the control of brucellosis in Yellowstone's buffalo and elk populations. Lein is right in the thick of it, working for cross-pollination between the Wildlife Services and Veterinary Services divisions of the USDA.

This list is far from complete. Lein belongs to many boards and councils and to industry organizations representing everything from farms to pharmaceuticals. "At every national animal health meeting, Don is there," says Ed Dubovi, the AHDL's director of virology. "To watch him at national meetings, it's like he could be governor of the state, he has so many people around him." Lein has a simple explanation for his ability to work with anyone and everyone — he is the son of a fourth-generation livestock dealer. "In that line of work, you either know how to negotiate with people or you're out of business," he says with a smile.

Lein's focus is always on the long view, and his staying power is prodigious. He envisions change on a national scale, and he understands and is willing to take all the steps — forward, back, and sideways — that have to be followed to raise awareness, shape agendas, secure appropriations, and broker agreements on the way to a final goal. A case in point is his skilled and patient stewardship of the New York State



Lein and his Welsh terrier, Demi

This guy has a huge heart. I've never seen anyone in the profession who cares as much as he does. He works for Cornell, he works for the diagnostic laboratory, he works for the state, he works for the country — but never for himself. He really cares about the farmers, the farming industry, and veterinary medicine. — Sang Shin, Director of Bacteriology, AHDL

Cattle Health Assurance Program, or NYSCHAP, and his continuing efforts to use it as a model for a national program. In the view of many, this project has been his most important.

This effort started in 1985 when Lein hatched the idea for a program geared toward prevention of three major diseases of cattle: bluetongue, bovine leukosis, and Johne's disease. He recognized that none of these had the cachet to catch on with the state legislature as a stand-alone program, so he proposed grouping them together as the Three Diseases Program.

Bluetongue, a viral infection of cattle that can be mild or fatal, is transmitted by a gnat. In the east, the gnat's range does not extend as far north as New York, so New York cattle are never exposed to the virus. Lein wanted New York's cattle to be exempted from the trade restrictions that barred their export as long as bluetongue was present in other regions of the U.S.

Bovine leukosis, on the other hand, was spreading rapidly in New York in

1985. The cause of the disease was known to be a retrovirus that was being transmitted by blood-to-blood contact through the re-use of needles and other instruments. The disease was and is a particular problem in the dairy industry, where cattle are managed to a much greater extent than they are in the beef industry. Lein knew that the disease could be controlled by putting in good management systems, but the wisdom of his view is only now beginning to be recognized. In the meantime, prevalence of the disease in New York state has doubled, from about 25 percent in 1985 to nearly 50 percent today.

Controlling Johne's disease posed special problems. From a technical standpoint the first was the difficulty in getting a diagnosis from the culturing method then in use. Johne's is a tubercular disease of the intestine that is caused by *Mycobacterium paratuberculosis*, an organism that is devilishly slow to grow in culture and easily contaminated by overgrowth from other organisms. According to Sang Shin, the AHDL's director of bacteriology and a veteran of the effort to improve Johne's testing, the disease took 26 to 30 weeks to diagnose by the old agar slant method, which relied on the ability to visually identify a growing bacterial colony.

At least as difficult for Lein was the prospect of convincing others, from producers to his bosses to the state legislature, of the value of doing anything preventive at all. Cattle with Johne's disease lose the ability to absorb nutrients well, but they usually don't die. Diseased animals become emaciated, and their immune status is compromised by the resulting malnutrition, making them subject to other diseases. Milk production drops and mastitis increases. But the extent of infection on a farm is masked by the disease's lengthy incubation period and the high number of latent infections. The Johne's bacillus survives for months in pastures and ditch water. Farmers have thought they were handling the problem by culling sick animals when in fact their farms were thoroughly contaminated with the organism.

Lein has known for many years that Johne's disease and bovine leukosis needed to be controlled, and that the only way to do so was to establish an

educational program for farmers that would raise their awareness of the diseases and show them how to improve their management practices. For that he needed extension veterinarians who could visit farms and develop programs. With support from the New York State Department of Agriculture and Markets, he hired Mike Bruner, then Chris Rossiter. They surveyed herds for the three diseases; as part of the bluetongue study Rossiter also surveyed deer for epizootic hemorrhagic disease, a similar syndrome caused by a closely related virus with the same gnat vector as bluetongue. She also surveyed the deer for paratuberculosis and Johne's disease and did tick surveys for Lyme disease.

The funding lasted for five years before being dropped in the economic downturn of 1990. Lein kept the program going by charging the users and managing the program within the AHDL; after several more years he brought over extension veterinarian Sue Stehman from the raccoon rabies vaccination program. "We were about ten years too early," he says. "But we had farms that were certified and had control programs, and we did it with our three extension people here."

"Don has the ability to continue after a program or anything that he sees is important and not let setbacks faze him," says Dubovi. The breakthrough in his efforts to change thinking about the importance of proactive disease management came only in 1996, when the National Animal Health Monitoring System released a study showing how much Johne's disease had spread. After eleven years Lein finally had all the data to correlate Johne's infection rates with economic losses and prove that it was cost-effective to try to control it. "This was really important for the country and for the world," says Shin. Lein also pushed for funding for research, and kept it going strong.

With the data showing the rise in both disease prevalence and cull rates and with more farms complying with voluntary control programs, Lein approached state veterinarian John Huntley with his vision for a new program. Huntley was very interested in building the program, which he named. He and Lein succeeded in convincing the state legislature to approve funding for

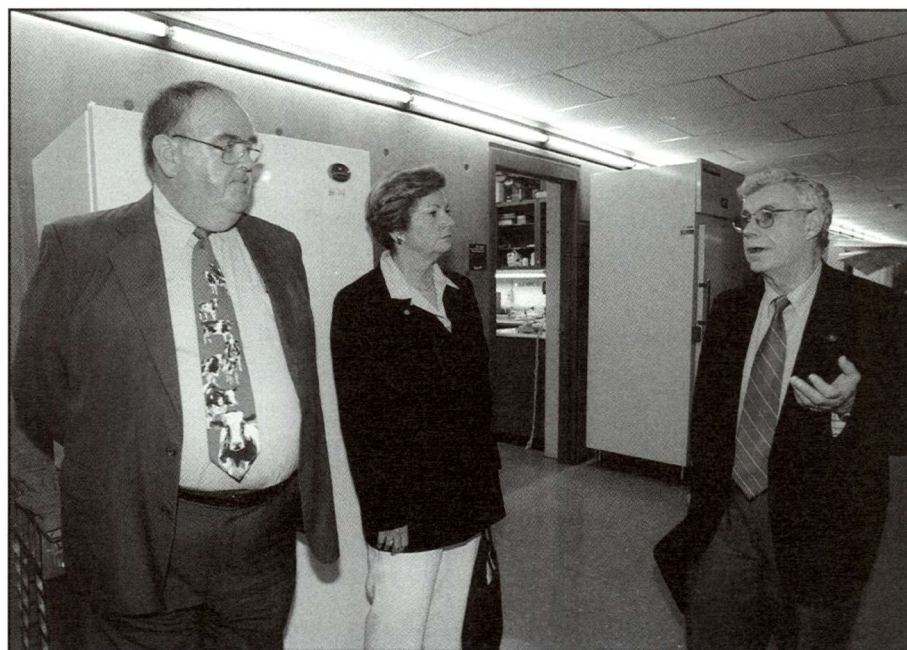
NYSCHAP, most of which is used to subsidize testing for Johne's disease. Huntley worked with Rossiter and Stehman to design the program, which Lein says is modelled after the Quality Milk Promotion Services' mastitis prevention program, although with a total-health, rather than a single-disease, focus. Now four years old, NYSCHAP is headed by

Dr. Lein can be counted among the visionaries of veterinary medicine. His broad view of the role that veterinary medicine plays in animal health, clinical medicine, and public health continues to expand and challenge traditional roles. He is one of those unique individuals who is equally at ease in technical, academic, governmental, and clinical spheres. His contributions will continue to produce positive developments for years in the future and his energy and determination will be missed. — John Huntley, New York State Veterinarian

the state's Department of Agriculture and Markets and represents a collaboration of extension veterinarians and laboratory groups in the AHDL, the Quality Milk Promotion Services, Cornell's Department of Animal Science, practicing veterinarians, the cattle industry, and the Animal Industries Division of the New York State Department of Agriculture. Most of the veterinarians who implement the program are employed by the state's Department of Agriculture and Markets.

NYSCHAP is a voluntary program that has already grown to include more than 600 farms. In addition to the specifics of disease prevention, its training modules encompass food and worker safety and environmental protection. "We use a standardized, education-based and risk-based approach to identifying health risks on farms at both the producer and the veterinary levels," explains Stehman. "We then address those risks with intervention strategies that are farm-specific, and develop a herd plan that is evaluated annually. Biosecurity is implied in everything we do."

The past few years of Johne's work have been productive on the research front as well. Shin has recently developed a system for decontaminating sam-



Lein, right, leads a tour of the AHDL for members of the State Assembly including, from left, William Magee (D-111th Dist.), chairman of the Agriculture Committee, and Margaret Markey (D-30th Dist.), a member of the Consumer Affairs and Agriculture committees.

Nicola Kountoupes/Cornell University Photography

ples for culturing, and a semi-automatic antigen-detection system that incorporates PCR to amplify DNA from a very small sample of the Johne's bacillus. Where testing once took 26 weeks, it now takes 12 to 35 days to get a result, and the laboratory can run 25,000 tests per year. According to Stehman, the contamination rate has also been reduced to one or two percent from the one-time norm of 50 percent. "This is the most up-to-date technique at this time," says Shin, who recently returned from a sabbatical in California spent setting up testing units there. Representatives from the federal animal-disease laboratory in Ames, Iowa visited Cornell in March to receive a week's training in the technique. "From Don's vision 15 years ago, now they are studying Johne's disease all over the world," says Shin. "There is now \$27 million in USDA funding to study it."

Although there is now widespread support for Johne's testing, prevention, and eradication efforts, most producers have not yet come to see the economic implications of allowing bovine leukosis to spread. Only a small percentage of infected cattle develop the disease, and they are easily identified and culled. The meat from unaffected carriers of the virus poses no risk to human health, according to Lein, and pasteurization kills the virus in milk. But for trade purposes, says Dubovi, leukosis-free certification has to be handled on a herd-by-herd basis. Lein thinks the time is coming when the leukosis problem will be used to block the export of all American cattle. "Eventually we're going to have to bite the bullet and take care of this disease, because our trading partners don't have it," he says. "The embargo game will be played one of these days." The good news is that NYSCHAP now incorporates a bovine leukosis module in its training.

Lein is now working to model regional and national cattle health assurance programs after the one he fostered in New York. "In the last three years we've been working on a regional council with 13 states," he says. "The whole of New England and the mid-Atlantic states down to Virginia, and Ohio, New York, and Pennsylvania have formed a regional herd-health quality manage-

ment alliance. We've been meeting twice a year and more frequently by e-mails and committees to come up with a standardized program for cattle health quality assurance programs. This plan has been endorsed by the National Milk Producers' Federation and the National Beef Cattlemen's Association. This has taken off from the egg-quality assurance programs for *Salmonella* – now there's a national effort to standardize these."

"There aren't many state cattle-health assurance programs," he says. "We in New York are one of the furthest ahead in this. A lot of states have some food-safety quality-assurance programs, and some industries have some quality-assurance programs dealing with food and milk, but not the total health." So Lein continues to work this through, one step at a time.

Don is absolutely loyal to his profession. He is a consummate veterinarian, and he knows every aspect of veterinary medicine. He is absolutely loyal to Cornell, and to this college. — Ed Dubovi, Director of Virology, AHDL

Lein's interest in getting USDA APHIS involved in overseeing a national program goes beyond the need for improving day-to-day management practices on farms. "This gets at our readiness to spot and deal with foreign animal disease outbreaks," he says. The field force used in the successful national effort to eliminate bovine brucellosis has been scaled back by half, he says, and needs to be rebuilt to be in place in the event of an outbreak. In the meantime, the perfect use for such a force is farm education work.

Over the years Lein has supported a variety of other programs that originated outside the laboratory, or even the university, and that had been cut adrift by funding shortfalls or changes in departmental priorities. He has the ability to relate seemingly unrelated programs to his broader vision and plan. He greatly increased the volume and scope of the laboratory's diagnostic programs through the incorporation of programs such as

comparative coagulation, clinical pathology, the contagious equine metritis quarantine station, the Feline Health Center, and the Quality Milk Promotion Services. In so doing, he encouraged service-oriented research projects to develop tests by molecular techniques, strengthened and expanded the scope of the laboratory's extension services, and created much-needed revenue.

Half the workload of the AHDL is now in small- and exotic/zoo-animal diagnostics. "The purpose is to provide a full diagnostic service for all species utilizing our comparative medicine approach for everyday diagnostics, emerging diseases, and preventive programs," Lein says. "The dynamics of being comparative are so important to looking for the latest emerging disease as well as for everyday diagnostics. We are working to protect the health of our animals, and human health as well."

Lein's management style is decidedly hands-off, but always supportive. "With Don, the staff always knew they had an advocate," says Dubovi. "He never told the faculty how they should do things, but he provided the opportunities for us as long as there was something good coming out of it." Wildlife biologist Laura Bigler, who has collaborated with Lein for ten years on the oral raccoon-rabies vaccination program, has enjoyed his approach: "I coordinate the program while he makes all the connections out ahead. It works really well." Shin echoes the same theme, saying, "If he saw that I was working to make things better for the diagnostic laboratory, he got support for it, no matter what the funding situation. He's an endless supporter."

In return, Lein has enjoyed the loyalty and affection of his staff and the friendship of legions of people in veterinary medicine, government, and industry. By way of explanation for this, he cites a bit of advice given to him by the first veterinarian he worked for after graduating from Cornell. "He said that veterinary medicine was 20 percent medicine and understanding animals. The other 80 percent was knowing how to communicate and get along with people. I really think he was probably right." ■

Sidney Nusbaum remembered

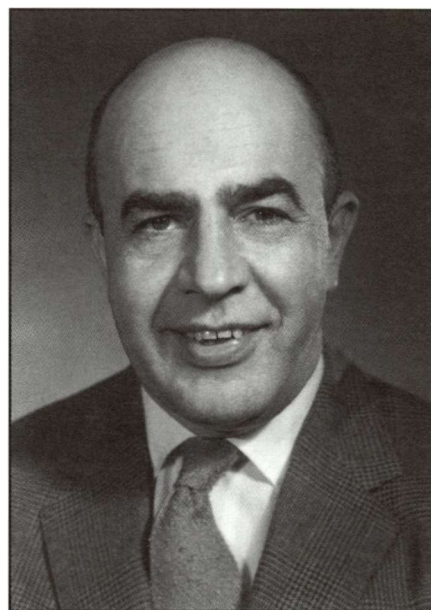
Donald Lein's many contributions to the New York State Animal Health Diagnostic Laboratory built on the solid foundation established by a notable predecessor, Sidney R. Nusbaum, DVM '46.

Sidney Nusbaum led the AHDL from 1970 to 1977, a pivotal time in its history. He was the first to garner significant state funding for the laboratory, which in 1970 was literally one laboratory with one professional staff member – Nusbaum – subsisting on \$15,000 in annual appropriations. In his first year as director he got the state appropriation raised by \$100,000. Although that sum was not nearly sufficient to build a major diagnostic program, Nusbaum expressed encouragement. He was quoted in the *Cornell Chronicle* at the time as saying, "This is the first time that the needs of the diagnostic laboratory have been recognized to this degree. And even more important, the legislature displayed continuing interest by directing that some of these funds be expended for a further study of the needs of the diagnostic laboratory."

Those needs were many. In addition to the prospect of adding a full-time virologist, immunologist, and pathologist to the staff, the *Chronicle* article stated that Nusbaum looked forward to adding toxicological, virus isolation, and identification services to the offerings of the AHDL.

He made good on those goals. According to professor Sang Shin, a bacteriologist whom Nusbaum hired in 1973 to work on bovine brucellosis testing, the laboratory had three professionals on staff at the time of his arrival. In addition to Nusbaum, there were a virologist and a pathologist. The three shared a technician and a secretary, and a third staff member handled receiving. The laboratory was starting to grow.

Nusbaum collaborated early on with virologist Leroy Coggins in the development of the famed Coggins test



Sidney R. Nusbaum, DVM '46

for equine infectious anemia. Nusbaum's interest in the mosquito-borne disease dated to his tenure during the 1960s as a supervising veterinarian for the New York State Department of Agriculture and Markets; in that capacity and following his arrival at Cornell in 1967 he supported the Coggins study as a field veterinarian. Nusbaum saw the importance of shepherding Coggins's research into application at Cornell. The laboratory test represented a major humane, economic, and technological advance over the only previously available method of detecting the virus, which had been to observe the effect on a healthy horse of injection with blood from an animal in question. It also represented a coup for Cornell, which became the only laboratory in the country to perform the test.

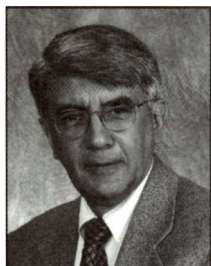
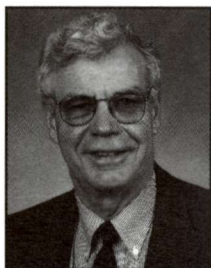
In 1971 Nusbaum won a three-year grant of more than a half-million dollars from the seven harness racetracks in New York to introduce pre-race drug testing in the state. Post-race testing was being done at the time, but was recognized as potentially inadequate to detect all drug use. Pre-race testing had already been done for six years at two

AHDL Directors to be Honored

Dean Donald Smith will pay tribute to three directors of the New York State Animal Health Diagnostic Laboratory during Reunion Weekend. As part of his State of the College remarks at 9:15 a.m. on Saturday, June 8, Smith will present photographic portraits of Sidney Nusbaum, DVM '46, Donald Lein, DVM '57, and Alfonso Torres, the laboratory's current director. Thereafter the portraits will hang in the Dean's Suite in Schurman Hall.

The portraits will be formally unveiled at a private gathering of family and friends on Friday, June 7. Among those attending will be Nusbaum's wife, Helaine, his son Kenneth E. Nusbaum, a 1976 graduate of the College and a faculty member at Auburn University, and other members of the Nusbaum family.

Lein (top) and Torres



racetracks in Ohio, but New York's became the first statewide pre-race equine drug-testing program in the nation.

In addition to an on-site mobile laboratory staffed by veterinarians from the diagnostic laboratory, pre-race testing required improvements in methodology that would allow for rapid turnaround at a higher volume. For those reasons the grant also funded a research program to develop new testing procedures and to measure the effects of various drugs and the time they took to clear a horse's system. Nusbaum hired veterinary toxicologist George Maylin to direct the program. Toxicology was a new field, and Maylin, who had just completed his doctorate at Cornell studying the effects of performance-enhancing drugs on horses, was the subject's foremost expert in the country.

The director's vision was also apparent in his recruitment of Shin to study bovine brucellosis, a disease that was having a major economic impact on the state's dairy industry in the 1970s. Nusbaum and state veterinarian Harold Nadler worked together to transfer the state's entire brucellosis eradication program to Shin's laboratory.

Shin developed an improved culturing method of testing for brucellosis, and the disease was eradicated from

Dr. Nusbaum was able to see the importance of having a strong research program to further the development of testing systems for animal diseases. He justified the importance of controlling bovine brucellosis, equine infectious anemia, and bovine vibriosis. He played the key role in expanding our veterinary diagnostic laboratory functions in New York State by working with the state legislature and letting them know the importance of the diagnostic laboratory in controlling disease. — Sang Shin, director of bacteriology, AHDL

the state within three years. Two years later, the USDA declared New York's cattle free of the disease, an enormous boon to the state's agricultural economy.

Much as he had done with Leroy Coggins's work, Nusbaum recognized the potential for diagnostic application of the research being done by microbiology professor Alex Winter on bovine vibriosis. The disease, which is sexually transmitted and causes abortions, was another serious problem for the cattle industry. When Winter succeeded in

developing a diagnostic test for the disease, Nusbaum saw that Cornell became the center for all testing.

"Dr. Nusbaum was able to see the importance of having a strong research program to further the development of testing systems for animal diseases," says Shin. "He justified the importance of controlling bovine brucellosis, equine infectious anemia, and bovine vibriosis. He played the key role in expanding our veterinary diagnostic laboratory functions in New York State by working with the state legislature and letting them know the importance of the diagnostic laboratory in controlling disease."

Nusbaum worked throughout his tenure to see the completion of another goal – a building for the AHDL that was completed in 1976. "The university diagnostic laboratories all started in corners of laboratories," says Shin. "The first independent, free-standing diagnostic laboratory building in the country was built at Cornell because of Sid Nusbaum's vision. All the other diagnostic laboratories were modeled after this one."

Nusbaum began his career as a clinical veterinarian for the United Nations Relief and Rehabilitation Administration following the Second World

Gröhn Named to Head Population Medicine and Diagnostic Sciences



Yrjö Gröhn in February was named chairman of the Department of Population Medicine and Diagnostic Sciences. He had been serving as acting chairman of the department since the retirement of the department's former chairman, Donald Lein, in January 2001. Prior to that time Gröhn served as the department's associate chair-

man for academic programs. A professor of epidemiology, he holds BVM, DVM, and PhD degrees from the College of Veterinary Medicine in Helsinki, Finland and an MPVM in epidemiology and an MS in genetics from the University of California, Davis. Gröhn joined the Cornell faculty in 1988 as an assistant professor of epidemiology.

His current research interests include production medicine; production diseases in dairy cattle; epidemiologic, genetic, and economic methods; bioinformatics; and food safety, salmonellosis, and *Listeria monocytogenes*. He has authored

numerous research papers and participated on review and editorial boards for the *American Journal of Veterinary Research*, *Journal of the American Veterinary Medical Association*, and other professional journals.

Gröhn has taught veterinary and graduate courses in the areas of animal health and disease, clinical biostatistics, dairy herd-health management, dairy production medicine, and epidemiology. He is a member of the graduate fields of comparative biomedical sciences, epidemiology, and animal science.

He is a member of the American Veterinary Medical Association, American Dairy Science Association, Association of Teachers of Veterinary Public Health and Preventive Medicine, Finnish Veterinary Medical Association, New York State Veterinary Medical Society, and Nordic Association of Veterinary Epidemiology. Among other honors Gröhn was a Kellogg fellow in 1981 and in 1994 was awarded the F. C. Donders Chair, an appointment for outstanding visiting scholars at Utrecht University in the Netherlands.

War. He served on four cruises aboard a liberty ship that was transporting horses destined for farm aid in Europe. He then spent several years in mixed practice in Herkimer, New York before going to work for the New York State Department of Agriculture and Markets in 1960.

Nusbaum left Cornell in 1977 to head the diagnostic laboratory of the Division of Animal Health of the New Jersey Department of Agriculture. At the time of his retirement he was director of the Division of Animal Health.

He remained active in retirement as a member of the Palm Beach County, Florida Division of Epidemiology Health Unit, developing surveys of vaccination rates among minority children and investigating food poisoning outbreaks. He also served two terms on the AVMA Council on Public Health and Regulatory Medicine. In that capacity

he advocated the addition of food safety education to the curriculum of all veterinary students and the inclusion of veterinarians in the federal disaster-response plan of the Federal Emergency Management Administration.

At the request of the AVMA, Nusbaum surveyed the aftermath of Hurricane Andrew by helicopter, visiting many damaged veterinary practices and assessing the impact on pets and their owners of the barring of animals from emergency shelters. His experience with disaster planning was formed during his tenure with the New Jersey Division of Animal Health; he was their emergency response officer at the time of the Three Mile Island nuclear accident. Nusbaum also chaired the AVMA-USDA Relations Committee from 1991-95 and served on the Florida District IX Health and Human Services Board. He died in Boynton Beach, Florida in 1998. ■

About the AHDL

continued from page 5

accurate and sophisticated diagnostic and treatment techniques.

The AHDL's main facility was the only free-standing university diagnostic laboratory when it was completed in 1976. Since then the growth in staff, programs, and testing volume has been explosive, with the result that the building is filled beyond capacity and many of the laboratory's programs are housed in off-campus outposts.

More than 150 faculty and staff members work for the AHDL. They are widely regarded as the premier cohort of faculty and staff in the country working in research and service dedicated to the prevention, control, and eradication of animal diseases.

Each year, the core sections of the AHDL conduct more than 600,000 diagnostic tests for animals of all species, including humans. The associated programs of the Quality Milk Promotion Services, Nutritional and Environmental Analytical Services Laboratory, Equine Drug Testing, and Avian Disease Program contribute another 300,000 tests per year.

Work includes surveillance of communicable diseases and food-borne and animal-borne pathogens. The Animal Health Diagnostic Laboratory coordinates with other governmental health agencies, such as the Centers for Disease Control; USDA and its Animal and Plant Health Inspection Service; the New York State Department of Agriculture and Markets; and the New York State Department of Health.

A sampling of the AHDL's activities:

- As part of the surveillance efforts of New York's Department of Agriculture and Markets and Department of Health, scientists in the AHDL are testing blood and tissue samples submitted by public-health officials and veterinarians across the state, in an effort to determine West Nile virus infection levels in both domestic and wild animals.
- Collaborating with New York City officials to assure safe drinking water for the metropolitan area, scientists in the College's Department of Population Medicine and Diagnostic Sciences study and test six reservoirs in the Catskill-Delaware Watershed and the surrounding land, looking for

sources of contamination and ways to manage the risks.

- As a New York state mastitis control program, the AHDL offers diagnostic services to the dairy and whole-milk industries of New York to assure the health of dairy cattle and the safety of the milk supply.
- The avian disease control program, a part of the unit of avian medicine in the College's Department of Microbiology and Immunology, works with poultry producers in the state to minimize the risk of *Salmonella enteritidis* in eggs.
- The laboratory operates two poultry laboratories in the state, offering diagnostic services to commercial producers of chickens, ducks, and turkeys.
- The AHDL and the College's Aquatic Animal Medicine Program, a part of the Department of Microbiology and Immunology, offer fish diagnostic services and assistance on problems relating to fish health in commercial and laboratory settings.
- The AHDL coordinates large-scale rabies control programs for wildlife, especially raccoons, within the New England states and northeastern Canadian provinces in an attempt to impede and ultimately reverse the northward progression of the virus into unaffected areas.
- Through a contract with the New York State Racing and Wagering Board, the laboratory provides chemical analysis, drug testing, and research to guarantee the integrity of horse-racing statewide.
- The AHDL maintains an equine viral arteritis control program for the New York state Thoroughbred breeding industry, a surveillance program for Potomac horse fever, and a contagious equine metritis quarantine station.
- Through the New York Cattle Health Assurance Program, a cooperative effort with the state's Department of Agriculture and Markets, the laboratory offers programs that allow New York farmers to determine the prevalence of disease in herds. Participants are provided management assistance and state-subsidized testing to eradicate diseases and achieve certified-free status. ■



forced to recede all the way to the Atlantic Ocean.

With the collaboration of associates in the AHDL and health and wildlife officials in New York and Ontario, Lein has already pulled off a remarkable and arduous feat. He has parlayed a local experiment into a regional program that has led the way toward the creation of a national raccoon rabies eradication program. Now in the hands of the Wildlife Services Division of the USDA's Animal and Plant Health Inspection Services (APHIS), the National Rabies Control Program promises to be a model for other wildlife disease eradication efforts.

Lein's efforts began in 1990 when he got a committee started through the

turning the tide

Fifty years have passed since the first U.S. outbreak of raccoon rabies got its start midway down the Florida peninsula. Since then the disease has travelled all the way up the East Coast to Maine and westward into Vermont, Pennsylvania, West Virginia, and Alabama. It has made incursions into Canada and is within range of the eastern borders of Ohio, Tennessee, and Louisiana. If raccoon rabies is not stopped, it is expected to waddle on four feet all the way to the Rocky Mountains.

But it can be stopped, and even eliminated, within the next ten years. So believes Donald Lein, professor emeritus of pathology and theriogenology and recently retired director of the New York State Animal Health Diagnostic Laboratory at the College. In his vision of the near future, the raccoon rabies epizootic will be cordoned off from the tip of Maine to the shores of Lake Ontario to the Gulf of Mexico and

After ten years

of hard work, a

Cornell team is

making the case

for a national

vaccination

barrier against

raccoon rabies.

AHDL and New York's departments of Agriculture, Health, and Conservation to examine the idea of vaccinating wildlife against rabies. At the time, the vaccinia-rabies glycoprotein (V-RG) recombinant oral vaccine that is now in widespread use was still in development. New York would later become an important testing ground for the vaccine's effectiveness.

The Cornell University Wildlife Oral Rabies Vaccination Program got its start two years later. In 1992 the epizootic was moving through New York's southern counties, and Lein set up a local vaccination study to try blocking its advance. He enlisted the help of extension veterinarian Sue Stehman (who after four years returned to ruminant work for the AHDL) and hired a wildlife biologist, Laura Bigler. They started small, trapping raccoons on the Cornell campus, in a neighboring residential area, and at Ithaca College. The study lasted three years.

"We vaccinated the raccoons like

dogs, put ear tags in them, and released them. We also looked at different oral baits," explains Lein. "At that time raccoon rabies had just come into the city of Ithaca. It had not yet gotten up onto campus, and we made quite a difference there, because we stopped it from going further. We kept raccoon rabies from going up the east side of Cayuga Lake for at least two years."

The next step was to enlarge the scale of the effort and apply vaccination strategically along the leading edges of the outbreak in an effort to stop the spread of the virus. Lein and Bigler focused on two points at opposite ends of Lake Ontario where New York shares a border with Ontario – the Niagara River and the Thousand Islands area of the St. Lawrence River. That project was the largest raccoon vaccination ex-

Lein and Bigler with a raccoon trapped for follow-up tests. Bigler will test for vaccine-induced antibody to the rabies virus and tag the animal so its range can be tracked.

**If raccoon rabies
is not stopped, it
is expected
to waddle on
four feet all the
way to the
Rocky Mountains.**

periment to date in terms of ground covered. The effort came none too soon; in that year, 1995, the region reported more than 150 cases of suspected exposure to raccoon rabies.

Concurrent with the Cornell effort, Lein says, officials on the Ontario side of the Niagara River began trapping and vaccinating raccoons every spring and summer. Before releasing them, they tagged them so that they could be tracked by global positioning. By tracing the animals that were found dead or were later retrapped, officials could determine how far they had travelled. "They found that the old literature saying that raccoons did not travel farther than ten miles was not true," recounts Lein. "They found that males, especially young males that had been kicked out of a heavy population, could travel up to 40 miles. The females sort of read the book, and most of them stayed within the expected ten-mile range."

Raccoon rabies had not yet breached the border with Canada, but Ontario Province was in the midst of eliminating Arctic-fox rabies, which had infected red foxes and spread the length of the Ontario Peninsula from the Quebec border to Detroit. "The Canadians were working with a modified-live vaccine that was being used in Europe for fox-rabies control," says Lein. "Occasionally it will cause rabies, so it never got licensed here, but it was licensed in Canada for restricted use by a government agency. They put together a method for dropping it by plane in tallow baits." Thanks to the use of these vaccine baits, fox rabies has recently been eliminated from most of Western Europe. Canada is having similar success, and the province of Ontario is now essentially free of red-fox rabies.

Although hand-baiting is still necessary in residential areas, the Canadians' method of air-dropping the vaccine baits was key to preventing raccoons from carrying rabies the length of their considerable range. The Ontario Ministry of Natural Resources made its aircraft, pilots and crew, financial assistance, and expertise available to the



Frank DiMeo/Cornell University Photography

New York effort in 1994 and has been a full partner with Cornell ever since. The province of Quebec and the Canadian Food Inspection Agency provided additional funding for a program in Vermont in 1997.

Canada has good reason to help us keep raccoon rabies on our side of the border. According to the National Center for Infectious Diseases, raccoons accounted for 2,778 of the nearly 6,800 cases of wildlife rabies confirmed in the U.S. in 2000 – more than any other species. While a high number of rabid skunks (2,223) were also reported that year, the NCID report states that the majority of the 881 rabid skunks found within the raccoon rabies zone were believed to have been infected with the raccoon variant of the virus. Most of the fox rabies reported in 2000 occurred in states affected by the raccoon outbreak, and most of those cases were also believed to represent spillover transmission from raccoons. All but one of the 52 rabies cases found in groundhogs, other rodents, and lagomorphs occurred in the raccoon epizootic zone. As for the human population, Cornell's Bigler says that in New York alone 1,500 to 3,000 people per year have to get post-exposure treatment after contact with terrestrial mammals. Before raccoon rabies moved up from Pennsylvania, that number was always under 100.

"This has put a tremendous strain on our health department," says Bigler. "USDA has shown that it is definitely cheaper to prevent westward viral spread than to live with rabies." While vaccine baits cost up to \$1.50 a piece, she puts the cost of post-exposure treatment at about \$2,000 per person.

While those numbers may make it seem obvious that funding for raccoon rabies vaccination is money well spent, cash-strapped state governments in the Northeast have been reluctant to invest in the program. In sparsely populated areas especially, there may be neither the local concern nor the local funding to combat the problem. For example, the disease is now in northern Vermont and northeast Maine and has crossed the border into three towns in New Brunswick. "Getting funding is hard because there's so little population to protect in those places," says Bigler.

"Maine is expected to come on board if federal funding comes through."

USDA APHIS Wildlife Services could not provide funding for the project until the recombinant oral rabies vaccine was deemed effective and licensed fully. Lein's and Bigler's work provided much of the required efficacy data. "Wildlife Services has been very supportive of the concept of ORV [oral rabies vaccination] since the early 1990s," Bigler says, "but they couldn't do much financially until there was a federally licensed product with clear,



**If we at
Cornell look
good, it's only
because we're
cooperating with
great people.
– Laura Bigler,
Wildlife Biologist**

positive results. The vaccine was conditionally licensed in 1995, which means that it is and was pure and safe, but there was not enough data to support efficacy or full licensure until 1997. Wildlife Services started funding ORV programs in 1997, as soon as it was humanly (or federally) possible."

Lein has lobbied endlessly to gain state funding for the initiative throughout the Northeast. He has been dogged in pursuing the endorsement of the Centers for Disease Control (CDC) and in lobbying key senators and congress-

men. "We got monies from the House Appropriations Committee – we started with \$1.5 million that was shared between Texas, with their program to control dog rabies in the coyote and grey fox, and Ohio, New York, and Vermont," says Lein. "We started a program in Vermont with in-kind support from the state, funding from Quebec, and Wildlife Services money that was appropriated by the Senate. We have all of northern Vermont vaccinated." According to Bigler, legislation was initiated last year to bait the Connecticut River Valley in northern New Hampshire. That funding will also come through Wildlife Services.

It has taken an aggressive effort on both sides of the international border, funded largely by Ontario Province, to contain a major outbreak in St. Lawrence County, New York. "The first few cases did get into Ontario two years ago – we had about 150 cases in the central part of St. Lawrence County, which hadn't been vaccinated, and it got up into Ogdensburg and finally went across the river, probably right across the bridge," recalls Lein. "They reacted very quickly to that and have been able to contain it. They've also put more money into the U.S., so that we have been able to vaccinate the whole St. Lawrence Valley, and we're down to one or two cases up there. We think we're going to be able to snuff that out this year."

When raccoon rabies threatened the Ohio border, the state responded with a well funded control program. "Ohio is instrumental in stopping raccoon rabies from spreading all the way to the Rockies," says Bigler. After finding six cases in 1999, Ohio widened its barrier and successfully pushed the front back into Pennsylvania. "Now West Virginia has come in," says Lein. "Raccoon rabies was going to make an end run around the Ohio barrier through West Virginia and along the Ohio River. With Senate support, another \$4.2 million was added to Wildlife Services to use in West Virginia and other states with wildlife rabies vaccination programs." With these barriers established, Bigler and Lein's ultimate goal for the Northeast is to push the rabies-free zone south until it merges with the Ohio program. In addition to getting

funding from USDA and its Canadian counterpart, the Canadian Food Inspection Agency, to get Maine on line, another critical goal is to establish a regional vaccination barrier program in Alabama and Louisiana.

A less likely, but major, source of support for Cornell's rabies vaccination program has been the state of Texas. Like Ontario, Texas learned the hard way the importance of containing wildlife rabies. "Texas had coyote rabies, which is really dog rabies, in the mid-1990s," says Lein. "It was coming out of

Lein. After boosting the number of viral particles in the vaccine, they had a product they were ready to distribute by air-drop. "We got them working with the Ontario Ministry of Natural Resources in putting the baits up, with their planes and their distribution system," continues Lein. "In 2000 they finished taking coyote rabies out of Texas."

Texas had also been living with grey-fox rabies for 30 years. That disease was heading into Oklahoma, so Texas decided to try to eliminate it. "The state of Texas put a lot of money

increased its support of the program from \$1.5 million to \$7.7 million. Lein and Bigler are hopeful that total appropriations will increase again this year. Wildlife Services has now begun coordinating all the regional efforts from the Northeast to Texas. "We have put a national program together that includes Texas, Ohio, Canada, the Humane Society of Pinellas County, Florida – whoever has got a program going," says Lein. "The CDC is involved now. It's hard to get CDC funding because not many people die of rabies, but Wildlife Services has done an economic study along with CDC of the cost of prevention efforts versus living with raccoon rabies, and it shows that it's cost-effective to complete the barrier and keep the West from becoming infected with it. So we're working with New Hampshire and Maine now to try to get programs started there. Alabama is also planning a program."

With New Hampshire and Maine linked up this year, the Northeast barrier will be secured – a tremendous accomplishment for Bigler and Lein and for international cooperation and teamwork. Bigler credits the USDA, the New York State Department of Health Rabies Laboratory – "a phenomenal rabies control laboratory" – Ontario, Quebec, New Brunswick, the Canadian Food Inspection Agency, Health Canada, Queens University in Kingston, Ontario, and the cooperation of the states in the Northeast for the successful establishment of the Northeast Rabies Control Program. "We're a cohesive unit, all working toward the same goal. If we at Cornell look good, it's only because we're cooperating with great people."

Lein is now focused on getting a \$70 million, five-year appropriation for the National Rabies Control Program attached to the Farm Bill that should come before Congress this year. If that effort succeeds, Lein says that the money will be used to complete the barriers that are planned or under consideration and increase the size of existing barriers, "and look at what it will take to eliminate raccoon rabies." He adds, with the cool patience of a seasoned negotiator, "It's getting close. We'll see what happens." ■



Lein on a bait distribution flight over Niagara County, New York in 1995. At left is Charles MacInnes, MS '60, PhD '63, coordinator of the Ontario Ministry of Natural Resources Rabies Unit; New York state senator George Maziarz (R – 61st Dist.) is at right. They are sitting behind a computerized conveyor belt that feeds vaccine-laden baits to the delivery machinery at the back of the airplane, which is owned by the Ministry.

Mexico, where dogs had infected coyotes, and the coyote had become the reservoir for the canine form." When the disease came across the Rio Grande it claimed a human victim, and Texas was able to get \$2 million in emergency funding from the USDA to try the same experimental vaccine that Lein and Bigler had been working with. The state of Texas put in \$4 million more.

"They looked at the vaccine with Wildlife Services, which has a coyote colony in Logan, Utah, and so all the vaccination trials were done there," says

into that program after the governor's grandson got bitten by a rabid fox and had to go through the treatment," recalls Lein. "So did Wildlife Services, finally, after their request to help in APHIS was approved and successful lobbying for federal funding was accomplished. We've worked very closely with Texas, and they've been very important in helping us with raccoon rabies." The state of Texas continues to invest heavily in the program.

In addition to the \$4.2 million from Congress, Wildlife Services last year

honors, gifts, and grants

Dennis Bailey, a resident in medical oncology and a member of the DVM class of 2000, received the Robert S. Brodey Memorial Award of the Veterinary Cancer Society for the paper he presented at their annual meeting in October. Bailey spoke on "Preliminary evaluation of carboplatin and doxorubicin combination chemotherapy for treatment of appendicular osteosarcoma in dogs."

Dwight D. Bowman, associate professor of parasitology, and **Stephen C. Barr**, associate professor of medicine, have a new textbook, *Feline Clinical Parasitology*, co-authored with Charles M. Hendrix of Auburn University and David S. Lindsay of Virginia Tech and published by the Iowa State University Press. International in scope, the book discusses a broad range of topics intended for both feline practitioners and veterinary parasitologists, including parasite identification, history, geographic distribution, pathogenesis, diagnosis, and control.

Howard Evans, professor emeritus of veterinary and comparative anatomy, was made an honorary member of the New York State Veterinary Medical Society at an executive meeting in December.



Evans

He does not hold a veterinary degree, but earned a certificate in small animal surgery from the School of Veterinary Medicine at the University of California, Davis in 1957. He chaired the veterinary college's Department of Anatomy for ten years until his retirement in 1986. Since then he has continued to teach at Cornell and as a visiting professor, and has covered the globe as a lecturer and a leader of Cornell Adult University programs. Among his other honors, Evans received the Outstanding Anatomist Award of the American Association of Veterinary Anatomists in 1990 and was made the ninth honorary member of the Japanese Association of Veterinary Anatomists in 1997. He was made an honorary life member of the American Veterinary Medical Association in 1970.

Evans joined the veterinary faculty in 1950 after completing a PhD in comparative anatomy, ichthyology, and entomology in the Department of Zoology in Cornell's College of Arts and Sciences.

Douglas D. McGregor, professor of immunology, has been named a founding board member of the Thurman-Zumwalt Foundation. The foundation is named for Admiral Elmo R. Zumwalt, Jr. and General Maxwell R. Thurman, who coined the memorable recruiting slogan "Be all that you can be". The foundation has been established for the



McGregor

purpose of facilitating research and research training directed to protecting the Armed Services and other overseas personnel against biological and chemical agents.

In addition to supporting the development of vaccines and antidotes for microbial pathogens, the foundation will also focus on ways to detect toxic agents such as nerve gases and to diagnose, treat, and protect against exposure to such agents. Studies will also address unresolved issues relating to previous exposure, as in Gulf War syndrome.

McGregor served from 1991 to 2001 as the College's associate dean for research and graduate education. From 1976 until 1991 he was director of the Baker Institute for Animal Health. In 1990 he developed the Cornell Leadership Program for Veterinary Students, a highly competitive program that offers veterinary students from around the world the opportunity to spend a summer at Cornell conducting laboratory research under the guidance of a faculty mentor.

Drew Noden, professor of anatomy, was presented with the 2002 Craniofacial Biology Research Award during the opening ceremonies of the 80th General Session of the International Association for Dental Research in March. The cash prize is supported by Oral-B Laboratories.

Noden was recognized for his seminal contributions to the understanding

On Behalf of Boo-Boo, a Million Thanks

The Cornell University Hospital for Animals has received a four-year, \$1 million pledge of support from a grateful client of the small animal medicine service. Renowned author and animal advocate Patricia Cornwell made an initial gift of \$100,000 and subsequently pledged an additional \$900,000 to express her appreciation for the exceptional care that she and her dog, Boo-Boo, received at every point of contact with the hospital staff and students. Boo-Boo, an English bulldog puppy, is doing well. While at the CUHA, Boo-Boo was under the care of the internal medicine service's Richard Goldstein, DVM, DACVIM, DECVIM-CA.

Cornwell is the best-selling author of 14 crime novels, including *The Last Precinct* and *The Body Farm*, and a new cookbook, *Food to Die For: Secrets from Kay Scarpetta's Kitchen*. Scarpetta, the medical-examiner heroine of Cornwell's novels and a fictional Cornell graduate, cooks to unwind; after many reader requests Cornwell published the recipes for all the dishes featured throughout her novels.

of craniofacial biology in demonstrating that the neural crest provides patterning information that determines the identity of all other facial structures. His demonstration of the differences in the pluripotential nature of the cranial and trunk neural crest cells was cited as a "fundamental tenet" that has formed the basis of recent studies of homeobox genes and craniofacial determination. He is also recognized as one of the first investigators to realize the scope and importance of stem cells and to study the role of programmed cell death (apoptosis) during development.

Physiology professor **David Robertshaw**, who recently began a new assignment as associate dean for premedical education of the Weill Cornell Medical College in Qatar, was honored in April at a meeting of the Environmental and Exercise Physiology Section of the American Physiological Society. Robertshaw was presented with the Section's Honor Award in recognition of a career of distinguished research in comparative



Robertshaw

physiology focusing on thermal stress. Robertshaw has studied sweat-gland physiology in some unusual models including sheep, camels, oxen, goats, donkeys, primates, and humans. At the awards banquet he summarized his work in an address, "Cavorting with Camels: Lessons in Thermoregulation from Comparative Physiology".

Michael J. Wildenstein has become the only farrier in the U.S. to be awarded certification as an associate of the Worshipful Company of Farriers, a centuries-old professional organization based in the U.K. Professor Normand Ducharme surprised Wildenstein by presenting the AWCF certificate during a meeting in February of the Department of Clinical Sciences. Wildenstein was honored later that day at a public reception in the Gallery.

Only one higher rank remains for Wildenstein to achieve, certification as a fellow of the Company. He will sit for that examination next year. There are currently 42 fellows worldwide.

Linear Accelerator to be Dedicated

The arrival of a state-of-the-art linear accelerator will be celebrated with a ribbon cutting on June 7 at 1:30 in the Gallery adjacent to the Cornell University Hospital for Animals. Timed to coincide with Reunion Weekend, the ceremony will take place three days after the delivery of the very sophisticated equipment for radiation treatment of small-animal cancers. Medical and radiation oncologist Margaret McEntee, who will supervise the use of the linear accelerator, estimates that it will be early August before the equipment is fully calibrated and ready for use, but the mechanical portion of the installation will be completed in time for the dedication.

The accelerator is being acquired at a cost of approximately \$2 million. A Kresge Foundation challenge grant will provide \$500,000 toward the purchase price and the endowment needed to maintain it. In order to receive those funds, the College has until March 2003 to raise a remaining \$1 million.

The Alumni Association of the College of Veterinary Medicine recently bestowed its highest honor, the Daniel Elmer Salmon Award, on **John Shumway**, DVM '56. **Harmon Leonard**, DVM '44, who worked with Shumway for 22 years until his retirement, traveled from Arizona to make the presentation at a luncheon held during Cornell's Conference for Veterinarians in March. The award was a complete surprise to Shumway, who came to the luncheon expecting to present the award to Leonard, his close friend of 45 years. **Robert Clark**, DVM '52, executed the ruse for Leonard by inviting Shumway to make the presentation.

Shumway, who is retired from practice at the Cheshire Veterinary Hospital in Cheshire, Connecticut, has earned the remarkable distinction of co-chairing every one of his reunion classes since graduation. He has also served twice on the College Development Committee, both terms coinciding with

college and university campaigns, and as a member of Cornell University Council.

To mark his 30th reunion in 1986, Shumway established the Class of 1956 Scholarship, the first such scholarship at the College. His idea has since inspired 43 other class scholarships. The College's class scholarship endowment now stands at \$2.6 million and is expected to yield \$190,000 in scholarship support for the coming academic year.

The Salmon Award is given for "exemplary effort on behalf of the College". Previous recipients, listed in reverse chronological order, have been DVM alumni Robert Hillman, Robert Lynk, Harold Zweighaft, Robert Manning, Francis Fox, Jack Brennan, Louis Schimoler, Stanley Aldrich, Richard Grambow, Richard Smith, Robert Kirk, Robert Clark, Stephen Roberts, John Murray, Arthur Danks, Ellis Leonard, and Frederick Wright.



From left: Robert Clark, John Shumway, and Harmon Leonard.

Alexis Wenski-Roberts/Image Lab

endnote



Alexis Wenski-Roberts/Image Lab

Upon the completion of my first term, I pause briefly to reflect on the honor and great privilege it has been to serve as your dean during these five years. I thank you for your support and encouragement, and for your invaluable feedback.

By the time you receive this newsletter, our 134th Commencement will be upon us, and we will be sending 80 new veterinarians into the world to uphold and strengthen the Cornell legacy. As I write the first draft of my commencement address now, in mid-April, I struggle to find words that adequately bring the turmoil and change of the past year into accord with the steadfast spirit and resolve that characterize the members of our profession.

How will I share with the graduates the reality that the world they enter has changed more in the past 15 months than in the previous 15 years? Last spring, we witnessed the funeral pyres of livestock burning throughout Great Britain, even as we braced for the fearsome possibility that this scourge might reach our soil. As foot-and-mouth disease prompted the destruction of four million animals, the dreaded trail of BSE marched onward across Europe and beyond. In this country, debate over stem-cell research and human cloning challenged prior models of scientific conduct, and yielded discord.

Then came September 11th and its aftermath of anthrax and war, where the foe that was unseen has done something in our day that we would not have believed even if we had been told.

While such devastation consumed animal and human lives and created great uncertainty regarding our economic futures, the unfolding of the human genome in this country allowed unprecedented potential for the confluence of science and medicine. The animal health industry remained strong, and pets became more fully integrated into the framework of the family. Here at Cornell, we made key faculty and leadership appointments that will strengthen the College's teaching and research infrastructure. Hospital and diagnostic laboratory services expanded in new areas such as the oncology and cattle health assurance programs. Renewed

commitments were made by alumni, friends of the College, pet lovers, and industry partners.

It is into this rapidly changing world that our graduates enter. Those of you who have gone before as veterinarians will be their mentors. Those of you who are their clients, their family members, their associates and friends: you will provide them strength, reassurance, balance, and perspective.

My hope for them is that they establish, early in their careers, a series of core attributes that will serve as guideposts along the way:

Excellence—the passion to add value through accomplishment

Creativity—the openness to imagine new possibilities

Commitment—the willingness to be true

Collaboration—the confidence to look outwards

Integrity—the moral soundness to draw resolve from principle.

In closing, I repeat the words written to the faculty and staff five years ago, and reprinted in this column in summer 1997, for they are increasingly relevant today:

None of us knows what the next five years will bring, although we can predict with clarity that it will be a period of great dynamism, unparalleled challenge and much uncertainty, and a period that will necessitate the development of meaningful partnerships in a multitude of domains. I will, therefore, honor those who have the courage to embrace innovative change in areas of highest priority, and I will support those who demonstrate the ability to establish meaningful and productive partnerships to enhance the future of the College and the profession.

I ask for an added measure of trust, commitment, and resolve, especially when the path is uncertain; and for integrity and probity, particularly during difficult periods. Most of all, I ask for generosity of spirit and compassion, for it is through our hearts and by our actions that we will be measured by each other and by those whom we are privileged to serve.

Donald F. Smith

coming events

MAY

- 25 College Hooding Ceremony
- 26 Cornell University Commencement

JUNE

- 6 Reunion Weekend (2's and 7's)
- 10 Advanced Quantitative Epidemiology Conference

JULY

- 13 AVMA meeting, Nashville, Tennessee
- 26 14th Annual Fred Scott Feline Symposium

SEPTEMBER

- 23 "Black Tie & Tails" benefit, New York City
- 26 American Association of Bovine Practitioners Conference, Madison, Wisconsin
- 27 Homecoming Weekend

OCTOBER

- 14 Trustee/Council Weekend

NOVEMBER

- 15 New York State Veterinary Medical Society Conference, Kerhonkson, New York
- 16 19th Farriers Conference

DECEMBER

- 4 American Association of Equine Practitioners Conference, Orlando, Florida

CORNELL UNIVERSITY Veterinary Medicine

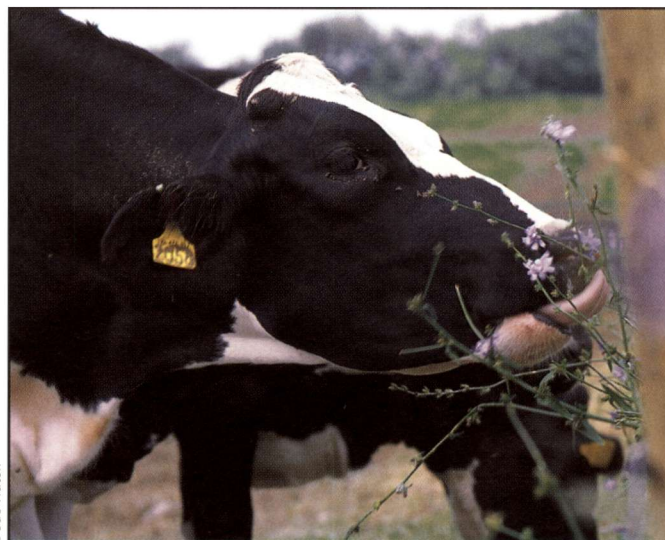
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Dede Hatch



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