Bellwether

Applied Engineering in Stifle Repairs

A dog is sent out for a romp and returns limping, one rear leg drawn up. It does not improve over a period of time and the veterinarian diagnoses a torn cruciate ligament. Surgery is performed and within a few weeks the dog is back on all four legs. To the owner the procedure was successful, the dog can run around and the gait appears to be normal. For Gail Smith, V.M.D., Ph.D., this assessment is not enough. The assistant professor of orthopedic surgery at the Veterinary School of the University of Pennsylvania wants to find out whether surgery restored the stifle to maximum stability, ideally to the pre-injury state.

Dr. Smith currently is studying results of different surgical techniques used in cruciate ligament repair to determine which procedure comes closest to restoring the pre-injury conditions. He is conducting quantitative studies in which he evaluates the repaired joints and compares them to the uninjured ones. The study is done in conjunction with the Sports Medicine Center at U.P.; the measurements and tests are performed at the University of Medicine and Dentistry of New Jersey.

Dr. Smith holds an engineering degree in metallurgy and materials sciences and approaches the stifle joint and its repairs as a problem of loads, stresses, and function of materials. He is not content with exterior evidence and has designed the tests to measure the mechanical stability of the repaired joints. His limited testing has shown that repairs cannot return the stifle to its pre-injury state. "Despite the repairs done, a joint cannot be defined as normal after surgery," he explained. "The problem is that no material is as finely tuned as the original material, the anterior cruciate ligament. The best we can do at this time is to come close to the pre-injury stability."

That is a formidable task when one recognizes that the stifle joint presents a complex arrangement of bones, cartilage, ligaments, and muscles, organized in such a manner to permit articulation of the joint whenever the dog walks, runs, jumps, sits, or lies down. It is a masterpiece of construction where forces and counterforces keep the bones from slipping and sliding and permit an accurate, efficient gait.

Each of the many ligaments in the stifle joint has a special function. The two cruciate ligaments are arranged in the interior of the joint, crossing each other, connecting the femur and tibia. One can think of them as crossed bindings holding the joint together internally, permitting only the hinge action needed for flexing the joint. The two ligaments are strong and composed of precisely arranged bundles of collagen fibers covered by a synovial membrane.

The posterior cruciate ligament is not commonly injured; it is the anterior cruciate ligament which bears the brunt of the damage if the joint is used improperly. This occurs if the dog catches its foot, if it is hit sideways, or if it twists its leg with the full weight on the limb, very similar to the classic "football knee." Then the anterior cruciate ligament may tear, either partially or completely.

(continued on page 7)
Reproductive problems are common to purebred dogs, and, to some extent, to cats. They are costly and frustrating and may end a breeding program. Cures and remedies are few because information is scarce. "There is a great deal of basic research necessary to solve these problems," explained Vicki Meyers, V.M.D., instructor in genetics, pediatrics, and reproduction at the School of Veterinary Medicine of the University of Pennsylvania, "much work needs to be done, much more information needs to be collected." To help breeders solve reproductive problems of their breeding stock, and to gather information, the section of medical genetics established a weekly clinic in genetics, pediatrics, and reproductive problems. Here, Dr. Meyers and others counsel dog and cat owners and, together with referring veterinarians, seek solutions to the puzzle of infertility and reproductive problems in the animals.

"Infertility can have many causes. We look at the animal, check its history, and review the breeding management. Often things can be straightened out by changing the latter. We approach reproductive problems in the same manner as it would be approached in human or large animal medicine." Breeding management is particularly important in dogs because bitches are fertile only for a brief period every six to ten months. "That problem does not exist in cats, who are very efficient breeders and cycle frequently," said Dr. Meyers. "Also cats are not as varied as dogs: you do not have the tremendous number of breeds." As a consequence few cats with reproductive problems are presented at the clinic. "We would like to see more to study them and to gather information."

Breeding management for dogs includes close monitoring of the heat cycle through vaginal smears to observe the cell changes which occur prior to estrus. "It's not difficult to prepare and read the slides: all it takes is some practice and a small microscope. It need not be a fancy one, it can be a child's microscope," she explained. Another aid in breeding dogs is artificial insemination. "The owner can handle that also. The equipment is easily available. I have been teaching breeders how to do it and hope that they in turn will show others. To do artificial insemination here takes too much time and, therefore, is quite costly."

Proper breeding management also requires that a bitch be bred several times over a period of days once the slides indicate that estrus is present. If natural breedings are not possible, then artificial inseminations should be done. The object is to get the animal in whelp. She recommends that vaginal slides be read throughout the heat cycle to establish the day of ovulation retrospectively and to predict the whelping date. Dr. Meyers stated that the change in breeding management in most cases resulted in litters. She did point out that even though breedings are done at the proper time, twenty to thirty percent of normal bitches do not whelp litters. Dogs, unlike people, do not abort early in pregnancy, instead, the fetuses are resorbed. "When we open the uterus we find resorption sites. We do not know why this occurs, most likely something was wrong with the fetus," she explained. Bitches sometimes abort later in pregnancy, usually due to infectious disease, such as brucella. Cats abort more frequently due to a herpes-type infection against which the animal can be protected through vaccination.

Slides are not the only monitoring devices utilized to eliminate reproductive problems. Some breeders follow more closely through blood samples taken throughout the heat cycle and estrus to determine hormonal values and to analyze these retrospectively. "We know, for example, that the blood progesterone level rises in a bitch in diestrus, whether she is in whelp or not," Dr. Meyers explained. "We also know that it drops two months after ovulation. We don't know though what causes the bitch to go into labor; the drop in progesterone alone does not initiate it." In one study of research, dogs' progesterone levels are not only measured through blood samples but also through samples taken directly from the ovaries and the uterus of the pregnant female. "We want to find out whether the ovaries alone produce the hormone or whether the placenta also make it."
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Additional information about normal hormonal values and their function is important and must be studied to find the cause of a reproductive problem. For example, it has been shown that uterine infections are common after mating to sows given to bitches which were accidentally bred.

Most uterine infections though are caused by bacteria. "When a bitch is in season it is very possible for bacteria, which are normally present in the vaginal tract, to make their way into the uterus. It's just a matter of chance," Dr. Meyers explained. During the estrous phase of the bitch increases in efficiency and provides additional resistance against invading bacteria. In diestrous the uterine resistance decreases and the bacteria which entered the uterus can multiply undisturbed and cause infection, pyometra. It has been found that uterine cell changes occurring during diestrous, such as an increase in uterine glands, create an ideal environment for bacterial growth. It is postulated that older bitches are more susceptible to uterine gland changes and increases with each heat cycle. Pyometra often does not manifest itself for several weeks. Once symptoms are evident swift action has to be taken. In the past bitches with pyometra were spayed. Now such drastic treatment is no longer the only alternative.

Dr. Meyers and her colleagues have devised a regimen which eliminates infection and retains the breeding capacity of the animal. The treatment differs from others in that a uterine biopsy and culture are taken to identify the pathogen. "Doing a vaginal culture only will not provide the answer because there are so many bacteria there normally," she said. During the biopsy surgery the uterus is examined, and the ovaries are checked and palpated. The examinations enable the clinicians to make a definite diagnosis of infection and other problems and help to ascertain the extent of damage to the uterus. The data aid in finding out whether reproductive capacity can be restored in a severely damaged uterus.

Bitches are treated with small doses of prostaglandin F2 alpha for three days. Dr. Meyers explained that the dosage for a bitch has to be carefully calculated because dogs are very sensitive to the drug. Cats are more tolerant and can be given higher doses. Prostaglandin F2 alpha causes the uterus to contract and expel the purulent material. The veterinarians also measure plasma progesterone levels and white blood cell counts before, during, and after treatment. Since progesterone levels are normally high during diestrous when the disease appears, it is thought that a reduction in these levels may be helpful in preventing a relapse. It has been found that prostaglandin F2 alpha can reduce progesterone production by the ovaries during late diestrous.

So far ten bitches have been treated at V.H.P. The oldest was six years old, though treatment is usually reserved for the young bitches that a breeder wishes to retain for his program. A number of the treated animals have whelped normal litters; none has had to be spayed to date. The largest litter was by a mastiff which recently whelped fifteen puppies. Dr. Meyers successfully used the prostaglandin treatment for a cat with pyometra and she subsequently had kittens. Because chance invasion of bacteria is possible during each heat cycle, Dr. Meyers feels that bitches treated with the drug should be bred during the cycle following treatment.

The research and studies at the School not only deal with female infertility but also with male infertility. This is a frustrating problem. Often we cannot find the reason for it," she explained. "The typical story goes something like this: the dog produced puppies and then suddenly ceased to produce. We find that there are very few sperm, and in most cases there is no history of disease." Extensive tests and examinations reveal no causes for the absence of sperm. Dr. Meyers feels that a testicular biopsy is important to rule out that infertility is caused by infection or autoimmune disease. She pointed out that infertility in some beagles is due to immune mediated orchitis and thyroiditis and that the tendency for it is inherited.

Low thyroid function, according to Dr. Meyers, presently has not been found to be a major cause of reproductive failure. "People find that the T4 is low, they supplement, but they also do other things, so who is to say whether results are due to the thyroid supplement alone," she said. "To get the picture as to whether the thyroid is functioning properly, a thyroid stimulation test has to be done. We have not found low thyroid function in the in fertile dogs we have treated here," she added. She pointed out that women with low thyroid function conceive but frequently miscarry, but whether this occurs in bitches is not known. "There really is no clear picture of the effects of low thyroid hormone production on the reproduction of dogs.

Other hormones play a role in male reproduction and one researcher, Dr. Vicki Shedd of the dermatology department, is collecting data about testosterone levels in males. She is trying to define the normal level of the hormone in male dogs, regardless of age and size, and is measuring the blood values of many dogs to obtain these vital data.

Dr. Meyers's work does not end when the bitch or cat is in whelp. Often she and her colleagues are called upon when problems develop during pregnancy or birth. Much of this is done by telephone. By working closely with referring veterinarians, Dr. Meyers and her colleagues help breeders realize the goal of a litter of healthy, lively puppies or kittens.

The mechanisms of reproduction and birth still pose many questions. Answers to these will only come through more research. Dr. Meyers sums it up this way: "The more we see, the more we learn, and the more we can help."
The School had made good progress during its first quarter century but it began its second twenty-five years on a sad note. Its young, energetic dean, Dr. Leonard Pearson, had died on September 20, 1909. More than any other individual, Dr. Pearson had brought the young institution to a position of national prominence within the profession. He had established an excellent relationship with the state government, important agricultural organizations, and the University. Almost single-handedly Dean Pearson had formulated plans for the new quadrangle building, begun in 1907, and had secured funds for its construction. Through him some money had been obtained for research and the Laboratory of the State Livestock Sanitary Commission (later Pennsylvania Bureau of Animal Industry) was located at the School. This laboratory provided a means of conducting research on horses and farm animals.

Unfortunately, with Dr. Pearson’s death these important relationships were allowed to languish and the institution entered a long period during which there was very little progress. From 1910 until 1952 little substantial research was conducted, almost no physical plant improvement was undertaken, and the faculty remained small and underdeveloped. This state of affairs cannot wholly be laid at the feet of those who guided its fortunes, but it is true that two of the deans who served for the greatest number of years during this period were very conservative individuals.

The dearth of research is partly attributable to the fact that there was little money available from government, industry or foundations. Most of the federal funds for research went to land-grant colleges and universities where it was funnelled into the experimental stations rather than to veterinary schools. At most institutions having both a veterinary and an agricultural school, the veterinary school was a “poor cousin.” Large scale grants from government agencies such as the National Institute of Health, private foundations, or industry were required to have completed one year of college. In 1940 this was increased to two years.

Another forward step was the offering of graduate work. Although a graduate program in bacteriology and pathology was initiated in 1927 it was not until 1934 that a veterinarian registered for this work. This was Dr. Israel Live who had received his V.M.D. degree in microbiology in the Graduate School of Arts and Sciences. Dr. Live is now emeritus professor of microbiology. The second veterinarian to receive a graduate degree was Dr. M. Josephine Deubler (V’38) who was awarded a Ph.D. in 1941. Dr. Deubler is now assistant professor of pathology in medicine. The development of graduate work was largely through the efforts of Dr. Evan L. Stubbs who was professor of pathology and is now emeritus professor.

In 1910 the total faculty numbered twenty-nine with thirteen of these coming from the Medical Department or other schools in the University. Of the remaining sixteen members who had veterinary degrees, only three were graduates of other veterinary schools. This trend to inbreeding of the faculty would continue for many years. By 1935 when the School entered its second half-century there were thirty-three on the faculty and by 1951 the total faculty numbered fifty-six.

When Dean Leonard Pearson died in 1909, Dr. Louis A. Klein (V’97) became dean and served until 1936 when he was succeeded by Dr. Harold E. Bemis. Within less than one year Dean Bemis died and he was followed by Dr. George A. Dick (V’04) who held the office until 1946. Both Dr. Klein and Dr. Dick gave many years of unselfish service to the School but neither was able to generate the support needed to foster a healthy growth of the institution.

In 1946 Dean Dick was succeeded by Dr. Raymond A. Kelser who was dean until his sudden death in 1952. During the few years of Dr. Kelser’s deanship the fortunes of the School began to improve, setting the stage for the phenomenal development that was soon to begin.

We will conclude our discussion of the years 1910-1952 in the next issue of Bellwether.
Resources

The following is an update on resources available in the Veterinary Hospital of the University of Pennsylvania (VHUP).

Cases are seen on an appointment basis only. Most clinical sections see cases between 9:00 A.M. and Noon.

The appointment desk may be called between 9:00 A.M. and 4:00 P.M. (215-898-4680). The emergency room is open 24 hours/day, seven days/week (215-898-4685).

Clinic Days:
Behavior: Scheduled by department only—215-898-4525
Cardiology: Wednesday, Thursday, Friday
Dermatology and Clinical Immunology: Tuesday thru Friday
Exotics: Tuesday and Wednesday evening
Medicine: Monday thru Friday
Neurology: Wednesday (other days by special arrangement with referring veterinarian)
Oncology: Monday
Ophthalmology: Monday and Thursday
Orthopedics: Wednesday and Friday (This section accepts appointments only after the referring veterinarian has called to explain the case).
Medical Genetics/Pediatrics and Reproduction: Monday and Tuesday
Soft Tissue Surgery: Monday thru Thursday

The Veterinary Service offers veterinary care for unowned animals such as pigeons, hawks, owls, squirrels, rabbits, and groundhogs found abandoned and injured.

Call 215-898-4680 during regular hours (Monday thru Friday 9:00 a.m.—4:30 p.m.). At other times, call 215-898-4685. For additional information, call Dr. Josephine Debuer—215-898-8862 or Mr. Barry Stupine—215-898-4161.

Dean Jang-nag Lee visits the School of Veterinary Medicine

On July 15, 1982 the Dean of the College of Veterinary Medicine, Seoul National University (Seoul, Republic of Korea) visited our School. Pictured here are Dean Jang-nag Lee (center), Dr. Yun K. Oh, former president of the Korean Veterinary Society (left), and Dr. Hung Min Chi, a Philadelphia practitioner (right).

Unusual Amphibians

Some of the Philadelphia Zoo's more interesting, yet little-known animals are the Poison Dart Frogs. In general, amphibians are not greatly emphasized in most zoos. Their environmental requirements, stringent, yet varied, make their display more difficult. The Philadelphia Zoo, however, is able to provide amphibians with their proper environmental conditions. The Reptile House is equipped with air conditioning so that the Lake Titicaca Frog is comfortable at a temperature range between 60°F and 72°F. Yet the Poison Dart Frogs, housed in the same building, are kept in a temperature range between 72°F and 80°F.

There are three genera of Poison Dart Frogs: Colostethus, which are not toxic; Dendrobates, which are mildly toxic; and Phyllobates, which are the most toxic. Ranging in size from one inch to two and a half inches, the frogs are found throughout South America, Central America, and in parts of North America. An alkaloid is present in the skin secretions of the frogs. The name "Poison Dart" derives from a dying use of these toxic secretions by the Indians of South America for their weapons. In fact, the frogs are more commonly known as Poison Arrow Frogs. However, since the Indians used the toxin only on their darts, this name is incorrect. Currently, there is a movement, led by Charles W. Meyers of the American Museum of Natural History, to establish the frogs' name as the Poison Dart Frog.

Like most poisonous species, the frogs are brightly colored. Red, yellow, blue, and black distinguish the Poison Dart Frogs from their common green relatives. Their coloration serves two purposes: it camouflages them in their lush environment, yet it also advertises their toxicity when necessary.

Another distinction of the Poison Dart Frogs is their breeding pattern. The female's only part in the process is depositing clumps of eggs under dry leaves. The male, after fertilizing the eggs, also guards them. The eggs usually hatch in twelve days. The male then carries the tadpoles, sometimes almost a hundred of them, on his back to a body of water. These areas include ditches, roadside puddles, or bromelias, plants that collect water in their centers. Tadpoles are deposited in individual sites because they will eat anything, even brothers and sisters! Within sixty to eighty days the tadpoles mature into frogs and within a year they too are ready to breed.

The Philadelphia Zoo presently possesses two types of Poison Dart Frogs: Dendrobates auratus and Dendrobates tinctorius. They are commonly referred to as Green and blacks and Tie-dyes. The Green and blacks arrived in 1979 from Hawaii and gave birth for the first time last year. Amphibian births in zoos are difficult and therefore rare; so, the birth was quite a happy event for the Zoo. The Green and blacks are now on exhibit in the Reptile House. The Tie-dyes arrived at the Zoo from Florida in 1982 and are currently under the observation of John Groves, the Reptile Curator. Groves expects the Tie-dyes to reproduce in early 1983.

New Poison Dart Frogs are expected at the Zoo shortly. These frogs are the Phyllobates terribilis, more commonly known as the Golden Poison Dart Frogs. Presently these frogs are found in the U.S. only at the American Museum of Natural History. However, this year they will be loaned to the Philadelphia Zoo and the Bronx Zoo. The Golden frogs are almost 200 times more toxic than the other Poison Dart Frogs. Their poison has no known antidote. The Zoo hopes to breed them and eventually place them on exhibit with their other amphibians.

Photo courtesy of Zoo One Magazine and Mike Juniac, Asterisk, Inc.
Deemed a general nuisance by farmers and horse owners, the woodchuck's only claim to fame occurs once a year on Groundhog Day, when it is hailed as the official prognosticator of spring.

Now the fat, furry little rodent, whose burrowing causes damage tantamount to a Philadelphia pothole, may prove more friend than foe as it aids researchers in the battle against cancer. As a natural carrier of the hepatitis B-like virus, experiments with the woodchuck could conceivably lead to the prevention of primary liver cancer.

Tucked away on the wooded periphery of the New Bolton Center campus is a breeding and research colony of 100 woodchucks, established and headed by Dr. Lenore "Lenny" Southam.

"The Woodchuck Project" as it is called, was initiated in December 1979 and is run under the auspices of the Department of Clinical Investigation of the Fox Chase Institute for Cancer Research, Philadelphia. Dr. Baruch S. Blumberg, Nobel prize winner for medicine in 1976, is its director.

"Early heart-related research with woodchucks by Dr. Blumberg and colleague Dr. Robert Snyder of the Philadelphia Zoo's Penrose Laboratory revealed that the woodchuck is a natural carrier of a virus similar to the human hepatitis B virus which is commonly transmitted through blood transfusions and renal dialysis," explained Dr. Southam. "Prior to this, there had been no animal model for the virus."

"Infection of the woodchuck results in acute hepatitis followed by antibody production or, alternatively, a chronic carrier state characterized by an asymptomatic period, chronic active hepatitis and, subsequently, hepatocellular carcinoma," she continued.

Similar to the pattern of the disease in humans, as a chronic carrier of the hepatitis B virus, the woodchuck showing no signs of illness at this stage is, according to Dr. Southam, prone to liver tumor development. Noting that this form of cancer is a worldwide concern, the disease, however, is most prevalent in Africa and Asia.

"We are primarily concerned here with establishing a successful breeding colony so that we can examine the transmission and infection of artificially infected woodchuck offspring, which is one of the goals of the Project," said Dr. Southam.

Dr. Snyder had built eight woodchuck pens on the half acre site of the present colony in the early 1960's, she explained. Under a 1980 agreement between the Fox Chase Institute and the School of Veterinary Medicine, the Institute financed the construction of an office, laboratory, and animal housing areas at the vacated site. Dr. Blumberg hired Dr. Southam in 1979 to establish the woodchuck colony for his on-going hepatitis and primary liver cancer research.

"We spent the winter and spring clearing out the pens, which had grown over with thick underbrush," said Dr. Southam. "We began by trapping wild woodchucks, using box-type cages baited with apples at the entrance to their burrows. The building wasn't completed yet. We used dog cages lined with styrofoam to keep the animals cool in summer. Some of the woodchucks were left loose in the pens for breeding.

"By the end of 1980, we had 34 woodchucks and a building complete with office, lab, and animal housing, that was ready for occupancy."

At a time when woodchucks naturally hibernate, ten animals were kept inside cages, where they were closely observed. In the hibernation state, the woodchuck's body temperature, metabolism and heart rates are considerably lower than normal. In the summer, care had to be exercised to shield the outside caged animals from the heat. If left in the sun, the animal would die because excessive body fat keeps heat contained," explained Dr. Southam.

More woodchucks were trapped in the spring of 1981, two litters were born in the outside pens, and in 1982 three more litters were born in the cages and others are expected. With the colony's current population, there is a sufficient number for breeding and it is no longer necessary to trap, she noted.

"The major goal of the Project is the study of transmission and infection in the perinatal period, when the chronic carrier state is usually initiated," she explained.

"That, of course, depends on successful breeding and births in captivity."

Other objectives of the program include the study of various modes of B virus transmission and infection, and the prevention of hepatitis and formation of primary liver tumors. A vaccine for the woodchucks is also anticipated in the course of the research. A similar vaccine was recently approved for use in humans, noted Dr. Southam.

"The vaccine would he used purely as a research tool. On the theory that the woodchuck would develop liver tumors in two to four years, a vaccine for the animals would enable researchers to know much sooner if a vaccine would inhibit the development of cancerous tumors. Conversely, humans probably wouldn't develop liver cancer for at least 30 years," she explained.

Dr. Southam is aided in the Project's lab work by veterinary technician Francie Rubin.

John Elling, a high school student, has pitched in since the colony's inception. Weekly blood samples are taken from the infected woodchucks and sent to the Institute, where assays detect surface antigens in the blood.

Artificially infected for ten months, one woodchuck appears to be clinically healthy, yet blood assays show chronic liver infection. Dr. Southam performs periodic liver biopsies on the animals, which are also sent to the Institute's labs. To date, two of the woodchucks in the colony have developed tumors.

Pleased with how well the woodchucks have adapted to their captive environment, she noted that the animals are thriving and gaining weight on their vegetarian diet of Purina rat chow. Taking the visitor on a tour of the facilities, she seems to have a natural way with the animals and even has her favorite "pets" among the bevy of beasts. One animal eagerly accepts a thick, sweet substance from the tube she offers through its nose.

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Dr. Smith explained that it is rare when the only injured element of the joint is the anterior cruciate. In that case, repair is often regained without surgery as nature heals the injury by fibrous proliferation of the medial structure, the medial collateral ligament. This additional support compensates for the loss of the anterior cruciate. In most cases though other parts of the joint are also damaged and the natural healing process cannot overcome the pain and instability. Often the menisci are damaged and this interferes with their function as "centering devices" within the joint. Also, when the anterior cruciate ligament is torn, the "binding-like" effect ceases. The joint becomes loose and the tibia can move forward, sliding like a drawer along the joint tissue, it also can suddenly rotate. These movements irritate and erode the bone surfaces and cartilages, causing a painful inflammatory response and the development of extra bony tissue which further irritates the joint. Left untreated the condition continues to worsen and degenerative arthritis develops. As the joint thickens, movement may be impaired. To prevent these ongoing secondary changes, and to repair the initial injury, surgery can be performed.

The many surgical techniques used for the repair of a torn anterior cruciate ligament can be divided into two categories, intra articular repairs and extra articular repairs. In the first the surgeon removes the damaged ligament and replaces it with a graft, using either tissue taken from the dog or an artificial material. This procedure is quite successful and statistics show that seventy to ninety-five percent of the dogs appear to regain function of the joint. When using the extra articular technique, the surgeon stabilizes the joint by using muscles, tendons, and ligaments at the exterior of the joint and he tightens them in a manner to eliminate the joint instability. There is no attempt to replace the anterior cruciate ligament.

Dr. Smith favors the latter approach. He has developed a technique to achieve joint stability by altering the stresses and functions of two ligaments in the joint by rerouting one. He starts his procedure with the lateral collateral ligament which mainly connects the fibula with the femur, but also has a fibrous connection to the tibia. By severing this connection and moving the fibula forward onto the tibia, he changes the angle of attachment of the lateral collateral ligament, creating a resultant force which tightens the joint. This causes the medial collateral ligament, which joins the femur and the tibia on the other side of the joint, to alter its function. It now opposes and stabilizes the surgically induced forces of the lateral collateral ligament. Through this procedure, Dr. Smith creates two exterior bindings which give the joint stability and which prevent the forward and rotational movement of the tibia.
Acupuncture is becoming recognized in the Western Hemisphere as a method of treating some conditions in animals. It has been accepted in the Orient for centuries. There is an International Veterinary Acupuncture Society which meets regularly for the exchange of information. The first English-language text, "Veterinary Acupuncture," was co-authored by Alan M. Kide, V.M.D., associate professor of anesthesia at our School of Veterinary Medicine and Shiu H. Kung, Ph.D. Since this, several other books have been published around the world.

In our Large Animal Clinic, acupuncture has been used in treating horses with chronic back pain and other painful conditions. The treatments are given once a week for eight weeks. It usually takes three to five treatments before signs of improvement are seen. After eight treatments, the duration of effect is a variable, unpredictable length of time—from weeks to years. Individual animals may require additional treatments at varying intervals, but usually the interval is constant for a particular patient.

The treatments are reported to decrease muscle spasms and block the transmission of pain sensation between the source of pain and the brain. In most cases, needles are placed at the acupuncture points and left in place for 15 to 30 minutes.

Dogs and cats are being treated in this manner for various painful conditions by veterinarians in different parts of the country.

Re-vaccination of dogs and cats can be considered a form of insurance. While it may not be necessary, it may prevent illness and is recommended by most veterinarians. Often it is included with the annual physical examination.

Vaccination against rabies is extremely important in dogs and cats. There are vaccines available that give protection for three years while others require annual re-vaccination. Using the newer vaccines, dogs and cats need only be vaccinated every three years. Rabies is a public health problem and the incidence of this disease in wildlife is increasing. The vaccinated dog provides a protective barrier between wildlife and humans.

Dog and cat owners should keep rabies vaccinations up-to-date. There are many different methods of vaccinating puppies and kittens. The problem here is the protection received through the mother’s milk which neutralizes the modified-live vaccines. It is possible to determine the amount of maternal antibody present by testing the blood of the mother and preparing a nomograph to show how long there will be protection in the offspring. This may last as long as sixteen weeks.

Yearly vaccination is recommended against most diseases. This should be continued for the lifetime of the animal. It may not be necessary but the insurance it provides can be life-saving. There is some evidence that dogs over seven years old have decreased ability to produce antibodies and re-vaccination of these older dogs is important for maintaining immunity. It is assumed this is also true for cats.

In addition to rabies, dogs usually are vaccinated against canine distemper, infectious canine hepatitis, canine parainfluenza virus. Usually, these vaccines contain modified live virus. A killed product is used against leptospirosis and intranasal vaccine is available for use against Bordetella ("Kennel Cough"). Rabies vaccine is given intramuscularly, while the others (which may be combined) are given subcutaneously, except for the intranasal product.

In addition to getting vaccinated against rabies, cats are usually vaccinated against panleukopenia, viral rhinotracheitis, calici virus and pneumonitis.

Rabies vaccine is always given intramuscularly. The others may be given intramuscularly, subcutaneously or intranasally. It is anticipated that a vaccine against feline leukemia will be available in the near future.

Modified live virus vaccines should never be given to pregnant animals. Also, vaccination may not be successful if the animal has been exposed recently to the disease or if it is not in good physical condition. Unfortunately, there are a few animals which are not able to develop immunity. During the past several months, a number of new canine parvovirus vaccines, both killed and modified live virus, have come on the market. We have too little experience with these products to make any recommendations concerning their use at this time.

Choosing a Dog, particularly if it will be the first canine member of the family, should be done carefully. Most puppies are cute and pictures can be deceiving, so don’t base your decisions on “that darling puppy in the pet shop” or on photographs in a book. Think about how the puppy will look when it is mature, how much grooming and months and develop a fatal anemia. The animal becomes listless, loses its appetite, and will die. The treatment is spaying preferably during the first year of life.

It is said that ferrets have been domesticated since Roman times and if correctly handled, can live indoors. However, anyone considering any exotic animal as a pet, should do some investigating. You might be asking for trouble. Also, consider what damage might be done if the animal escapes.

Bellweather

Animal

Ferrets

A surprising number of people are keeping ferrets as pets. They are different, but require the same care as cats. Ferrets may be box-trained and become quite friendly with people.

As a general rule, exotic pets are not recommended, but some are becoming quite popular. The problem is mostly in the control of diseases which might be transmitted to humans. The Commonwealth of Pennsylvania requires a permit for ferret ownership.

Ferrets have an unusual problem in that if a female is not bred, she will stay in heat for months and months and develop a fatal anemia. The animal becomes listless, loses its appetite, and will die. The treatment is spaying preferably during the first year of life.

It is said that ferrets have been domesticated since Roman times and if correctly handled, can live indoors. However, anyone considering any exotic animal as a pet, should do some investigating. You might be asking for trouble. Also, consider what damage might be done if the animal escapes.

Dog Museum

The Dog Museum of America opened on Sept. 15 with its first exhibit. Best Friends—Dogs in Art, encompassing more than fifty works of art, including paintings, sculpture, photographs, prints, and the decorative arts. The exhibit documents the dog in art from prehistoric to modern times. The works exhibited include major Western and Oriental works, showing the great range of art depicting the dog and its relationship to humans.

The Dog Museum was founded in 1981 and is located on the ground floor of 51 Madison Avenue, New York, NY. It is sponsored by the American Kennel Club Foundation. The goal of the institution is to collect, preserve and exhibit works of art related to the dog. The museum is open Monday through Saturday from 10 a.m. until 4 p.m. The first exhibit closes Dec. 1, 1982.
The Loyal Red and Blue

The Veterinary Medical Alumni Society was organized on the day the first class of ten men graduated from the Veterinary School, June 17, 1887. At this time a banquet was given for the first graduates by Drs. Edmund S. Roberts, H. H. Shipherd and Dr. William L. Zull, professor of surgical pathology and obstetrics. Prior to the dinner, the graduates had received their diplomas at the Academy of Music in Philadelphia. Following the banquet the Alumni Association was organized, with James W. Robinson as president of a constitution and a code of professional ethics.

The Alumni Association met regularly on the afternoon of Commencement Day each year, however, the minutes of meetings from 1887 to 1901 were lost, and apparently during these years attendance at meetings was poor. In 1901, Dr. Clarence J. Marshall, president of the Association convened a meeting for the purpose of establishing a "permanent alumni society of the Veterinary Department of the University of Pennsylvania." At this time a new constitution was adopted and the name of the association was established as "The Society of the Alumni of the Veterinary Department of the University of Pennsylvania." Dues were set at $1.00 per year and by 1903 there were thirty active members. In 1912 a resolution was passed to affiliate the Veterinary Society with the General Alumni Society of the University.

The Society met in various places during the early years. At times meetings were held in conjunction with the Annual Conference for Veterinarians in January and in other years there were special meetings to coincide with A.V.M.A. meetings in various parts of the country. The early meetings were embelished with social activities of various kinds. When the society met at the Veterinary School in June, it was common for the group to march to Franklin Field to view a baseball game. In other years meetings were held at such locations as the H. K. Mulford Laboratories in Glenolden, PA, the Mineral Springs Hotel in Willow Grove, PA, and at "The Orchard," in Essington, PA. "The Orchard" was the home of the Philadelphia Athletic Club, and business meetings at this location were often followed by a cruise down the Delaware River. At some gatherings, a picnic atmosphere prevailed with baseball games and foot races. At meetings held at the Veterinary School the clinical staff presented various demonstrations.

During the 1920s the Society was involved in a very ambitious project of raising funds for an endowment that would establish a number of chairs and rooms in the School to meet all of its operational costs without seeking financial aid from the Commonwealth. The University itself launched a $45 million drive in 1925 but the School of Veterinary Medicine was advised that it would not share in this total and it should solicit its own funds. Some money did accumulate in a Veterinary School endowment fund but never a sufficient amount to establish chairs or to make the School self-sufficient. In the 1932 meeting it was reported that the fund had a total of $179,243.93. Although $150,000 of this total represented an endowment that had been set up by Mr. Joshua B. Lippincott and Mr. Joseph Gillingham, two early benefactors of the School.

The Alumni Society was concerned with the lack of research undertakings, but there was never a concerted effort to develop a research fund. At the 1932 meeting it was estimated that in order to carry out some research and to improve graduate teaching, an additional $90,000 was needed in the annual budget. This did not happen, and in fact, from 1930 to 1935, during the years of the Great Depression, the budget was cut.

An important committee of the Society was the Departmental Committee which each year surveyed the overall program of the School and submitted recommendations. In 1935 this committee was greatly disturbed by a report of the Educational Committee of the A.V.M.A. in which the School had been placed in a position secondary to veterinary schools at Cornell University, Kansas State University, and Ohio State University. The committee believed that this was the result of a mistake in evaluation and registered a strong protest. Apparently this was successful, because in 1936 the School was placed in a Class A rating which was equivalent to the Schools named above.

At the Alumni Society meetings the dean gave a detailed report of the activities of the School for the previous year. Throughout the reports submitted by Deans Louis Klein and George Dick, there are several common themes. For example it is evident that the School was always in a precarious financial situation. Despite this ongoing situation, both Dr. Klein and Dr. Dick continued to express optimism about the future, and the Alumni Society always gave evidence that it was solidly behind the School. One perceives, however, that there was never a realistic, cohesive plan on the part of the School and the Society to attack the problems. Compared to the current situation, Alumni Annual Giving was quite small, but most years it did increase. For example, in 1927 Alumni Annual Giving amounted to $450, while in 1928 it had increased to $800 and by 1935 it was slightly over $900.

The 50th Anniversary of the Alumni Society in 1937 was marked by a banquet held at the Bellevue Stratford Hotel in Philadelphia, attended by 341 people.

In 1938 the C. J. Marshall Memorial Library Fund was established in memory of Dr. Marshall, who died in 1937. Dr. Marshall, professor of medicine, was one of the most illustrious of the early faculty members. Dr. Elias Booth was the prime mover in establishing this fund and through his untiring efforts it continued to grow and was instrumental in the School being able to hire a full-time librarian for the first time in 1942. In 1946 a plaque was placed in the library designating it as the C. J. Marshall Memorial Library. The last mention of this fund in the minutes of Alumni society meetings occurs in 1947 when it was reported that $40,000 had been raised.

In the 1946 meeting, held in January, as a part of the Annual Conference for Veterinarians, Dr. A. N. Richards, vice president for Medical Affairs, announced that Dean George A. Dick was retiring and introduced the newly elected dean, Dr. Raymond A. Keiser. In 1952, following the death of Dr. Keiser in April, the acting dean, Mark W. Allam presented his first report to the Society.

Purposal of the minutes of the Alumni Society provides a running commentary on the affairs of the School. The additions of new members, deaths of older members, the addition and retirement of faculty, and the acquisition of new facilities are all recorded here. The minutes also record the fact that for all of these years and especially in the bad times, the Veterinary School had great support from a loyal body of alumni. The Alumni Annual Giving Fund continued to grow each year, and each of the four deans who served during this period of time stressed the fact that these uncommitted funds were vital to the life of the School. Over and above this monetary consideration, the School's prestige grew in relation to the accomplishments of its alumni in many areas, and in times of need there were always those who were willing to provide their particular expertise in dealing with problems.

Medical Alumni Society

1910-1952

The 50th Anniversary of the Alumni Society in 1937 was marked by a banquet held at the Bellevue Stratford Hotel in Philadelphia, attended by 341 people.
Dr. Charles Newton, associate professor of orthopedic surgery, was the main speaker at a meeting sponsored by the Tri-State Bird and Rescue Inc. and the Woman's S.P.C.A. of Pennsylvania. This was a seminar on avian orthopedic surgery held on September 28, 1982 in Philadelphia at the Ritter Hospital for Small Animals of the Woman's S.P.C.A.

Dr. Vincent J. Cristofalo, professor of biochemistry and director of the Center for Aging, is the recipient of the Robert W. Kleemeier Award for 1982. This award is made by the Gerontological Society of America and recognizes Dr. Cristofalo's many contributions in the field of gerontology.

Robert J. Eckroade, D.V.M., PhD, Associate Professor of Poultry Pathology, was elected secretary-treasurer of the American Association of Avian Pathologists (AAAP), and the national office of the AAAP has been re-located to the New Bolton Center.

Dr. Charles D. Knecht (V'58) received the 1982 Games Award at the AVMA convention in Salt Lake City, Utah on July 20. Dr. Knecht, who is head of the Department of Small Animal Medicine and Surgery at the School of Veterinary Medicine, Auburn University, was cited for his outstanding contributions to small animal medicine and surgery. Dr. Knecht is a diplomate of the American College of Veterinary Surgery and the American College of Veterinary Internal Medicine. He has authored over seventy major publications and a textbook.

Dr. Gerald M. Snyder (V'71) of Pompano Beach, Florida, was senior veterinarian on a project combining the resources of the National Audubon Society and the National Trust of the Bahamas involving the Bahamas' national bird, the flamingo. The work included a de-flogging procedure to prepare the birds for exhibition in various parts of the islands. Strangely, even though the flamingo is the national bird, the great majority of the Bahamian people have never seen one! (A situation akin to the American people and our national bird, the eagle.) Dr. Snyder is also very active in lecturing on practice management in this country and in Europe.

Dr. Roy D. Hoffman (V '31) was named a Paul Harris Fellow by the Bedford Chapter of Rotary International. Dr. Hoffman, a long-time resident of Bedford, PA, was cited for his outstanding service to the community.

Dr. Colin Johnstone, associate dean for student affairs, has been appointed to the board of trustees of the Dog Writers Educational Trust.

We welcome two new members to our Board of Overseers, W. Edward McBeath, M.D., and Mr. Oakleigh B. Thorne. Dr. McBeath is professor of psychiatry at the College of Medicine and Dentistry of New Jersey—Rutgers Medical School and is president of the Monmouth County Kennel Club. He raises Cardigan Welsh Corgis and is a well-known dog show judge. Mr. Thorne is chairman and director of C.T. Corporation Systems, a firm specializing in tax and business law reports. He is president of the Oakleigh L. Thorne Foundation and is active in the New York Farmers Association. Mr. Thorne's ancestors were 17th Century farmers in Duchess County, N.Y., and were among the first to import Short-horn and Durham cattle from England for breeding purposes.

We are pleased to welcome the following interns and residents for the year 1982-83:

**Philadelphia Interns**
- Dr. Michael Bauer
- Dr. Geoffrey Berk
- Dr. Kathryn Graham
- Dr. Alan Kirmayer
- Dr. Timothy Lyon
- Dr. Mary Louise Martin
- Dr. Primrose Sedmak

**Philadelphia Residents**
- Dr. Lawrence Wahl
- Dr. Robert Washabau

**New Bolton Center Interns**
- Dr. E. Susan Clark
- Dr. Kent A. Humber
- Dr. Noel D. Muller
- Dr. Paul G. Orsini
- Dr. Christina E. Ross
- Dr. Jill L. Shepford
- Dr. Raymond W. Sweeney
- Dr. Mario Trillo

**New Bolton Center Residents**
- Dr. David L. Defenderfer
- Dr. Assadollah Ebrahimi
- Dr. Dennis G. Gentile
- Dr. Arthur Hettel
- Dr. Kathleen L. Hawkins
- Dr. Katrin Hinrichs
- Dr. Nita Irby
- Dr. Albert H. Lewandowski
- Dr. Carol A. Lichtensteiger
- Dr. John B. Madison
- Dr. Daniel J. McGrath
- Dr. Michael W. Ross
- Dr. Daniel P. Shaw
- Dr. Linda Ann Silverman
- Dr. Wendy E. Vaala
- Dr. Angelina E. Warner

Our congratulations to the following officers of Student Government:
- President, John Pantaleo
- Vice President, Tom Eng
- Secretary, Tina Dougherty
- Treasurer, Janet Remeda

**Erratum**

In the Spring, 1982 issue of Bellwether we incorrectly noted that the School of Engineering of the University of Pennsylvania was created in 1893. Actually this School dates back to 1852 when a School of Mines, Arts and Manufactures was established. We are indebted to Dean Joseph Bordogna of the School of Engineering for calling this to our attention.

Dr. Paul Nicolasen (V '81) points out that in the column titled "Animal Crackers" we used the term brachiocephalic to describe certain breeds of dogs. The proper term here is brachycephalic. Dr. Nicolasen indicated that the prefix brachio means "arm", whereas brachy refers to "short" (and wide).
The following is a current list of chiefs of the Clinical Sections at VHUP and New Bolton Center:

Department of Clinical Studies—Philadelphia
Director, Small Animal Hospital: Barry J. Stupine, M.B.A.

Section of Cardiology: David H. Knight, D.V.M., chief

Section of Clinical Pathology: Peter J. Felsburg, V.M.D., Ph.D., chief

Section of Dermatology: Robert M. Schwartzman, V.M.D., M.P.H., Ph.D., chief

Section of Epidemiology: Lawrence Glickman, V.M.D., Ph.D., chief

Section of Medical Genetics: Donald F. Patterson, D.V.M., Ph.D., chief

Section of Neurology: Sheldon A. Steinberg, V.M.D., M.S., chief

Section of Ophthalmology: Gustavo D. Aguirre, V.M.D., chief

Section of Small Animal Anesthesia: Barbara Penny, V.M.D., acting chief

Section of Small Animal Medicine: Kenneth Bovee, D.V.M., M.Med.Sc., chief

Section of Small Animal Radiology: Darryl N. Berry, D.V.M., chief

Section of Small Animal Surgery: Elizabeth Stone, D.V.M., M.S., chief

Department of Clinical Studies—New Bolton Center
Chairman: Charles F. Reid, D.V.M., M.S.
Director, Large Animal Hospital: Richard A. McFeely, V.M.D., M.Med.Sc.

Section of Clinical Reproduction: Robert M. Kenney, D.V.M., Ph.D., chief

Section of Field Service: Richard C. Bartholomew, V.M.D., chief

Section of Large Animal Anesthesia: Lawrence R. Soma, V.M.D., chief

Section of Large Animal Medicine: Robert H. Whitlock, D.V.M., Ph.D., chief

Section of Large Animal Radiology: Charles F. Reid, D.V.M., M.S., chief

Section of Large Animal Surgery: David P. Nunamaker, V.M.D., chief

Section of Nutrition: David S. Kronfeld, B.V.Sc., M.V.Sc., Ph.D., chief

Section of Viral Oncology: Jorge E. Ferrer, M.D., chief

Poison Information Hotline
An Animal Poison Control Information Center has been established at the University of Illinois. It provides antidotal and other information on a 24-hour basis. It is staffed by veterinary toxicologists and can be reached by calling 217-333-3611.

New Telephone Exchange
The telephone exchange of the Veterinary Hospital of the University of Pennsylvania in Philadelphia has been changed from 243 to 898. All the extension numbers remain the same.

October
16
PVMU 100th Annual Meeting, Dean's Reception, White Haven, PA

20
Zukaw Lecture, Dr. Lowell Weltkamp, New Bolton Center

27
Surgical Approaches to the Bones and Joints of Dogs*, School of Veterinary Medicine, Philadelphia, 9 am-5 pm

November
6
SCAVMA Square Dance, New Bolton Center

13
Pennsylvania Hunt Cup Carriage Drive, New Bolton Center

17
Canine and Feline Dermatology*, School of Veterinary Medicine, Philadelphia, 9 am-5 pm

December
1
AAEP National Meeting, Alumni Reception, Nashville, TN

3
SCAVMA Auxiliary Christmas Auction, Room 13, Rosenthal Building, School of Veterinary Medicine, Philadelphia

5
AAEP National Meeting, Alumni Reception, Atlanta, GA

11
Christmas Dinner Dance, New Bolton Center

17
Christmas Buffet, New Bolton Center

January
26-27
Penn Annual Conference*, Hilton Hotel of Philadelphia, Philadelphia

29
Canine Symposium for Owners and Breeders, School of Veterinary Medicine, Philadelphia, 9 am-5 pm

February
19
Radiology, Survey and Contrast Radiographic Techniques and Interpretation Workshop*, School of Veterinary Medicine, Philadelphia, 9 am-5 pm

21
Western States Conference, Alumni Reception, Las Vegas, NV

March
10
Bovine Viral Diseases*, New Bolton Center, 9 am-5 pm

13
AAEP National Meeting, Alumni Reception, San Antonio, TX

26
Necropsy Techniques and Interpretation of Gross Lesions*, School of Veterinary Medicine, Philadelphia, 9 am-5 pm

* these are Continuing Education Courses offered for credit.

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The Benjamin Franklin Society

In his Autobiography Benjamin Franklin said, "I turn'd my thoughts again to the affair of establishing an Academy. The first step I took was to associate in this design a number of active friends...."

That was in 1740. In 1955 a number of active University of Pennsylvania alumni founded the Benjamin Franklin Associates and agreed to contribute $1,000 or more a year without restriction to the University through Annual Giving.

These donors, now organized as the Benjamin Franklin Society, may designate their gifts to one or more Schools within the University for unrestricted purposes, and in 1981-82, 54 members of the Society contributed $75,611.00 to Veterinary Annual Giving.

Membership in the Benjamin Franklin Society is in three categories: Founder ($10,000 or more); Fellow ($5,000 or more); and Associate ($1,000 or more). Further information on the Society is available from Elizabeth S. Caulk, director of Veterinary Annual giving at (215) 898-4234.

Each Alumni Weekend the dean and the Board of Overseers host a black-tie dinner for the veterinary members of the Benjamin Franklin Society. Following this year's dinner Dean Robert R. Marshak and Clifford F. Wright (V'49), our Benjamin Franklin Society chairman, unveiled a plaque in the lobby of the Veterinary Hospital recognizing the Society's members who contribute to the Veterinary School.

New Bolton Center Day at Belmont

Over 200 trainers, horse-owners, veterinarians and others interested in Thoroughbred horses attended a seminar on "Pelvic Problems in the Racing Thoroughbred" at the Turf and Field Club, Belmont Park, New York, on June 24, 1982. Hosts for the affair were Dean Robert Marshak of the School of Veterinary Medicine and Dr. Manuel A. Gilman who had been an examining veterinarian for New York State for the past thirty-seven years. Four faculty members from New Bolton Center gave presentations:

- Dr. Loren H. Evans, professor of surgery.
- Dr. William R. Moyer, assistant professor of surgery.
- Dr. Charles F. Heid, associate professor, School of Medicine, The Johns Hopkins University.

Dr. and Mrs. J. Stuart Evans (V'59), Pittsburgh, PA (left) and Dr. and Mrs. Clifford F. Wright (V'49), Bethlehem, PA (right).