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The Center for Animal Health and Productivity

An outstanding characteristic in the history of the School of Veterinary Medicine has been its willingness and ability to gear its educational, service, and research programs to the changing needs of the veterinary profession. For example, the Veterinary School pioneered the development of clinical specialties, now a vital part of modern veterinary practice. Likewise, in 1970 we initiated a unique core-elective curriculum to meet the diversified career goals of today's students. The most recent example of the School's concern with changing patterns in veterinary practice and agriculture is the creation of the Center for Animal Health and Productivity in 1986.

The intensification of agriculture, with larger numbers of animals being raised in smaller areas, opens up the greater possibility of disease spread and places greater emphasis on careful surveillance of production methods for greater efficiency. With these changes in animal agriculture, the role of the food-animal veterinarian is shifting from concern about the health of individual animals to problems of the herd and flock.

Despite the outstanding contributions of the veterinary profession in the United States in controlling such devastating livestock diseases as foot and mouth disease, bovine tuberculosis, brucellosis and hog cholera, losses from animal disease, and inefficient production still take staggering tolls. The 1983 Annual Report of the Animal Health Science Research Advisory Board (U.S.D.A.) estimated the average loss from food animal diseases at $14-billion annually. When the cost of reproductive inefficiencies ($14.8-billion) is added to this, it means that the food animal industry in this country is operating at a 67 percent efficiency.

Recognizing the need to train veterinarians who will be experts in preventative medicine and herd and flock disease control, the Commonwealth of Pennsylvania in 1985 funded a training grant in Epidemiology and Health Economics at New Bolton Center. Dr. Colin Johnstone, a parasitologist, became director of this program, and last year the first group of trainees began this exciting experience.

In 1986, the Veterinary School established the Center for Animal Health and Productivity, and the Commonwealth provided funds totaling $541,000 for this program. A five-year plan for the Center has been developed, with various phases being introduced each year. These include clinical nutrition, reproduction, large animal medicine, mammalian pathology, poultry pathology, parasitology, epidemiology, health economics, and computer science.

The Center will have clear linkages with programs at other institutions, particularly from Penn State, and with the Pennsylvania Department of Agriculture. It will have three main functions: (1) graduate and residency training in animal health and productivity; (2) the development of a computer facility at New Bolton Center, and (3) field investigations and "on-farm" applied research programs.

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The Center for Animal Health and Productivity

The original training program in epidemiology and food animal health economics will be expanded to include other disciplines such as medicine, nutrition, and reproduction. The association of the Veterinary School with the renowned Wharton School offers a unique opportunity for students wishing to develop a career in the rapidly emerging field of health economics. Several veterinary graduate students have already received MBA degrees from the Wharton School in Health Economics.

The foundation for a fully-staffed computer facility at New Bolton Center is already in place as a result of the work of the New Bolton Center Computer Task Force led by Dr. Charles Ramberg, professor of nutrition. This facility will functionally integrate the academic and service operations at New Bolton Center and will communicate with the extensive computer network now being developed within the University and with a statewide agricultural and diagnostic computer network. Eventually it will provide access to computerized diagnostic and herd health management information systems by veterinary practitioners and farmers. This system, when fully developed, will play a major role in the prevention, diagnosis, control, and treatment of livestock diseases in Pennsylvania. It will also significantly improve our teaching and research programs.

Members of the clinical facility at New Bolton Center receive numerous requests from large animal practitioners to provide field consultations on specific and serious herd or flock problems. Because of lack of funds and personnel it has not always been possible to fully meet these requests. Also, our experience indicates that diagnosis of a problem in an individual animal referred to the New Bolton Center hospital may suggest a peracute life threatening disease in the herd with the potential for economic disasters on the farm, or it may uncover a smoldering problem that has been slowly eroding a herd's productivity. With the creation of the Center for Animal Health and Productivity, we will be in a much better position to provide an integrated approach to effectively dealing with such problems.

Field investigations will also be available to assess the current production status of a herd or flock and to establish productivity goals to maximize the potential productivity of an enterprise.

Also, at the field level, the Center will examine the applicability of new concepts derived from controlled research and undertake or supervise the effectiveness of drugs and biologicals on single animals or herds/flocks. An example of how research can be applied to a particular field problem is the study of the effects of quantity and type of protein on bovine fertility. The research, now underway at New Bolton Center by Dr. James Ferguson and Dr. William Chalupa, was initiated after investigation of a problem herd in which the conception rate had dropped nearly 50 percent over a five-month period. Investigation revealed that the only recent change in farm operation was a feeding change in which cattle were being fed a diet high in degradable protein and relatively low in energy. After reformulation to produce a balanced diet, the conception rate increased by 100 percent and milk production increased by 10 percent. In the case of drug treatment, the Center will assess the range of responses that can be expected from a particular treatment, at what costs, and what range of financial benefits can be expected as a result of these responses.

The liaison with Penn State and the Pennsylvania Department of Agriculture greatly expands the potential value of the program to the livestock and poultry industries of Pennsylvania. For example, Penn State is able to provide expertise in the fields of toxicology, veterinary medicine, nutrition, soil and crop analysis, and veterinary medicine, especially in beef and swine.

Founding members of the Center are: Dr. Colin Johnstone, associate professor of parasitology; Dr. Charles Ramberg, professor of nutrition; Dr. William Chalupa, professor of nutrition; Dr. Thomas Divers, associate professor of medicine; Dr. Daniel Cohen, visiting professor of epidemiology; Dr. Gary Smith, assistant professor of epidemiology and population biology; Dr. David Galligan, lecturer in economics; Dr. Wilf Marsh, lecturer in economics; Dr. Robert Eckroade, associate professor of poultry pathology; Dr. James Ferguson, lecturer in reproduction; Dr. Richard Bartholomew, associate professor of medicine.

Seventeenth Annual Symposium

The Seventeenth Annual Symposium, "Your Veterinarian and Your Dogs," will be held on January 30, 1987, at VHUP. The all-day event begins at 9:30 a.m.

During the morning session, Dr. Donald F. Patterson, Charlotte Newton Sheppard Professor of Medicine, and Chief, Section of Medical Genetics, will discuss the Canine Genetic Disease Information System. Dr. Vicki Meyers-Wallen, assistant professor of reproduction, will speak about Canine Reproduction Problems.

In the afternoon Dr. Susan Donoghue, assistant professor of nutrition, will discuss Feeding Programs for Problem Dogs. The final presentation, Rabies Update, will be given by Dr. Lawrence T. Glickman, associate professor of epidemiology, and Chief, Section of Epidemiology.

There will be question and answer periods after each lecture, and questions can be submitted prior to the symposium date. The cost for the program is $35: this includes lunch and parking. Space is limited and reservations can be made by contacting Dr. M. Josephine Deuber, VHUP, 3850 Spruce Street, Philadelphia, PA 19104. Telephone: (215) 898-8862.
Radiation Therapy

Veterinarians utilize many therapeutic measures employed by physicians, and radiation therapy, long used in human medicine to treat cancer, is finding its place in veterinary medicine.

For many decades physicians have applied radiation therapy to reduce or eliminate tumors," said Dr. Sydney Evans of the School of Veterinary Medicine, University of Pennsylvania. "In veterinary medicine, radiation therapy has been available for 60 years, but its use is not widespread. There are only about 25 institutions in the nation where animals can receive such therapy; Penn is one of them."

In veterinary hospitals radiation therapy most frequently consists of X-rays, termed "orthovoltage radiation." The ionizing radiation is generated by equipment that is similar to a conventional X-ray machine. This type of radiation therapy is rarely used in human medicine, which now relies on higher energy radiation emitted from a cobalt-60 source or linear accelerators.

Orthovoltage radiation does not penetrate tissue as deeply as the higher energy radiation. Also, bone absorbs orthovoltage radiation at a greater rate than the surrounding tissue, increasing the danger of bone necrosis. These factors limit the application of orthovoltage X-rays. Radiation generated by linear accelerators has even higher energy and can penetrate deep enough to the surface of the tumor where the tumor blood supply is best developed. The more central cells, far away from the blood supply, may be less well oxygenated. As a result the central tumor cells are hypoxic, low in oxygen, and they do not respond well to radiation therapy. However, as oxygenated tumor cells are killed by the therapy, the blood supply to remaining cells enhances somewhat, increasing the chances of destroying these cells during the next treatment. But it is often impossible to destroy all the hypoxic tumor cells, and sometimes a pool of cells remains to begin growth anew. Dr. Evans' research centers on studying means to enhance the oxygen content of hypoxic cells to make them more susceptible to radiation therapy.

Recent review studies have shown that radiation therapy does increase the survival rate. "We have studied the records of a number of patients here. We compared cases where animals received surgery alone and cases where radiation therapy was given in addition to surgery." It was found that in some tumors, when patients received the combined therapy, they had a longer survival rate. " Nasal tumors are among the more common ones we see here," said Dr. Evans. "Previous studies have shown that dogs untreated or treated with surgery alone lived less than six months. We studied 70 cases treated with surgery and radiation therapy between 1973 and 1985. Of these, 29 died because of the tumor, 14 died from other causes, and 18 are alive; 9 were lost to the study. These animals received a bilateral rhinotomy, and three weeks after surgery ten radiation treatments were administered over a period of 22 days. The age range of the animals was two to 15 years. The median survival rate was 14.7 months; the survival range was 0.5 to 61.7 months. If the animal survived for one year, its chance of survival for a longer period of time was good.

Another tumor treated with radiation therapy is hemangiosarcoma. In a retrospective study of surgery plus radiation therapy, it was found that animals with this type of tumor on the hindleg had a better survival rate than those with the tumor on the front leg. Tumor-free intervals after therapy ranged from 1.5 to 55 months; the overall recurrence rate of the tumor was 36.9 percent. Canine oral noninvasive carcinomas are another category of tumors treated with radiation therapy. Many of these tumors also involve the bone. However, the response to treatment is good, particularly if the animal is a younger one and bears a relatively small tumor.

There are many different tumor types, and the response to radiation therapy is known for some of them. Transmissible venereal tumors and acanthomatus epulis of periodontal origin respond well to radiation therapy. The chances of treating oral squamous cell carcinomas are fair to good. If a tumor has metastasized, radiation therapy is not appropriate.

Animals do not suffer the severe side effects from radiation treatment experienced by people. They do not have general hair loss or the weakness after treatment. "There is hair loss at the site of the radiation treatment," said Dr. Evans. "But sometimes the hair will grow back, though frequently it will be patchy and white."

Dr. Evans treats about 800 patients a year. "I wish we could handle more," she said. "But we just don't have the personnel." She explained that the School had been given a cobalt unit. "It would greatly enhance our capabilities. We currently have a suitable space at VHUP to put this unit in, but it would require major expenses to build a room to contain the rays and quite a bit of money to refurbish the unit. Currently the radiation therapy unit is housed in the old building. The room is shielded and equipped with monitoring television cameras for Dr. Evans to observe the animals during the 5 to 10 minute treatments.

Radiation therapy for animals is an exciting field, but one where much research is needed, often the data from work on companion animals can benefit people as well. "It is attracting people, and slowly the number will grow. "It is a delightful field, and slowly the number who can administer these treatments is increasing," she said. "But at this time, radiation therapy of animals is not the norm, and to utilize it fully we need much more data."

Dr. Evans is assistant professor of radiology at Penn's School of Veterinary Medicine. She received her VMD in 1977 and studied radiation therapy at the Medical School of the University of Pennsylvania.
Veterinary Epidemiology—

studying naturally occurring diseases

Consequently, scientists are searching for alternatives to the use of laboratory animals in the study of diseases. According to Dr. Lawrence T. Glickman, associate professor of epidemiology at the University of Pennsylvania School of Veterinary Medicine, epidemiologic studies of pet animals with spontaneously occurring diseases may be just one such alternative.

"Pets share an environment with people," said Dr. Glickman, "They have many of the diseases that affect people. The lifespan of dogs and cats is shorter, and this permits studying the entire course of a disease. By examining pet populations with specific diseases, we may not only get answers which will help humans, but we may also be able to help the animals."

Dr. Glickman pointed out that epidemiology is the basic science of disease prevention. "We try to determine why a disease occurs, how it is spread, and its distribution in a population. For the infectious diseases, once these factors are determined, we try to develop a preventive protocol which may involve vaccination programs, isolation, or strict hygienic measures. For noninfectious diseases, we try to determine why or environmental factors predispose to disease and alter the animal's husbandry or lifestyle accordingly. Epidemiologists do not perform surgery or treat patients; instead they gather their data through observation, questionnaires, and the systematic study of case records. When such studies are conducted, they usually consist not only of a group of affected individuals but also of control groups.

When studying human populations, it is often difficult to obtain accurate information about exposure to environmental factors as humans move between home and work as well as from one area of the country to another. Also, in the case of cancer, the disease often occurs long after initial exposure to suspected cancer-causing substances. Studies are further complicated by the use of alcohol, cigarettes, and other carcinogenic substances consumed by humans.

Pets, by contrast, typically remain in the same environment and are not exposed directly to factors such as alcohol or cigarettes. Also, the pet's diet remains relatively constant throughout its life. Diet plays an important part in some of the most commonly occurring cancers, though no specific causes of cancer have been established. Pets may prove useful models because of their relatively stable diet, short lifespan, and the ease of obtaining accurate dietary histories from the owners.

According to Dr. Glickman, pets may serve as sentinel species for environmental hazards. To this end, a Veterinary Medical Data Program was established, sponsored by the National Cancer Institute, to collect and analyze data pertaining to morbidity and mortality of animals seen at about 15 veterinary teaching hospitals. There are also several canine and feline neoplasms registries of defined populations in specific geographic areas. Through study of these data it has been found that the sex-specific pattern of breast cancer in women and dogs is very similar. It was also found that a significant correlation existed between canine bladder cancer and the overall industrial activity in the counties where the animals lived. "Mortality from bladder cancer among white men and women in the same districts had similar correlations with industrial activity," said Dr. Glickman. "The similar pattern in humans and animals suggests that environmental exposures are more important than occupational exposures in developing bladder cancer, and that the dog may be a sensitive sentinel for the presence of bladder carcinogens. However, additional studies are needed to identify specific residential and environmental exposure such as smoking habits of their owners that may be associated with an increased risk of canine bladder cancer."

Dr. Glickman and his associates have studied the occurrence of mesothelioma in canine patients presented at VHUP. This lung tumor is associated with exposure to asbestos. In humans it usually develops twenty or more years following exposure to the mineral fibers. The study identified 18 dogs with confirmed mesothelioma. It was found that the exposure to asbestos at the owner's workplace or through an owner's hobby at home was significantly associated with an increased risk of mesothelioma.

Researchers learned that exposure included a household member with an asbestos-related occupation or hobby for nine dogs, home remodeling or addition of home insulation for five dogs, and the use of asbestos powder or sprays for five dogs. Quite a number of the owners worked in auto repair shops; a number worked in construction involving work with gypsum wallboard and spackling. Some owners had done extensive home remodeling and others lived near demolition and construction sites. One dog accompanied its owner to work, which was adjacent to a shipyard. Three of the dogs had no known exposure to asbestos, but they had been treated regularly with asbestos powder and sprays which have been shown to contain asbestos-like fibers.

The mean age of the animals with mesothelioma was eight years; this corresponds to middle age in humans, when most asbestos-related diseases are first diagnosed. The asbestos fiber level in the lungs of the affected dogs was similar to the level reported in humans with mesothelioma who had had occupational exposure to asbestos.

Owners of dogs with mesothelioma were made aware of these findings. "They need to have their lungs examined regularly," said Dr. Glickman. "And if they are smokers, they should stop, as smoking greatly increases the risk of asbestos-caused lung cancer."

Currently the Epidemiology Section at VHUP is conducting a breast cancer study to assess the risk of nutritional factors, previous hormone use, and drug use in the development of the disease in dogs. This study encompasses a group of 450 dogs (150 animals with diagnosed breast cancer, 150 with other cancers, and 150 healthy dogs). Through a carefully designed questionnaire and a lengthy interview with the owners, we are asking about the food used, the brand, quantity, and whether table food is fed," he said. "We calculate the protein, fat, and carbohydrate content of the diet. We have found that the fat content of food given to dogs varies considerably, ranging from 10 to 70 percent. Although the study is not yet complete, eventually we do hope to determine the role of nutrition in puppies and adults in the development of canine mammary cancer."

Pets may also be used to discover health problems resulting from the introduction of chemicals into the environment. "Animals have long been recognized as a sensitive indicator," Dr. Glickman said. "Think of the role of the canary in the mine." He pointed out that with increasing awareness of chemical leaks or spills into the environment, animals could be used as sentinels. "We hope to study pets in an area where PCBs have leaked into the ground. By examining tissues and blood samples from these pets, we might be able to get an indication of the seriousness of the contamination and what effect it has on animals," Dr. Glickman said that in addition to such studies there would also be a questionnaire and an interview with the owners to correlate exposure history and levels of chemicals in the animal's blood and tissue.

Pet animals can also serve as sentinels to warn of the presence of bacterial disease that could also affect humans. "We are looking at dogs to determine whether Lyme disease could be a problem here in the Delaware Valley," said Dr. Glickman. Lyme disease, an illness caused by a spirochete, is transmitted through tick bites. In humans, it causes a rash at the bite site and, if untreated, can develop into arthritis or neurologic and cardiac abnormalities. The disease is treatable with antibiotics. In dogs, Lyme disease can result in intermittent lameness and arthritis.

"We took blood samples from 39 dogs at an SPCA in the suburbs," he said. "We found that 25 percent of the animals had antibodies for Lyme disease, which is indicative of previous infection. Since ticks in the area carry the disease, physicians should be aware of the possibility of Lyme disease occurring in their patients in the Delaware Valley," Dr. Glickman feels that the incidence of Lyme disease may rise, particularly in areas with large deer populations, as deer harbor infected ticks. The study is continuing and the researchers plan to pinpoint those areas where people are most likely to be exposed to the spirochete-carrying ticks.

Epidemiologic studies of the pet population with spontaneously occurring diseases will not totally eliminate the need for research using laboratory animals. However, for many diseases it can reduce the number of laboratory studies needed. Thus, cats and dogs not only serve as companions but also help us to gain in-depth knowledge about diseases that affect a variety of animal species, including humans.

The researchers responsible for the studies discussed above include Dr. L. Glickman, chief of the section of epidemiology; Linda Domanski, a research coordinator and computer specialist; Dr. Fran Shaler, an internist and epidemiologist, and Beth Sonnenreich, a registered nurse who is completing an ALPO-supported doctoral dissertation on the relationship of diet to the risk of canine breast cancer. The dogs and cats used in these studies were seen at VHUP or were those belonging to people who live in the laboratory of Dr. Michael Goldschmidt for histologic examination.
Ultrasound—
a diagnostic tool

On the first floor of VHP, centered in one of the rooms of the cardiology suite, stands the two-dimensional, phase-contrast blood flow velocity ultrasound machine. This unit, complete with computer keyboard, video monitor, stereoephonic amplifier, video recorder, and strip chart recorder, permits clinicians and technicians to observe the heart, lungs, and other internal organs of cats and dogs. This ultrasound machine, shared by cardiology, is facilitating diagnosis of many animal diseases.

Ultrasound, a non-invasive procedure, uses the reflection of high-frequency sound waves from the interface of tissues with dissimilar density to create an image on the video screen, hence the term echogram. The technique lets the clinicians observe the internal structure of organs, unlike radiographs which provide only a silhouette. Furthermore, ultrasound imaging makes it possible to observe an organ like the heart in motion, providing additional information about its function. Waves are projected into the body from a transducer placed on the surface of the patient's body; the transducer also acts as a receiver of the reflected waves, and the echoes are assembled by a computer into a two-dimensional image corresponding to a slice through the organ along the sound beam. The picture can be frozen on the video screen for a closer look, and videotaped in motion for later review by clinicians and students. The machine at VHP also combines Doppler blood flow measuring capability with the two-dimensional image. This marvel of modern technology accounts for the change in frequency of a sound wave when it encounters a moving object. The frequency shift occurs in the audible range and is directly proportional to the velocity of the moving target blood cells. Blood velocity is calculated from the Doppler shift by a computer, and the audio component of the unit assists the examiner in locating the area where fluid is flowing in the animal.

The use of ultrasound does have its limits. Bone is highly reflective and will obstruct the view of an area behind it. Air is very absorbent of the waves; thus, the lung will also block the view. "When using ultrasound to diagnose heart disease, we must look for a window," said Dr. David Knight, associate professor of medicine at the Veterinary School of the University of Pennsylvania. "A space has to be found between the ribs where the waves are not blocked by bone or lung." He explained that the best image is obtained when the heart is close to the chest wall as it usually is when it is pathologically enlarged. "Ultrasound does not eliminate the traditional diagnostic steps," said Dr. Jeffrey Wortman, assistant professor of radiology. "Rather it complements them and enables the clinician to provide a more in-depth evaluation.

In the case of a patient with suspected cardiac disease, the clinician still takes a history, performs a thorough physical exam, has chest radiographs taken, and records an ECG. Echocardiography then is used to expand the data base. "We can observe the changes in cardiac geometry during contraction and relaxation and make measurements of the velocity of blood as it flows through the heart," said Dr. Knight. "From this information it is possible to calculate various indices of cardiac performance, which allow us to be more specific in our assessment than is possible with the conventional clinical evaluation. Of particular interest are the blood pressure gradients across abnormal communications between chambers of the heart or across the heart valves. This can be calculated from the Doppler echocardiogram. Previously, information of this type could only be obtained by performing a cardiac catheterization."

Dr. Knight explained that in many cases the information once obtained from cardiac catheterization and angiography can be obtained from the Doppler echocardiogram. "Angiography is an invasive procedure, and there is some risk involved. Echocardiography now can provide similar information with less risk to the patient. Physicians, prior to performing surgery on patients with aortic stenosis, now commonly accept echocardiographic data and do not require angiography to be performed."

Dr. Knight pointed out that it is much easier to view a diseased heart by ultrasound than a healthy heart. "Diseased hearts usually are larger and are closer to the chest wall. However, we need to collect more data from normal hearts to establish valid reference criteria." He mentioned that the machine can be used for very young, small animals for diagnostic purposes.

The cardiology department also uses the ultrasound machine as an additional diagnostic tool. "Soft tissue structures do not radiograph well," said Dr. Wortman. "A lot of detail is lost, and by utilizing ultrasound we have the advantage of diagnosis with a very small instrument. A look at the log shows a great variety of soft tissue disorders identified through the use of this non-invasive procedure.

Clinicians are able to detect abnormalities of the skin, liver, and blood vessels, kidneys, and masses within the body cavities and a variety of organs. Ultrasound can be used to confirm suspected uterine infection or pregnancy. Clinicians utilize this test for potential to examine the prostate, kidney, and even the eye. In one case a detached retina was detected.

Another important use of ultrasonography is for biopsies. "We use it to guide the needle exactly to the spot where the tumor is," said Dr. Wortman. "A biopsy done this way is much safer and truly a minor procedure with very little discomfort to the animal."

VHP's ultrasound machine is very much in use, not only for diagnostic purposes but also for teaching. Dr. Knight explained that the diagnostic value of the technique is dependent on the skill of the ultrasonographer. The quality of the study must be constant, and if dependable results are to be obtained, this must be done while the examination is in progress since later it may be impossible to verify that optimal signals have been obtained. Penn was the first veterinary school to obtain a Doppler unit. "Now they are at a number of other schools, and the way technology progresses, more advanced models are already available," said Dr. Knight. He pointed out that the unit at VHP could be adapted to incorporate features of the newer machines.

Owners of companion animals have come to expect sophisticated diagnostic equipment. They accept the costs of modern technology and look for the latest methods when their pet is in distress. The Doppler ultrasound unit at VHP enables clinicians to perform a more complete examination and to provide better patient care. The machine at VHP has proven its many times during the one year it has been in use.

JEDSU Update

A new electron microscope was installed for the Inherited Eye Disease Studies Unit. The purchase of the instrument was made possible through funds from NIH, and a $10,800 contribution from the Frances V. R. Sibree Trust through Mr. and Mrs. W. K. Kiefer.

The new microscope will be used by the JEDSU in the research of eye diseases, particularly inherited disorders. "We are continuing our work on PRA," said Dr. Gustavo Aguirre, director of the unit. "We are looking for methods of early detection of these diseases and for carrier identification."

Researchers at Penn had established earlier that PRA is not one disease but a group of diseases which are different in each breed. PRA-affected animals show the same clinical abnormalities and signs in the course of the disease: night blindness, progressive loss of day vision, and eventual blindness.

"Although the same clinical signs are present in all PRA-affected animals, the age of onset of the disease differs among breeds, and this difference is breed specific," said Dr. Aguirre. "For example, PRA-affected Irish setters and/or collies have clinical signs between six months to one year of age, while, on the other hand, miniature dachshunds and others do not show similar signs until 3.5 years of age. Work done by our group over the past 7-8 years has shown that the diseases present in collies, Irish setters, Norwegian elkhounds, and miniature poodles, although clinically similar and called PRA, are unique disorders which are different in each of the breeds."

Recently Drs. Acland and Aguirre found that the Norwegian elkhound breed can have two types of PRA. It had been known that individuals in this breed have rod dysplasia which can be diagnosed by ophthalmoscopy after three years of age. The second type of PRA, early retinal degeneration, can be diagnosed by ophthalmoscopy as soon as six to eight months of age in affected animals. This disease causes advanced retinal degeneration by one year of age. Electroretinography tests show that these two diseases are functionally different. The ERG identifies affected dogs much earlier than conventional methods, and it enables the clinician to diagnose the specific form of PRA in affected Norwegian elkhound puppies.

Dr. Aguirre and his colleagues have been conducting morphological and biochemical studies of canine progressive retinal degeneration. They have found that the rate of renewal of these visual cells differs in the various stages of the disease. It was discovered that renewal is much slower when the disease is advanced. "We are now looking at phosphocytic cells which appear in large numbers during the advanced stages of the disease," Dr. Aguirre said. "We are looking at their role and are trying to find the signal which causes these cells to appear when the photoreceptor cells degenerate."

The JEDSU holds clinics twice a month. Many breeders bring litters for an ERG to find out whether the puppies have PRA. In addition to the clinic and the research, Dr. Aguirre also works closely with other specialists at the hospital. "When a dog with sudden blindness is presented, we have been able to establish in a number of cases that the retina was normal," he said. "In several cases I turned out that blindness was due to an intraocular tumor."

Other members of the JEDSU are Drs. Gregory Acland, Larry Stram, Kenneth Long, and Lister McGregor; Mr. C. F. Cameron and Mrs. K. Nolte; and Dr. A. E. R. Schot. The work of the unit is supported by NIH, the C.R.E.F. PRA Research Fund, and contributions from local and national breed clubs.

-H.W.
Rabies Vaccination

Important for Dogs and Cats

There has been a dramatic increase in the number of rabies cases reported, particularly in Pennsylvania, Maryland, and the District of Columbia. The cause appears to be an outbreak of the disease in raccoons, with subsequent spillover to skunks, foxes, horses, dogs, and cats. In contrast, the number of cases in bats has remained relatively constant.

Cats are particularly at risk because of their free-roaming nature and hunting instincts. However, there are estimates that only about four percent of the approximately 53 million cats in the United States are vaccinated against rabies. The result is that for the past few years, there has been a higher frequency of rabies in cats than in dogs.

Dogs and cats should be vaccinated against rabies. Killed vaccines which give protection for three years are available. If one of these vaccines is used, cats and dogs should be vaccinated at three months and one year of age, then every three years. Be sure to have your veterinarian check the manufacturer's recommendation, as some vaccines give protection for less than three years.

At the present time, there is no approved method for vaccinating wild animals against rabies, although researchers are working to develop techniques, including an oral vaccine.

New Poultry Laboratory

Construction of the Evan L. Stubbs Building at New Bolton Center will begin shortly. Named for the 1911 graduate, a pioneer in the study of avian infectious diseases, the new structure will house a state-of-the-art laboratory. The Evan L. Stubbs Building is designed to safely deal with and manage research with infectious organisms, primarily poultry, said Dr. Robert J. Eckroade, associate professor of poultry pathology and director of the poultry pathology laboratory at New Bolton Center. "Funding has been provided by the Commonwealth of Pennsylvania. Our primary task is to study avian influenza, a disease which has dealt devastating losses to Pennsylvania's poultry industry."

The new 43-by-65-foot one-story structure will have an impressive array of safeguards. "It will have two air handling systems, and in each the air will be filtered to remove all organisms, including any virus," Dr. Eckroade said. "It will be a very limited-access building with air locks, shower areas, one-way air flow, a special pathological incinerator, and a chemical treatment retention tank for effluent waste."

All these precautions are necessary, as the researchers will be dealing with infectious organisms pathogenic for food animals. "The building is primarily for avian influenza research," said Dr. Eckroade. "This disease is devastating to the poultry industry, and while a lot is known about the influenza virus, we know very little about the disease it causes in poultry."

He explained that the avian influenza virus is present in wild migratory waterfowl and that it is quite resistant. "During the winter in Pennsylvania it can survive for about 105 days in the manure from infected birds." Pennsylvania took drastic measures to curtail the spread of the disease. Millions of chickens were depopulated before the disease was eradicated. However, there was another outbreak of a mild form of the disease in Pennsylvania in early 1986.

The source of this outbreak was traced to trucks with dirty coops originating from the live bird, street market system. "There is a large market for live chickens in New York City and other large cities," said Dr. Eckroade. "80,000 live birds are sold weekly in New York alone through about 40 street markets." He explained that suppliers for this market travel by truck from farm to farm to buy small flocks of chickens. "It was found that these trucks were not cleaned and disinfected after each trip, thus it was possible for the virus to be introduced to the Pennsylvania farm," according to Dr. Eckroade. Legislators are considering regulations making mandatory the cleaning and disinfecting of vehicles used for poultry transport.

The researchers at New Bolton Center will study the avian influenza virus infection of poultry, pheasants, turkeys, and ducks. The influenza research team at the University of Pennsylvania School of Veterinary Medicine includes Drs. Helen M. Acland, Charles Benson, Shennill Davison, Robert Eckroade, Linda Keller, and Ben Wall. The Evan L., Stubbs Building will be part of the Cooperative Poultry Diagnostic Laboratory at New Bolton Center.

Class of 1990

The School of Veterinary Medicine, University of Pennsylvania, accepted 100 students for the first year of class entering in September and graduating in 1990. There are 75 women and 34 men in the class. Of these, 72 come from Pennsylvania, and 28 from the states with contracts for admission of residents (13 from New Jersey, five from Maryland, three from Delaware, two from Connecticut, two from Vermont, and one from New Hampshire). There is one contract student from Puerto Rico. The other out-of-state students are three from New York, one from Massachusetts, one from Michigan, and one from Texas. There are two foreign students—one from England and one from Singapore.

The minimum educational requirement for admission is two years in college or university accredited by the Association of American Colleges and Universities or one of the regional accrediting associations. Required courses include English, Physics, General and Organic Chemistry, Biology or Zoology, Geology, Social Sciences or Humanities, or Calculus. The scores obtained on the Graduate Record Examination (GRE) must be submitted.

Applications for admission are distributed after July 1st and must be received by November 15th for the class entering in September of the following year. Further information may be obtained from the School of Veterinary Medicine, 3800 Spruce Street, Philadelphia, PA 19104.

Although there have been reports of a surplus of veterinarians, nearly 85 percent of recent graduates have entered some form of clinical practice. A number of nonpracticable positions are available. There are public health positions in Federal, state, and municipal governments. The Army veterinarian is also involved in public health work and some care for Army dogs and horses. Aquatic animal medicine is another field, and veterinarians also work with laboratory and zoo animals.

Growth Rate of Puppies

A steady weight gain is an important indicator of a puppy's good health. Puppies should gain weight the first day of life and continue to gain daily. The birth weight usually doubles within 7-10 days, and most reach 50 percent of their mature weight by four months. At about one year of age, most breeds reach their adult weight. Grant breeds such as Great Danes continue to grow until about 18 months of age and do not reach their mature weight until about two years of age.

A good management practice is to weigh pups at birth, daily for the first two weeks of life, and then every three days until a month old, with periodic weight checks thereafter. A gram scale should be used. You should know the adult weight for the breed. The
pup should gain one to two grams per day for each pound of anticipated adult weight. For example, if an adult is expected to weigh 20 pounds, the pup should gain 20 to 40 grams per day for the first five months of life. (An ounce is slightly less than 30 grams.) Supplemental feeding or a better quality diet is indicated if this growth rate is not achieved.

During the first few weeks of life, the puppy can sleep. The twitching and jerking during activation sleep is important for muscle development. For the first two weeks, the puppy's body temperature is 94° to 97°F. There is no shivering reflex for the first six days, and the puppy is dependent on the mother or an external heat source to sustain normal temperature. Many puppy deaths are caused by chilling, and the bitch and puppies should be kept no lower than 70°F.

Check the weight to be sure the pups are thriving. Be sure they are kept warm.

Cold Weather Notes

Antifreeze is very toxic to dogs. Dogs seem to love it, and a very small amount can be fatal. Prompt veterinary attention is necessary if any is ingested. Be careful where you drain radiators.

If dogs are kept outside in cold weather, be sure they have a dry bed and protection from drafts. Additional feed may be needed. Avoid shifting between heated and unheated kennels. Different breeds have different requirements. All very young puppies must be kept warm.

City dogs often walk on salted sidewalks. Wash their feet with warm water regularly. Dry with a towel and check between the pads.

Dogs kept in warm apartments should wear a sweater or coat when taken outside in cold weather, especially toy breeds and those with short hair.

Cats may get under the hood of cars. There have been some nasty accidents. If this is the only warm place for your cat, it might be well to check its whereabouts before you start the car.

Don't neglect regular grooming. Bathing usually is not necessary if the dog is kept clean by brushing and combing. As a general rule, regular or frequent bathing is not necessary.

Many dogs will shiver when frightened, excited, or emotionally upset. They will shiver when they are cold. This is not necessarily a sign of illness.

Keep your vaccination schedule up-to-date. Some infectious diseases occur more frequently in cold weather.

AKC Filming

The bucolic background, complete with cows, in some of the terrier video tapes to be released in February was provided by New Bolton Center, the large animal facility of the School of Veterinary Medicine, University of Pennsylvania. From October 1 to 8, AKC personnel and a camera crew came to the Chester County campus to tape Norfolk and Norwich terriers. miniature schnauzers, bull terriers, Welsh terriers, fox terriers, and Airedale terriers. The filming for the breed standards sessions included Norwich terriers going to ground in a small tunnel under a haystack. The weather cooperated and the entire filming went without a problem.

William A. MacKay Scholarship Fund

William A. MacKay, Belle Meade, NJ, has endowed a scholarship fund (at the School of Veterinary Medicine, University of Pennsylvania.

"Our School receives more applications for admission than any other veterinary school in the nation," said Dr. Robert R. Marsilial. "Yet the difficulty of obtaining sufficient financial aid turns many bright students away. Mr. MacKay's contribution aids us in our efforts to admit the most highly qualified students, regardless of their ability to pay."

"We wanted to do something for one of the veterinary schools," said Mr. MacKay. "Our veterinarian, Dr. Amos Stuha (V'35), is a Penn alumnus, and that in part determined that our contribution would go to the University of Pennsylvania School of Veterinary Medicine. A scholarship fund is a meaningful way to help tomorrow's veterinarians, particularly in light of ever-rising tuition fees.

Mr. and Mrs. MacKay and their six children are ardent dog lovers. "I have had dogs since I was three years old," he said. "My parents owned boxers, German shepherds, and Doberman pinschers. Now my family has wheaten fox terriers, Doberman pinchers. Lakeland terriers, and Pekingeses."

Winter 1986
Dr. Robert J. Ruiman, professor of biochemistry, served as general chairman of the International Pan-African Nutrition Conference held in November at Hahnemann University, Philadelphia.

Dr. William Moyer, associate professor of sports medicine, has been named to the Pennsylvania State Board of Veterinary Medical Examiners.

Dr. Urs Giger, assistant professor of medicine, is a diplomat in the American College of Veterinary Internal Medicine, specialty of internal medicine. Dr. Giger received a grant from the Muscular Dystrophy Association. He also received a New Investigative Research Award from NIH to continue his studies of an inherited disorder in English springer Spaniels. Dr. Giger spoke at the International Congress for Neuromuscular Diseases in Los Angeles in July.

Dr. Douglass Macinirne, assistant professor of medicine, is a diplomat in the American College of Veterinary Internal Medicine, specialty of internal medicine.

Dr. Daniel Cohen, visiting professor of epidemiology, New Bolton Center, is a member of the World Health Organization Expert Advisory Panel on Zoonoses.

Dr. Mark Saunders (V'81), lecturer in radiology, is a diplomate in the American College of Veterinary Internal Medicine, specialty in radiology.

Dr. George Farnbach (V'74) has been appointed associate director for corporate sponsored research at the University of Pennsylvania.

Dr. Robert Whitlock has been named to the Research Advisory Board for the Morris Animal Foundation, Englewood, CO, for a three-year term.

Dr. Jay P. Farrell, associate professor of parasitology; Head, Laboratory of Parasitology; Dr. Colin Johnstone, Dr. Gary Smith, assistant professor of population biology and epidemiology; and Dr. Gerhard Schad, professor of parasitology; participated in the Sixth International Congress of Parasitology held at Brisbane, Australia. Dr. Schad chaired symposia workshops concerning the population biology of parasitic helminths, the life history strategies of nematodes, and the biology of soil transmitted helminths of humans, respectively. Dr. Smith presented an invited lectures in the population ecology symposium.

Dr. Virginia Reef, lecturer in large animal medicine, lectured on diagnostic ultrasound and equine cardiology in Sweden, the Netherlands, and England.

Drs. Chalupa, Ferguson, Galian, Marsh, Ramberg, Rob and Schneider attended and presented papers at the annual meeting of the American Dairy Science Association in Sacramento, CA, in June.

Dr. Victoria L. Voith, assistant professor of medicine (behavior), participated in the Peds and People in Focus conference held in Oslo, Norway. Here she also presented three papers.

Dr. Alan Beck, Dr. Aaron Katcher, and Dr. Voith participated in the conference, Living Together—People, Animals, and the Environment, held in Boston in August, sponsored by the Delta Society.

Dr. Max A. Van Buskirk, Jr. (V'56) received the 1986 Honorary Award for Service from the National Association of State Department of Agriculture. Dr. Van Buskirk is director of the Bureau of Animal Industry in Pennsylvania. He played an important role in halting the outbreak of avian influenza in Pennsylvania in 1981-84.

Dr. John Higgins (V'55) received the Morris Animal Foundation State Chairman of the Year Award.

Dr. Robert Eckroade, associate professor of poultry pathology; director, Poultry Pathology Laboratory, New Bolton Center, has been reelected as secretary/treasurer of the American Association of Avian Pathologists and business manager of the Journal of Avian Diseases. Also he was an invited speaker at the Second International Symposium on Avian Influenza.

Dr. M. Josephine Deubler (V'38) received the 1986 Distinguished Avian Veterinarian Award from the Pennsylvania Veterinary Medical Association. Dr. Deubler serves as show chairman of the Montgomery County Kennel Club. The 1986 show, held in October, was the world's largest terrier show with an entry of over 2,000 terriers.

Dr. Vicki Meyers-Wallen (V'76), assistant professor of reproduction, is now a diplomate of the American College of Theriogenologists.

Dr. Steven J. Fluharty has been appointed assistant professor of anatomy in animal biology. Dr. Deborah M. Gillette has been appointed assistant professor of pathology, and Dr. Amirali N. Hamir has been appointed assistant professor of pathology in the department of pathology.

Dr. Gaylor McKissick (V'58), assistant director of Meck and Co., Inc., was selected “Veterinarian of the Year” by the Northwestern New Jersey Veterinary Medical Association.

Dr. Richard Klemsner (V'61) was selected “Veterinarian of the Year” by the Southern New Jersey Veterinary Medical Association.

Dr. Donna Alexander (V'83) served as one of the judges for the Junior Miss America contest held in June in Mobile, AL.

Dr. Susan Donohue (V'76), assistant professor of nutrition, participated in the Small Animal Clinical Nutrition Symposium—1986, sponsored by Huli's Pet Products Inc. in Kansas City in June.

Dr. William Donawick, Mark Whitner and Lila Guiswold Allam Professor of Surgery; Dr. Donald Patterson, Charlotte Newton Shepard Professor of Medicine; Chief, Section Medical Genetics; and Dr. Robert Whitlock, Marilyn M. Simpson Professor of Equine Medicine; Chair, Clinical Studies, New Bolton Center; were recently recognized as Distinguished Practitioners by the National Academy of Practice in Veterinary Medicine.

Dr. Robert J. Ashman (V'67) has been named to the advisory board of the Lakeside State Bank.

Dr. Bruce R. Madewell (V'70) has received a Fulbright Scholarship to work with Peruvian veterinarians in their research on respiratory diseases.
A New Technique to Diagnose Hip Dysplasia

Hip dysplasia in dogs was first described in 1935 by Dr. G. B. Schenelle of the Angell Memorial Hospital. Since then, much research has been done to determine the causes of the disease and to develop diagnostic techniques. It has been shown that hip dysplasia is a polygenic trait, that 30 percent of the breed's population would be affected if inheritance were the only factor. Environmental factors such as nutrition, exercise, and injury also play a part in the development of the disease. In dogs, hip dysplasia primarily affects large and giant breeds. It also occurs in chickens, pigs, horses, and cows.

Hip dysplasia, an instability of the hip joint, causes osteoarthritis in the joint. This can be a painful, and in some cases a severely crippling condition. Affected dogs do not have the ability to perform athletic or recreational activities. In addition, they are prone to develop hip and back problems.

Dr. Smith, a coinvestigator on the grant and a student scholarship fund, concluded that the synovial fluid plays a crucial role in the development of hip dysplasia. "Optimum performance of the joint is achieved when there is a fixed and minimal amount of fluid in the joint. The capsular/thiad dynamic phenomena can be negated by adding a small amount of fluid to the joint capsule; this will result in marked coxofemoral laxity.

According to Dr. Smith, hip dysplasia could be identified by measuring the amount of synovial fluid in the joint capsule; this will result in marked coxofemoral laxity. Studies are needed to determine these factors and their role in the development of the disease.

"For the past two years we have been utilizing the traditional position method with the dogs on their back and the rear legs extended parallel. Rather, we put the legs into a flexed position and apply a small compressive force to seat the femoral head into the acetabulum. This is the normal stance, and it shows the joint in a natural position with the round ligament and the joint capsule relaxed (Fig. 1). This technique provides a good view of the joint. The second radiograph is taken with the dog in the same flexed position, but this time the lateral force is exerted to pull the joint apart slightly. If the normal amount of synovial fluid is present, its volume and the surrounding joint capsule act together to create a vacuum-like effect, preventing the socket from slipping out of the joint (Fig. 2). If there is excess fluid, the joint capsule will be stretched, and the avicavitational constraint will not be present, and the joint will subluxate (Fig. 3)." Dr. Smith contends that the traditional positioning method actually slightly twists and thus tightens the joint capsule, resulting in some cases in false-negative status of the hip joints.

"When you look at some dogs, which by the traditional method show no subluxation, with the new radiographic technique, you will find that subluxation does exist," Dr. Smith and his colleagues have developed a formula by which they calculate the degree of subluxation. "We can now look at the radiographs of 12-week-old puppies and determine whether the subluxation caused by the lateral force is normal or abnormal. If it is the latter, we expect the dog to develop dysplasia." Dr. Smith and his colleagues have radiographed these puppies at a later age and as adults and have found that the dogs that had the normal amount of subluxation due to the lateral force developed normal hips. Dogs with greater subluxation became dysplastic.

"It appears that by using this new technique we will be able to accurately predict which dogs will develop normal hips and which will not," he said. "We also think that this technique will be more accurate than the present one in detecting affected animals. By identifying affected animals at a young age, much time and money can be saved, as these dogs then will not be used as sires, guides, or field trial dogs. Also, it allows breeders to evaluate a breeding program much earlier.

"Dr. Smith is now developing an apparatus which will hold the dog in the flexed position and will exert a carefully calibrated lateral force. "We think that it will be possible to design and build such a device which can then be used by veterinarians. It is important that the lateral force exerted is proper to prevent damage to the joint."

He is also studying the biomechanics of the hip joint, and he hopes that a medical treatment can be developed eventually to prevent hip dysplasia once the subluxation has been detected. "Once we understand why some dogs have an excess amount of synovial fluid, perhaps steps can be taken to reduce it. But that is far in the future."

The research is supported by funds from the Morris Animal Foundation, The Seeing Eye, Inc., and the University of Pennsylvania Research Fund. Dr. Darryl G. Bierry is a coinvestigator on the grant and provides expertise in radiographic interpretation.

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Refurbishing of the Isolation Barn

New Bolton Center's six-stall isolation barn is being refurbished through the generosity of the Cheever Foundation. The garage doors and the walkway between the barns are gone. In its stead is a regular door. The floor is resurfaced, and new drains and waterlines have been installed. Each stall is equipped with a faucet, making in-stall hydrotherapy possible. Also added are stainless steel sinks in each of the stall anterooms. Sliding windows at each feeding area were installed to permit adding feed without entering the stall. This new feature also allows clinicians and nurses to observe each patient. A pulley system for handling the 20 liter IV fluid bottles was added, enabling one person to handle the heavy jugs. The common work area was improved. Now there is a counter with laboratory equipment for simple tests, a centrifuge, and a total solids meter. Also purchased and installed were a small refrigerator and a microwave oven.

New Bolton Center's isolation barn is much in use. "When horses are in the isolation barn, they are placed here," said Dr. Jonathan Palmer. "As salmonella is a common diagnosis for horses with diarrhea, we must make sure that a patient does not have it before being moved to a common barn. Culture of the stool sample is done to determine if the horse is free of salmonella."

"As salmonella is quite contagious, special disinfection measures are taken for each stall that was occupied in the isolation unit. The stall is thoroughly scrubbed, disinfected, and then cultures are taken over a period of days. Once we have three negative ones, the stall can be used again." This results in a rather long turnaround time for each stall, but it is needed to protect each patient entering the unit.

A forced air ventilation system is also planned for the isolation barn. It will be installed at a later date. "This system will help to keep the barns much better," said Dr. Palmer. "It has made it easier for the clinicians and nurses to work on the horses, and the new drainage system helps us to keep it even cleaner than before."

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Scholarship Funds

The School has received $50,000 from the Salisbury Foundation for the student scholarship fund. Contributions to this fund were also made by Dr. Carol A. Dolinskas, a client of VHUP.
Birds as Pets

More people are choosing birds as pets because they can be as comforting as dogs, say University of Pennsylvania researchers Drs. Alan Beck and Aaron Katcher.

Beck and Katcher surveyed bird and dog owners and observed them as they interacted with their pets. They concluded that birds elicit calm interactions and encourage more dialogue between pet and owner. "People do not normally think of the bird as an outlet for affection and intimacy," Beck said. "But people spend even more time with their birds than they do with their dogs."

Earlier studies by Beck, adjunct associate professor of animal ecology and director of Penn's Center for the Interaction of Animals and Society, and Katcher, associate professor of psychiatry, have shown that companion animals have a therapeutic effect on people. Pets reduce stress and relieve loneliness, they found.

The intimacy people feel with their pets becomes protective armor against everyday tensions and mishaps," said Beck. "Pets can also be especially helpful to people with emotional problems and the elderly, and to people who suffer from hypertension."

According to Beck and Katcher, the dialogue between birds and their owners is the same form, and hence the same stress-reducing properties, as interaction with dogs.

But, because birds are smaller and require that the owner reduce his or her own level of activity in their presence, they reduce stress even more effectively than "man's best friends." "The need to be gentle and not threatening makes the owner calmer," said Beck.

"And, in a tank of fish, a tagged bird provides a visual stimulus that may prove to be a calming distraction."

The nature of the pet-human interaction involves talk, touch, and the assumption of real communication, Beck said. "Birds are especially comforting because they are more vocal than dogs and cats."

"Almost any sound made by the bird is sufficient to stimulate dialogue from owners. Dialogue creates companionship, and companionship is soothing."

The way that people interact with their birds is surprisingly similar to the way that parents interact with their babies. "There is a lot of verbal play between birds and their owners. Bird owners use more sounds and play with speech more than dog owners. Birds may be a better stimulus for this kind of soothing "baby talk" than dogs."

In an earlier study, birds were found to soothe psychiatric patients meeting for group therapy in a room with finches. There was significantly better attendance and participation in the therapy, and patients were significantly less hostile than the control group meeting the same therapists in a room without birds.

For some people, however, pet ownership can be worrisome. Beck cites a recent survey of 298 pet owners. ages 16–69, which revealed that pet ownership is sometimes emotionally draining, particularly for people who worry about the death of their pets. Birds are easier to care for in an urban environment, and can be less of a worry to their owners, Beck said.

"Dog and cat owners were especially concerned about car accidents, poisonings, and sudden disappearances," he said. "Bird ownership is an attractive alternative for those people in urban areas who are especially concerned about their pets."

Beck and Katcher surveyed bird and dog owners and found that pet birds are treated like family members more so than pets. Bird owners also spend more time talking to their pets than dog owners (95 percent and 66 percent, respectively).

The percentage of bird and dog owners who "play with their pet frequently" was about the same (88 percent and 100 percent, respectively), as was the percentage of bird and dog owners who spend more than two hours a day with their pet (around 68 percent).

Birds, like other animals, appear to express some sort of jealousy when another bird is near them; and birds as well as dogs are loyal to one or two specific people, usually those who spend the most time with them, Beck said.

More than 60 percent of U.S. households have a companion animal, with dogs and cats representing the most popular species. Of this 60 percent, 45 percent own dogs and 30 percent own cats. Caged bird ownership is about 4 percent, but sales of birds in pet shops is booming and Beck expects their popularity to continue to rise.

— Margaret Barry

Potomac Fever

In the summer of 1979, practitioners in Montgomery County, Maryland, noticed a sudden increase in the number of horses with acute, often fatal diarrhea. At first the disorder was called Equine Equine Diarrhea Syndrome, but soon it became known as Potomac Horse Fever, after the river where it first was recognized.

Potomac Horse Fever is a seasonal disease, occurring between May and November, with the highest incidence in July and August. Cases of PHF have been reported in many areas of the eastern United States, including Illinois, Indiana, and Pennsylvania. The disease is most frequently observed in young horses, especially those under 4 years of age.

The disease is caused by the bacterium Ehrlichia risticii, which is transmitted to horses by several species of ticks. The bacterium causes symptoms such as fever, anemia, and lethargy, and can be fatal if not treated promptly.

The disease can be diagnosed using a blood test, which detects antibodies to the bacterium. Treatment involves antimicrobial therapy, typically with tetracycline. Prevention involves tick control measures to reduce exposure to infected ticks.

Potomac Horse Fever is a zoonotic disease, which means that it can be transmitted to humans. While the disease is rarely seen in humans, it can cause severe illness and, in some cases, death.

Researchers at New Bolton Center are currently investigating the development of a vaccine for PHF, which could offer a more effective means of prevention. The vaccine would be developed using the bacterium Ehrlichia risticii.

In conclusion, Potomac Horse Fever is a serious and often fatal disease that affects horses in the eastern United States. It is caused by the bacterium Ehrlichia risticii, transmitted primarily through infected ticks. Early detection and treatment are critical to the management of this disease.
The Second Annual Warm Fuzzy Award

For the past several years, four local veterinary associations (Bucks-Montgomery, Keystone, Suburban, and Southern New Jersey) have cosponsored a picnic, which has provided an opportunity for practitioners to meet with the new interns and residents at Penn. This year the picnic was held at the Philadelphia Zoo (with the help of Dr. Wisbur Amand). Approximately 75 practitioners, interns, residents, and faculty members were in attendance.

The officers of these four area associations have decided, through a ballot of their members, to select one member of the VHUP staff as the recipient of the Annual WARM FUZZY AWARD. In brief, this award is presented to a member of the VHUP staff who consistently maintains good relationships and communications with referring practitioners and their clients. The award is presented at the Interns and Residents Picnic and this year’s winner is Dr. Charles D. Newton.

Penn Annual Conference

Wednesday, January 28 and Thursday, January 29, 1987, is the date to mark on your calendar for the 1987 Penn Annual Conference at the Adam’s Mark Hotel, City Line and Monument Avenue in Philadelphia.

Large Animal Program:
- Dairy Ration Formulation for Animal Health Productivity: School of Veterinary Medicine Faculty
- Nutritional Causes of Laminitis in Cattle: Dr. Ned Moser
- Bovine Viral Diarrhea: Dr. Rubin Donis (Cornell University)
- Equine Respiratory Disease: Dr. Richard Manessmann (California)
- Equine and Food Animal Dermatology: Dr. Thomas Manning (University of North Carolina)
- Dr. John Smith (University of Colorado)

Small Animal Program:
- Through the Retroscope: School of Veterinary Medicine Faculty
- Mills Pet Products Inc. Lecture on Small Animal Clinical Nutrition: School of Veterinary Medicine Faculty
- Flea Bite Dermatitis: Dr. R. E. W. Hamill (University of Florida)
- Critical Care of the Cat: Drs. Geraldine Kaufman and Rebecca Kirby
- Fracture Repair using a Kirschner Ehmer Device: Dr. Erick Egger (University of Colorado)

Parents and Partners

On Saturday, September 20, 1986, the School hosted its first Parents and Partners Day. This event is designed to help the families of first year veterinary students understand a veterinary education. The morning session included four "mini" lectures on subjects ranging from curriculum content to animal rights issues. Students and parents joined with faculty members for lunch and then boarded buses for New Bolton Center. Dr. Robert Whitlock, Chairman, Department of Clinical Studies at New Bolton Center, and several faculty members led the 240 participants on a tour of our large animal campus. The day ended with a wine and cheese reception where members of the second, third, and fourth year class mingled with the Class of 1990 and their guests.

Alumni Day—1987

Saturday, May 16, 1987, at New Bolton Center. Plans are underway for tours, carriage and hay rides, and exhibits for alumni and their family members in celebration of Alumni Day. Saturday evening, Dean Marshak and the Veterinary Medical Alumni Society will host a reception and dinner dance at the Radisson Hotel in Wilmington, Delaware.

The following class agents are working hard to make this a special day for our reunion year classes:
- John D. Gadd, V'32
- Harry F. B. Bartoletti, V'37
- Norbert R. McManus, V'47
- Loy C. Awkerman, V'52
- Charles W. Koenig, V'57
- Robert M. Erna, V'62
- Larry A. Dieter, V'67
- Michael E. Schaden, V'72
- Steven A. Levy, V'77
- Anthony J. DeCarlo, V'82

Calendar

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<td>Feline Symposium</td>
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<td>Continuing Education Course, Oncology for the Practicing Veterinarian: Diagnosis and Treatment of Common Canine and Feline Tumors</td>
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Operation Haylift

The Veterinary School of the University of Pennsylvania participated in "Operation Haylift," organized by the Pennsylvania Farmers Association, to farmers in the drought-stricken southern states. The photo shows Mr. Leroy Bruce, New Bolton Center farm manager, loading hay on the trailer. Mr. Bruce has been affiliated with Bolton Farm and New Bolton Center since 1946.

Kleberg Laboratory Dedicated

The Robert J. Kleberg, Jr. Animal Genetics Laboratory was dedicated on October 13, 1986. Five trustees of the Kleberg Foundation attended the event. The Kleberg Laboratory is incorporated into the larger animal facility used by Dr. Ralph Brinster, Richard King Mellon Professor of Reproductive Physiology.

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We'd like to hear your praise, criticisms, or comments. Please address your correspondence to:
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