The Center for Animal Health and Productivity

An outstanding characteristic of 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 preventive 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 four 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

continued from page 1

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 for 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.

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 Deubler, VHUP, 3850 Spruce Street, Philadelphia, PA 19104. Telephone: (215) 898-8882.
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 about 15 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 therapy, confining it to tumors located relatively close to the surface.

Gamma rays interact with tissues differently than orthovoltage X-rays. Due to this different type of interaction, there is no difference in the absorption rate between bone and soft tissue. The maximum dose for this type of radiation is located 5 mm below the skin surface; reducing the skin changes seen with orthovoltage X-rays. Radiation generated by linear accelerators has even higher energy and can penetrate more deeply. It is used to treat large tissue volume in people. This type of radiation therapy is generally not available to treat animal cancers.

Cancer in animals is common. It is estimated that 381 new cases occur per 100,000 dogs per year and 156 new cases per 100,000 cats per year. Owners have come to expect sophisticated veterinary care for their companion animals, and they do not hesitate to ask for radiation therapy in order to prolong a pet's life.

"The animals we see here often are older and have become an integral part of the family," said Dr. Evans. "Radiation therapy is considered when it is felt that the animal's life can be prolonged, and when the animal can lead a normal, comfortable life during and after therapy."

Dogs and cats present a special set of problems to the therapist. In human medicine, radiation treatments are given over a period of four to six weeks, usually five days a week. This is not possible for animals as each treatment requires sedation to keep the dog or cat still. "We treat the animals three times a week for 3 to 30 days. The logistics of extending the treatments over a longer time become untenable."

Dr. Evans explained that in most cases radiation therapy is not the sole treatment. Often surgery has been performed to reduce or remove a tumor. "When a tumor is removed surgically, microscopic traces of the growth remain behind and radiation helps to destroy these. In other cases the entire tumor cannot be removed because of its location. Radiation is then employed to destroy the remaining cancerous tissue."

Chemotherapy is also used to reduce the tumor burden prior to radiation therapy. Chemotherapy may also be employed following therapy to decrease the chance of tumor metastasis. Radiation dosages have to be carefully calculated to minimize damage to healthy tissue. To arrive at the proper individual dosage, the radiologist calculates the total dose of radiation needed and then divides it by the number of treatments. In general, the aim is to give the maximum dose to the tumor without causing irreversible damage to normal tissues.

"Ionizing radiation penetrates the tissues and deposits energy within the cells," Dr. Evans said. "It affects not only the tumor cells but also the healthy tissue, thus one has to be careful. In this tissue is damaged, the DNA of the cells, causing them to die. The effect of radiation is seen quickly on cells which regenerate rapidly, such as skin cells. Damage to nonproliferating tissues such as muscles, nerve, or bone only becomes evident after a period of time. The cells most affected by radiation are those with a high oxygen content. Tumor cells of this type are close 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 is often impossible to destroy all the hypoxic tumor cells, and sometimes a pool of cells remains to begin tumor 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."

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There are many different tumor types, and the response to radiation therapy is known for some of them. Transmissible venereal tumors and acanthomatous 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 Schohl had been given a cobalt unit, "This 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 of clinicians 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

Constantly, scientists are searching for alternatives to the use of laboratory animals in the study of disease. 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 just be 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 what host 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 home environment and are not directly exposed to factors such as alcohol or cigarettes. Also, the pet's diet remains relatively constant throughout in life. Diet plays an important part in some of the most commonly occurring cancers, though no specific causes of cancer have been incriminated. Pets may prove useful models because of their relatively stable diets, short lifespan, and the ease of obtaining accurate dietary histories from the owners.

According to Dr. Glickman, pets may serve as sentinels 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 regis-

tries 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 humans 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 geographic area was also associated 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 of the pets to asbestos at their 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, another individual in the household for five dogs, and the use of fleas 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 gyspum wall board and spackling. Some owners had done extensive home remodeling or additions of home insulation for five dogs, and the use of fleas 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 control 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, 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 tissue 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 treasurable 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 subrub," 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 associate in epidemiology; and Beth Sonnenschein, a registered nurse who is completing an ALPD-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 chosen at random from those seen at 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 image of Doppler blood flow velocity ultrasound machine. This unit, complete with computer keyboard, video monitor, stereotrope amplifier, video recorder, and strip chart recorder, permits clinicians and technicians to investigate the heart and the blood vessels of dogs and cats. 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 surface of the patient's body 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. The waves are assembled into a computer to 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 better review by clinicians and students. The machine at VHP also combines Doppler blood flow measuring capability with the two-dimensional imaging. By studying the Doppler phenomenon, accounts for the change in frequency of a sound wave when the heart 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 with abnormal blood flow.

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 block this 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 been able to detect a multitude of problems. 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 spleen, liver, lung, blood vessels, heart, bladder, and kidneys in the blood pressure gradient obtained through ultrasound. Ultrasound can be used to confirm suspected uterine infection or pregnancy. Clinicians utilize this potential to examine the prostate gland, kidney, and even the eye. In one case a detached retina was detected.

Another important use of ultrasound 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 normally 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 ultrasound technique is dependent on the skill of the ultrasonographer. The quality of the study must be considered when evaluating the results. Ultrasound findings are 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 this many times during the one year it has been in use.

IEDSU 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. Scebe Trust through Mr. and Mrs. W. K. Knepp, Maugrave.

The new microscope will be used by the IEDSU 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 and/or poodles do not show clinical 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 of early retinal degeneration, can be diagnosed by ophthalmoscopy as early 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 there are two diseases which 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 phagocytic 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 IEDSU holds clinics twice a month. Many breeders bring litters for ERG tests 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 suspected blindness is presented, we have been able to establish in a number of cases that the retina was normal," he said. In several cases it turned out that blindness was due to an intracranial tumor.

Other members of the IEDSU are Drs. Gregory Acland, Larry Stram, Kenneth Long, and Lester McGregor. Mr. C. Faulman and Mrs. K. Noss were assistance, S.S. The work of the unit is supported by NIH, the C.E.F.R.P. 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 recommendations, 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.

Class of 1990

The School of Veterinary Medicine, University of Pennsylvania, accepted 109 students for the first year 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 (15 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 three 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, Genetics, Social Sciences or Humanities, or Calculus. The scores obtained on the Graduate Record Examination Aptitude Test (GRE) must be submitted.

Applications for admission were 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 nontraditional positions are available. There are public health positions in Federal, state, and municipal governments. The Army veterinarians are 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.

New Poultry Laboratory

Construction of the Evan L. Stubbins 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 sophisticated laboratory. "The Evan L. Stubbins Building is designed to safely deal with and manage research with infectious organisms, primarily of 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," said Dr. Eckroade. "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 on a Pennsylvania farm 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 clean 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 Renson, Shennill Davison, Robert Eckroade, Linda Keller, and Ben Wall. The Evan L. Stubbins Building will be part of the Cooperative Poultry Diagnostic Laboratory at New Bolton Center.

Second Century Fund

Gifts, subscription and bequests to the Second Century Fund now total $26.6 million. During the last six months approximately $60,000 in gifts have been recorded, ranging from $10 to the clinical research fund from grateful pet owners to the completion of the endowment of one of the chairs in medicine.
pup should gain one to two grams per day for each pound of anticipated adult weight. For example, if a puppy 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 eats and sleeps. The switching and jerking during activated 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 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.

Book Reviews

The Cat Lovers’ Cookbook by Tony Lawson (Storey Communications, Inc., Pownal, VT 05261) $4.95

This book offers nutritionally balanced recipes that are palatable for cats. They represent an alternative to commercial cat food. The Foreword, written by Dr. David S. Kronfeld, states that reciprocation is the basis of our relationship with cats. We have selected them as companions for our own pleasure and hopefully enjoy them in the same way. We have taken away from cats the primitive ability to make their own choices. We now make some, though by no means all, important decisions in their lives. One of the main choices a cat owner faces is the best diet. The recipes offer an alternative to commercial cat food.

Cats do not thrive on diets used to feed dogs. Dr. Kronfeld’s “Theme Recipe” uses ground meat and rice as staples because they are the main sources of energy. The supplements provide all of the essential nutrients not found in the staples: liver, bone meal, corn oil, and iodized salt.

The Theme Recipe
2/3 cup ground meat
1/3 cup dry rice (brown or white)
2 tablespoons chopped liver
1 tablespoon bone meal
2 teaspoons corn oil
1/2 teaspoon iodized salt
1 cup water

Bring the water to a boil. Add the rice, corn oil and salt, and simmer for 20 minutes on low heat. Dredge the meat with the bone meal. Add the meat and liver to the rice mixture, stir, and simmer for another 15 minutes. Cool and serve. Yields 3 servings. Leftovers should be refrigerated or frozen. Variations of the theme recipe are discussed.

There are useful comments on nutrition and health scattered throughout the text.

... A fish-only diet is definitely unbalanced, but this can be corrected by adding the basic nutritional supplements (liver, bone meal, corn oil, iodized salt).

... Some fish contain an enzyme that reduces the ability to absorb thiamine, which is essential to normal metabolism and nerve function. This enzyme is destroyed by cooking, so it’s a good idea to cook all fish before serving.

... You may add one teaspoon of salt to any of the recipes to help promote water intake.

... Both meat and cereal contain very little calcium, so it’s a good idea to add supplements. Use only the amounts recommended, as too much calcium can diminish the absorption of other nutrients.

... Feline mother’s milk has three times the protein of cow’s milk, but much less sugar and fat.

There are a few “Tandem Recipes” for people who like to eat with their cats. Special diets are mentioned: Allergy Diet for cats; Milk and Milk for a delicate constitution; Reducing Diet which also is suitable for cats with a history of F.U.S. (feline urological syndrome); Kidney Diet for impaired liver and kidney function; Diet for Urinary Stoppages to help prevent stone formation.

Complete Book of Ponies by Lorna Howlett (Howell Book House, 230 Park Avenue, New York, NY 10016) $12.95

This fascinating book is about ponies the world over and the pleasures they bring to young and old. It tells how to judge the quality of a pony, how to select and care for a pony, and it has a chapter on pony clubs. All breeds of ponies are described along with the breed characteristics and standards of excellence. Pony height is measured in “hands” (four inches). Measurements are taken from ground level to the highest point of the withers, and height limits vary for different breeds. The Shetland is the smallest, measuring about 10 hands, while the upper limit for pony breeds is 14-2 hands.

The book covers 16 types classified as Ancient and Native Breeds. These include the Welsh, Shetland, and Hackney Ponies. Endangered species are the British Spotted Pony and the Caspian Pony. Rare breeds are the Dales and Exmoor Ponies. Others are the Dartmoor, Fell, Halling, and Connemara Ponies.

The chapter on Modern and Evolved Breeds gives information about Australian Ponies, the Lundy Pony (an extremely hardy pony from the island of Lundy in the Bristol Channel), and American breeds including the American Walking Pony, Pony of the Americas, Palouse, and Chincoteague.

There is a Pony Society Index, a world-wide listing of these ponies. A chapter on “Managing a Pony Stud” covers breeding and foaling. There is a brief chapter on exhibiting and judging.

Pony Riding for the Disabled is the most advanced form of activity, apart from swimming, that is enjoyed by disabled persons. In Australia, there is a number of groups of able-bodied persons helping those less fortunate.

The text has 150 photographs, 40 in color, showing ponies of the various breeds. Particularly those who would like to know more about the different breeds, will enjoy this book.

William A. MacKay Scholarship Fund

William A. MacKay, Belle Meade, N.J., 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 Dean Robert R. Marsiluk. “Yet the difficulty of obtaining sufficient financial aid turns many bright students away. Mr. MacKay’s contribution aids us in our effort to admit the most highly qualified students, regardless of their ability to pay.”

“We want to do something for one of the veterinary schools,” said Mr. MacKay. “Our veterinarian, Dr. Arno Stuets (V’35), is a Penn alumnus, and that in part determined that our contribution 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 pinchers. Now my family has wheaten fox terriers, Doberman pinchers, Lakeland terriers, and Pekingese.”

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 series even included Norwich terriers going to ground in a wooden tunnel under a haystack. The weather cooperated and the entire filming went without a problem.

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Ms. Virginia Trelser receiving the EVSCO Prize in parasitology

Virginia Trelser, a senior student, received the EVSCO Prize in Parasitology for her essay on Hepatozoon and Cytauxzoon infections in dogs and cats.

Dr. Robert J. Ruiman, professor of biochemistry, served as general chairperson 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 diplomate 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 Macinure, assistant professor of medicine, is a diplomate 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 (V81), lecturer in radiology, is a diplomate in the American College of Veterinary Internal Medicine, specialty in radiology.

Dr. George Farnbach (V74) 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 a symposium worshop concerning the population ecology of parasitic helmints, the life history strategies of nematodes, and the biology of soil transmitted helmints of humans, respectively. Dr. Smith presented the 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.

Dr. Chalupa, Ferguson, Galligan, 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 Pigs 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 and sponsored by the Delta Society.

Dr. Max A. Van Buskirk, Jr. (V'66) received the 1986 Hawkins 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 (V55) 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 (V38) received the 1986 Distinguished Alumni Award from the Pennsylvania Veterinary Medical Association. Dr. Deubler serves as 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 (V76), 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. Hamid has been appointed assistant professor of pathology in the department of pathology.

Dr. Gaylor Mekssiek (V82), assistant director of Merck and Co. Inc., was selected “Veterinarian of the Year” by the Northwestern New Jersey Veterinary Medical Association.

Dr. Richard Klesmer (V61) was selected “Veterinarian of the Year” by the Southern New Jersey Veterinary Medical Association.

Dr. Donna Alexander (V83) served as one of the judges for the Junior Miss America contest held in June in Mobile, AL.

Dr. Susan Donoghue (V76), assistant professor of nutrition, participated in the Small Animal Clinical Nutrition Symposium—1986, sponsored by Hill’s Pet Products Inc. in Kansas City in June.

Dr. William Donawick, Mark Whitier and Lisa Guisword Allam Professor of Surgery; Dr. Donald Patterson, Charlotte Newton Shepard Professor of Medicine; Dr. Robert Whelock, 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 (V76) has been named to the advisory board of the Lakeland State Bank.

Dr. Bruce M. Madewell (V70) 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. Schnelle 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; about 70 percent of the disease is attributable to inheritance; 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 are unable to stand or lie down normally, and can not fulfill their functions as working, herding, and hunting dogs. Currently the disease is diagnosed through radiography. About 70 percent of the affected individuals can be identified by this method at age one year. By the age of two years 92 to 95 percent of the affected dogs can be identified. It has been shown that the incidence of hip dysplasia in a breed can be reduced if only breeding stock is utilized which has radiographically normal hips. To that end a voluntary screening program is available through the Orthopedic Foundation for Animals.

The late diagnosis of the disease creates a problem for breeders, trainers, and pet owners. By the time a dog is two years old, much time and money has been spent in training it for tasks such as sentry duty or guide dog. If the dog is a hunting dog, much effort has gone into field training. Also a bond has developed between the dog and the family. By two years of age many dogs of the affected breeds have already been used for breeding, particularly males. Thus it becomes important to develop a method of identifying dogs that may develop hip dysplasia at an earlier age than one or two years.

Dr. Gail Smith, assistant professor of orthopedics at the University of Pennsylvania School of Veterinary Medicine, is developing a diagnostic method which would allow early identification of affected animals. Dr. Smith, a veterinarian and bioengineer, has been looking at the hip joint not only from an anatomical point of view but also from a mechanical one. The hip joint is the least constrained of all the joints in the body, and it has the largest range of motion. A ball and socket joint, it is held in place by the round ligament, the joint capsule, and muscle forces. In addition to these three elements, there is a fourth, previously overlooked factor, the synovial fluid. It acts as a joint lubricant and, together with the joint capsule, creates an unicartilaginous constraint to prevent coxofemoral subluxation. Dr. Smith feels 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/lid fluid 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 induced by increasing the vascular volume of the joint capsule rather than lack of soft tissue constraints. New potential etiological factors for hip dysplasia could include those mechanisms known to affect synovial fluid volume such as joint effusion secondary to trauma, autoimmune phenomena, infection, or metabolic aberrations. Studies are needed to determine these factors and their role in the development of the disease.

"For the past two years we have been examining litter of German shepherds radiographically," Dr. Smith said. "We do not use the traditional positioning method with the dog on its 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 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, the antivacuational 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 (Fig. 4). "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 six- to seven-week-old puppies and detect 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 sentry, guide, 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 it will be possible to design and build such a device which then can 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. 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 Polytechnic Institute. The walkway between the barns is gone. In its stead is a regular floor. The floor is resurfaced, and new drains and waterlines have been installed. Each stall is equipped with a faucet, making in-stall hydrotherapy possible. Additional 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 better 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. New ...
**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 calmer 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 the owner has the same form, and the same stress-reducing properties, as interaction with dogs.

But, because birds are smaller and require that the owner reduce his/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, like a cat or dog, a caged 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 488 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 says.

"Dog and cat owners were especially concerned about car accidents, poisonings, and sudden disappearances," he said. "Bird ownership is an alternative for some 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 even more so than dogs are. 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 (86 percent and 80 percent, respectively), as was the percentage of bird and dog owners who spend more than two hours a day with their pets (around 68 percent).

Birds, like other animals, appear to express some level of anxiety when they are kept away from their owners. But, 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 15 percent, but sales of birds in pet shops is booming and Beck expects their popularity to continue to rise.

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**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 Dujardin Syndrome, but soon it became known as Potomac Horse Fever, after the region 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. Signs of PHF can be depression, lack of appetite, fever, diarrhea, and laminitis. However, in some cases signs are so mild that the horse does not appear to be sick. When the disease was first recognized, fatality rates were high, about 30 percent. This has decreased to about 8 to 10 percent because of better treatment methods, such as fluid therapy and administration of antibiotics.

Since the initial outbreak in Maryland, PHF has been reported in many areas of the country. The disease is often found near large rivers and their tributaries, though it can occur in other areas. Because of the seasonal nature, researchers suspected that the disease was transmitted by an insect vector. In 1983 entomologic studies were launched to attempt to identify unique ticks in areas where PHF occurred. No unusual insects were discovered.

Researchers at New Bolton Center focused on the transmission of the disease. In 1983 they showed that the disease was transmitted through-contaminated feces and by airborne. They discovered that the only way to infect a healthy horse was through trans-fusion of blood from a sick horse. This reinforced the theory that an insect vector might be involved in the transmission of the disease.

In 1984 a rickettsial agent was discovered in horses which had PHF. The organism, named *Ehrlichia risticii* in honor of Dr. Miodrag Ristic, University of Illinois, has yet to be found in ticks, the common vectors in rickettsial diseases. However, scientists still consider ticks, specifically the American dog tick, as a suspect. Other biting insects such as flies and mosquitoes are also being studied as possible vectors. At one point it was thought that small mammals, such as field mice, may act as a reservoir for the *Ehrlichia risticii* organism, but that idea has been abandoned, as no antibodies to the organism could be found in field mice.

Rickettsial infections are treated successfully with tetracycline. Dr. Jonathan Palmer, assistant professor of medicine at New Bolton Center, investigated this mode of treatment. "Using tetracycline in horses can be tricky, because they may harbor salmonella without being ill," he said. "And if a horse with salmonellosis receives tetracycline, this can cause severe diarrhea. Also, symptoms of salmonellosis and PHF are similar, and administering the drug to a horse with salmonellosis can have dire consequences."

To diagnose PHF, then, becomes crucial. Currently, tests which detect PHF antibodies are available. However, this is a lengthy business, as the tests have to be repeated over a period of time, while the disease progresses. Only when PHF is confirmed can drug therapy be started, Dr. Palmer explained. "Tetracycline is relatively inexpensive, but is administered as an injectable. We studied two other drugs, erythromycin and rifampin. These are given orally and they work well, though they are quite expensive."

Dr. Palmer pointed out that tetracycline will not prevent PHF, but it may speed recovery by reducing the severity of the symptoms, like fever and diarrhea. In addition to drug therapy, affected horses often need other support, such as fluid therapy.

Researchers at New Bolton Center are developing a rapid diagnostic test which would enable the veterinarian in the field to determine conclusively whether the sick horse has PHF. Traditionally, tests detect antibodies, the sign that the body is fighting the disease. The test being developed by the New Bolton Center researchers detects the presence of the *Ehrlichia risticii*. The organism is found in monocytes, a white blood cell type in the horse's bloodstream. A bloodsample from a suspected horse has to be concentrated to locate the monocytes. This takes a short time," said Dr. Palmer.

"Then a specific assay is used to prove that the organism is there. The test is not completely developed yet, however, the researchers are hopeful that they may have it ready for use in 1983. A quick test which can be used by the veterinarian so treatment can begin at once."

Dr. Palmer explained that Penn researchers are also collaborating with scientists at Illinois University in the development of a vaccine. Another project is the evaluation of a PHF test, developed at another institution, to determine its effectiveness.

While these tests are still in the future and no vaccine is available, horse owners can be very little to protect their animals against the disease. "We advise general insect control, and if the disease is suspected, immediate veterinary care and blood tests to determine whether it is indeed PHF. Blood samples should be sent to laboratories which have experience with these tests."

Scientists at New Bolton Center and at many other institutions are working to unravel the mysteries of PHF. Much of the research has been funded by the Morris Animal Foundation. The development of the diagnostic test at the University of Pennsylvania has been funded by the Morris Animal Foundation and by the Quarter Horse Association. The Quarter Horse Association also funded the research on therapy for PHF. In addition to Dr. Palmer, Dr. Ellen L. Ziemer, Dr. Carl E. Benson, Dr. Richard Menersmann, and Dr. Robert Whittemore have been involved in the development and testing of the new diagnostic test.

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By Margaret Barry
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. Wilbur 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 Mansmann (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
Hill's Pet Products Inc. Lecture on Small Animal Clinical Nutrition: School of Veterinary Medicine Faculty
Flea Bite Dermatitis: Dr. R. E. W. Hailowell (University of Florida)
Critical Care of the Cat: Drs. Geraldine Kaufman and Rebecca Kirby
Fracture Repair using a Kirschner Ehmer Device: Dr. Eric Egger (University of Colorado)

Continuing Education

Surgical Approaches to the Bones and Joints of Dogs—Wednesday, February 18, 1987: Lecture and Laboratory Course—Dr. Charles D. Newton.

Oncology for the Practicing Veterinarian: Diagnosis and Treatment of Common Canine and Feline Tumors—Wednesday, April 8, 1987: Lecture Course—Drs. Sydney Evans, Stuart Helfand, Ann Jeglum, and Gert Niebauer.

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.

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. Bartolo, V'37
Nobernt R. McManus, V'47
Loy C. Ackerman, V'52
Charles W. Koenig, V'57
Robert M. Eras, V'62
Larry A. Dieter, V'67
Michael E. Schaden, V'72
Steven A. Levy, V'77
Anthony J. DeCarlo, V'82

35th Annual Gaines Foods Symposium

On Saturday, September 13, 1986, Gaines Foods, Inc. sponsored a full day continuing education program on Liver Disease in Animals at the University Museum of the University of Pennsylvania. The program, including a three-course lunch, was provided at no cost to the 200 practitioners in attendance. Penn is proud to have been chosen by Gaines Foods, Inc. to co-host this year's symposium.

Calendar

Winter 1986
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.

Bellwether 19
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Assistant Editor: John E. Martin, V.M.D.
Writers: Helma Weeks, Dr. M. Josephine Deubler (Animal Crackers)
Illustrator: Marie Garalda
Photographers: Anthony Wood, Luane R. Klunder
New Bolton Liaison: Catherine Larmore
Distribution: Jane Johns

We'd like to hear your praise, criticisms, or comments. Please address your correspondence to:
Helma Weeks, University of Pennsylvania, School of Veterinary Medicine, 3800 Spruce Street, Philadelphia, PA 19104-6010
(215)-898-1473
or Linda Fischer, University of Pennsylvania, Office of University Relations, 410 Logan Hall, Philadelphia, PA 19104-6008

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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

Shown here are Caroline Alexander, Emory Alexander, Dorothy Alexander, Mrs. Helen S. Groves, Henrietta Alexander, Dr. Brinster, Helen Alexander.

Kleberg Laboratory is incorporated into the larger animal facility used by Dr. Ralph Brinster, Richard King Mellon Professor of Reproductive Physiology.

Dr. Brinster explaining the growth hormone gene research conducted at his laboratory.

Bellwether
University of Pennsylvania
School of Veterinary Medicine
3800 Spruce Street
Philadelphia, PA 19104-6008

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