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MEDICAL GENETICS
A New Frontier

Great strides have been made in the control, treatment and prevention of viral, parasitic and nutritional diseases in animals and man. Smallpox, once a threatening illness, has been eradicated; polio can be prevented through immunization, as can many of the childhood diseases. Nutrition has improved in many areas of the world and scientists are finding new ways to prevent or control parasitic disease. As communicable diseases are eradicated or prevented, researchers have focused on another group of disorders, diseases not caused by outside agents but diseases which have their origin in genetic material.

Today veterinarians increasingly deal with a large number of diseases which are wholly or partially genetic in origin. Hereditary defects of the bones and joints, the heart, eyes, and the central nervous system occupy an increasing portion of the time of the veterinarian who deals primarily with pet animals. Evidence is accumulating that hereditary factors are responsible for the high death rate among newborn offspring of purebred dogs and cats. The high frequency of some types of cancer and degenerative diseases in older animals of certain breeds may also be due to a genetically determined increase in susceptibility to these conditions. In livestock, genetic factors have been shown to produce a large variety of defects which cause death or limit production in more subtle ways. Substantial evidence exists that the susceptibility to such diseases as leukemia and mastitis in cattle, parasitism in sheep, and leukosis in chickens is genetically determined. Close to 200 genetic diseases in animals have been identified. Of these at least 150 occur in dogs. These numbers, while appearing high, are low when compared to the number of single gene genetic defects in people where more than 2,000 have been identified.

Genetic research is highly specialized, and in 1973 the University of Pennsylvania School of Veterinary Medicine established the Section of Veterinary Medical Genetics, a formal academic subdivision devoted primarily to the identification and study of genetic diseases in domestic animals. This Section includes laboratories for the study of inborn errors of metabolism, chromosomal anomalies and congenital malformation. Since its inception the Section has been on the forefront of medicine in identifying genetic disorders in animals. Researchers cooperate closely with scientists at the University of Pennsylvania Medical School and at other institutions. The work of the Veterinary Medical Genetics Section has led to the discovery of 15 previously unknown metabolic defects in cats and dogs, and it is expected that many more disorders will be identified in the future.

A number of these diseases identified in dogs and cats are also found in humans. These naturally occurring diseases continued on page 2
Medical Genetics

provide valuable animal models for us to study," said Dr. Donald F. Patterson, Charlotte Newton Shepard Professor of Medicine and Chief, Section of Medical Genetics. Since the 1960s, Dr. Patterson has studied congenital heart disease in dogs. The work began after an extensive survey, conducted by the Comparative Cardiovascular Studies Unit here at the School, revealed that the incidence of congenital heart diseases in dogs was 5.6/1,000. It was found that the heart diseases detected in dogs were anatomically and clinically similar to those in man. The live most common cardiovascular malformations in the dogs were, in descending order of prevalence, patent ductus arteriosus, pulmonic stenosis, discrete subaortic stenosis, persistent right aortic arch, and tetralogy of Fallot. Dr. Patterson and his colleagues discovered that specific disorders occurred in higher numbers in certain breeds. For example, there is a high frequency of tetralogy of Fallot in keeshonds. This cardiac malformation, common in humans, results in "blue babies."

Breeding colonies were established to investigate the underlying genetic basis of the five defects. Breeding studies showed that the malformations are not inherited as simple Mendelian traits. They behave as if multiple genes are involved, alleles which have additive effects on the growth and development of specific structures in the embryonic heart and great vessels. A cardiovascular malformation occurs when the additive genetic effect on a special developmental process exceeds a critical threshold. These studies have provided the most complete understanding of the genetics and pathogenesis of naturally occurring heart disease available in any species.

In recent years, in addition to the heart disease studies, the Medical Genetics Section has investigated inherited metabolic diseases. "Most inborn errors of metabolism involve defects in enzymes, proteins with catalytic activity," said Dr. Peter F. Jezyk, associate professor of Medicine (Medical Genetics). "In many cases there is only a partial reduction of enzyme activities, not a complete or near complete loss of activity." He explained that frequently the metabolic disorder may become evident only when the affected animal or person is ill due to infectious disease or is stressed. Then the metabolic disorder is manifested because of increased tissue breakdown and overloading of the affected metabolic pathway. Dr. Jezyk said that most inborn errors of metabolism are transmitted as simple autosomal recessive traits. He stated that it is possible that much of the high mortality seen in newborn purebreds cats and dogs is due to genetic defects. "One study showed that only 8.9% of the deaths of newborn cats and dogs could be attributed to infection. But it is not feasible for breeders to have extensive diagnostic procedures performed when there are "fading" puppies or kittens; it's just too expensive. However, if large numbers of newborn animals die during the first days of life, the breeder should try to discover whether or not genetic disease is responsible."

Reliable methods are now available to detect metabolic disorders in animals. Over the last ten years the Section of Medical Genetics has developed a metabolic screening laboratory, primarily for the dog and cat. Defined typical chromatographic patterns for amino acids, organic acids, carbohydrates, and glycosaminoglycans in urine. The laboratory is the only one of its kind in the world, and samples are received not only from veterinarians in this country but also from abroad. A number of years ago a program began where breeders and veterinarians would submit urine samples from animals on special filter paper. The samples are tested for abnormal metabolites and the breeders notified if a disorder is found. Over 15 new metabolic disorders have been identified in dogs and cats as a result of this program. Some of the defects include methylmalonic acidemia causing hypoglycemia and growth failure in a young giant schnauzer and a lethal acrodermatitis in bull terriers. Type II tyrosinemia, associated with skin and eye problems, was identified in a German shepherd. Basset hounds with an X-linked immune deficiency have also been identified by Dr. Jezyk.

Metabolic screening plays an important role in human medicine, particularly pediatrics. "Current estimates indicate that about 20 to 30% of the patients in the nation's children's hospitals are there because of genetic disease," said Dr. Jezyk. "Many of these children have identifiable metabolic disorders." In addition to his duties at the School, Dr. Jezyk directs the Metabolic Screening Laboratory at the Children's Hospital of Philadelphia.

Several years ago, a young Siamese cat seen at the clinic was diagnosed as having mucopolysaccharidosis (MPS). This is a lysosomal storage disease caused by a defect in glycosaminoglycan (GAG) metabolism. In a healthy individual, GAG is broken down by a sequence of degradative enzymes. In individuals with MPS, one of the enzymes is defective and the degradative process is not completed. The GAG molecule which is not fully broken down is stored in the lysosomes. As this material accumulates, the lysosomes enlarge and the proper function of the cells is disrupted. MPS manifests itself with varying severity, depending on the enzyme involved. The most severe form of the disease is Hurler syndrome, which causes mental retardation in humans and leads to death during the first decade of life. This syndrome has been identified in both the cat and dog. The diseases are inherited as autosomal recessive traits. A blood test has been developed to identify carriers; it is equally effective for canine identification in humans. "There are dozens of lysosomal storage diseases in man," said Dr. Mark Haskins, associate professor of pathology. "Each of these is rare, but when one takes them as a class of diseases, they are more common." So far 11 lysosomal storage diseases have been identified in animals.

Dr. Haskins and his colleagues are searching for a method to treat MPS in cats. A drug, cysteamine, restores partial enzyme activity for short periods of time in cats with MPS. Long-term studies are currently underway to evaluate this therapy in the cat. Dr. Haskins is also investigating bone marrow transplantation to correct the enzyme deficiency in cats with both MPS VI and MPS I. The researchers are also trying to clone the normal gene for the enzyme responsible for each disorder in order to use genetic engineering approaches to treatment.

Another part of the studies in the Section is the pathologic examinations of animals with birth defects. "We look at neonatal pups and kittens that die and try to determine the cause of death," Dr. Haskins said. "Recently we found..."
On the Road, Veterinary Medicine Comes to the Client.

Most of these practices, according to Dailey and Tabor, do not interfere with the traditional small animal practice. "They provide a service for another segment of the market," said Tabor. "They bring veterinary care to the door of those who have difficulty transporting their animals to a clinic." Dr. Dailey pointed out that, prior to opening her practice, she consulted with veterinarians in the area and explained her plans were accepted that there was a need for a house call clinic. "Dr. Dailey poinied out that, prior to opening her practice, she consulted with veterinarians in the area and explained her plans were accepted that there was a need for a house call clinic. "The animal and the owner are at greater peace making the death of the pet more acceptable."

Dr. Dailey's observations are borne out by Claire Tabor, a spokesman for Dodgen Industries, a manufacturer of mobile veterinary clinics. "These clinics are the fastest growing segment of veterinary medicine," Mr. Tabor said. "It is a service which is needed by more than 50% of companion animals which do not receive routine veterinary care. According to Tabor, these practices are divided between his two professions. Do his patients mind? "No," he said. "They think it is rather novel. Often my dental patients ask questions about animals and seek advice."

Recently he equipped a police dog with two new metal canines so that the animal could continue its service as a K-9 dog. The dog had broken its two upper canine teeth. Veterinary dentistry is also the subject of a special course Dr. Grove teaches to area practitioners. "I use the vehicle as a classroom where other practitioners can learn procedures and have hands-on experience in veterinary dentistry. This has been well received."

While Dr. Grove plans to open an office soon, he will not give up his mobile veterinary hospital. "I will continue to make house calls," he said. "There is a need for that aspect of veterinary medicine."

For both Dr. Grove and Dr. Dailey, the mobile unit provides the means to establish a practice without incurring the large debt associated with a clinic. "Mobile veterinary practices are here to stay," said Mr. Tabor. "They are needed to reach a new segment of the veterinary health care market, and they provide a service in animal care. Also, they enable the recent graduate to become independent much sooner."

H. W.

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Immunotherapy as a treatment for allergic respiratory disease in horses

ust and molds are found everywhere, so it is not surprising that these substances rank high on the allergen list for horses. They usually don't cause hives or itches as they do in dogs. In horses, dust, mold and other substances affect the respiratory system, and serious pulmonary disease can result if the allergic condition is left untreated. Allergies can seriously interfere with performance, and drug treatment is often difficult. Veterinarians at New Bolton Center have treated allergic horses for a number of years with immunotherapy with good success.

"It is suspected that allergies are the major causes of chronic obstructive pulmonary disease (COPD) or chronic bronchitis and chronic coughing in horses," said Dr. Jill Beech, associate professor of medicine at the School of Veterinary Medicine, University of Pennsylvania. "It is also suspected that horses with exercise-induced pulmonary hemorrhage and exercise intolerance at high speeds may have an allergic component to their disorder."

Dr. Beech and her colleagues see many horses with suspected allergies at the George D. Widener Hospital at New Bolton Center. "Often the first symptoms are a decreased exercise tolerance, and in race horses, slower times during high speed training sessions," she said. "Other signs include a cough or wheezing and an increased effort in breathing.

In many horses there is an inflammation of the lungs present," "When the animal is presented, a thorough physical exam is performed and a history taken. This often provides the first clue that we may be dealing with an allergy. An endoscopic exam is performed and transtracheal washes are done to obtain cell samples from the lower airways. Sometimes blood tests are done to rule out other disease," Dr. Beech explained that the extent of pulmonary dysfunction in horses is difficult to predict. "You can't do pulmonary function tests on these animals as you would do for humans, as testing involves patient cooperation and toleration of wearing and breathing into a mask with special equipment. Unless horses have been trained to tolerate testing, measurements are unlikely to yield meaningful information. Many of the tests which are used in humans, and would be most useful to us, require that the patient breathe in certain patterns requested by the examiner, and of course that is impossible in equine patients."

If the horse has respiratory problems only when running at high speeds, it may be normal while at rest. Ideally, lung function in these animals should be examined during exercise, but with the exception of a very few specialized research laboratories with treadmills and specialized equipment this is not possible.

The cell types found in the transtracheal washes in most cases provide a clue implicating an allergy. Allergy skin testing is the next step. Although the value of skin testing is somewhat controversial, at the present time it seems to be the best clinically applicable test for allergies. "We perform intradermal skin testing using 34 different allergens, mainly molds which are commonly found in barns but also including barn dust, hay and straw, some feedstuffs and saline and histamine as the negative and positive controls, respectively," she explained. "Reactions are evaluated for size, firmness and thickness at ½, 3 to 4 and 24 hours." Once it has been determined which compounds the horse is allergic to, an allergic extract for immunotherapy is prepared: "We prefer that the horse does not reach a very large number of antigens because that makes selection of antigens to be used more difficult; you either have to delete some from the mixture or give smaller amounts of each."

Treatment by immunotherapy is relatively simple. An allergic extract is prepared from the antigens that elicited a strong response. The treatment consists of weekly subcutaneous injections of increasing doses until the volume of 5 cc is reached; this often is given for six months and sometimes longer.

A retrospective study by Dr. Beech and Geralyn Schad Merryman on 116 horses treated with immunotherapy showed that immunotherapy is an effective and safe treatment for horses with allergic respiratory disease. The researchers found that 68% of the horses had a positive response. They found that the success rate tended to be higher in horses aged two to four years and more than 10 year old. They also found that Thoroughbreds had significantly more positive results than Standardbreds and Crossbreds and fewer positive results than Appaloosas and other breeds. "Thoroughbreds and Standardbreds spend a lot more time indoors. They are exposed continually to barn dust, mold and dust from bedding," she said. "It is very important that barns be well ventilated and kept as dust and mold-free as possible. Horses should be removed from the barn while it is cleaned to keep exposure to dust to a minimum."

If a horse is allergic, the resultant pulmonary disease can progress rapidly. "We have very few drugs we can use for treatment because of the racing regulations. Also, when drugs are used the frequency of medication is very important and some 'treatment failures' may be because people don't follow the schedule. Immunotherapy provides a simple and permissible treatment."

Dr. Beech emphasized that management of the horses plays an important role in minimizing the exposure to allergens. Ventilation and a relatively dust-free environment should be provided. Additionally, bedding material can be changed to woodshavings (if non-dusty) and hay can be fed cubed, along with pelleted food, to prevent dust. Wetting feed may help. The usefulness of specially cured hays (e.g. Horse Hay) has yet to be fully evaluated.

She stressed that early treatment is important. "If the allergic response is severe, the animal can develop a chronic bronchitis. It may stop eating and can develop a secondary bacterial bronchitis; breathing will become more difficult. If that continues too long, in the very severe case heart problems can actually develop."

The testing for allergies can be performed by veterinarians in the field. "We have a kit available which we send out upon request," she said. "And if the veterinarian wishes to pursue treatment and considers the horse to be a good candidate, we prepare the antigen solutions for immunotherapy." More than 300 horses have been treated at New Bolton Center by immunotherapy. "It is not known exactly how immunotherapy works," Dr. Beech said. "More research needs to be done. Also, at this point, we have no way to accurately and easily measure the antibody levels to allergens in horses. If such tests were available, we could ascertain whether immunotherapy is affecting them. There is a need for basic immunologic investigations to better understand the immunologic mechanisms in the horse."

Bellwether
Common Internal Parasites of Cats

Many kinds of internal parasites are common in cats. Most do not cause serious disease unless the animal is heavily infested. However, parasites are likely to cause illness in young kittens and puppies. The first indication of parasitic disease in a pet often is diarrhea or vomiting. The animal may be a little lethargic and not too interested in its food, and its haircoat may be dull. If parasites are suspected, a fresh stool sample should be taken to the veterinarian for diagnosis. He then can prescribe the proper deworming medication, eliminating the problem.

"Outdoor cats are more prone to becoming infected with parasites, because they hunt and because they are more likely to come into contact with other cats and their droppings," said Dr. C. E. Kirkpatrick, assistant professor of parasitology at the University of Pennsylvania School of Veterinary Medicine. "House cats, unless they are infected when they arrive in a household or have come into contact with an intermediate host, don't have internal parasites that frequently.

The most common internal parasite seen in cats is roundworm. "There are two kinds of roundworm affecting cats," said Dr. Kirkpatrick. "Toxocara cati, which affects cats only, and Toxascaris leonina, which affects cats and dogs." Kittens become infected with Toxocara shortly after birth because the larvae of Toxocara cati migrate to the milk during lactation.

Toxascaris leonina larvae do not leave the intestines to migrate to other tissues. Infection with this worm occurs by contact with feces or by eating infected prey, such as mice. Roundworm infestation can be debilitating for kittens, as it weakens the animals and prevents the proper absorption of vital nutrients. Kittens should be checked for worms and treatment should commence under veterinary supervision.

A parasite dangerous to young kittens is hookworm, though this disease is more frequent in dogs than in cats. A heavy infestation leads to anemia and diarrhea. Infective hookworm larvae survive in contaminated soil. Cats become infected in two ways: larvae are ingested or they penetrate the skin. This often causes a reaction which can develop into a most dermatitis.

Tapeworm is another parasite affecting cats. "There are five kinds," said Dr. Kirkpatrick. "When the tapeworm is diagnosed, it is important to determine which one it is, as the species are transmitted in different ways. And to prevent reinfestation, environmental controls should be instituted." The most common tapeworm in cats is Dipylidium caninum. It is also seen in dogs. It is transmitted by ingestion of fleas. The parasite is not transmitted by fleas. If the cat has Dipylidium caninum then it and the environment must be treated for fleas to prevent reinfection.

Other types of tapeworm infection occur if the cat eats rodents, snakes and frogs. Toxocara cati is another intestinal parasite seen occasionally in cats. Larvae of these worms survive for long periods of time on the ground where the cat can come into contact with them. It is thought that threadworm (Strongyloides) may be transmitted through the milk of an affected queen. Although it seldom causes disease in cats, Strongyloides is capable of infecting humans.

Cats are also subject to lungworms which can cause respiratory illness. Capillaria aerophila, a hair-like worm, lives in the bronchi. Eggs are laid in the air passages, coughed up and ingested. The eggs stay, then pass out to the environment in the feces. A larva then develops within each egg, which is infective for another cat when ingested. Cats with this parasite can develop chronic respiratory disease, though many infected cats show no signs of disease. Astreus is another lungworm found in cats. It is not as common in this area, but it is seen occasionally. Lungworms can cause serious problems for kittens because of the respiratory disease which can develop. Cats become infected with lungworms by eating snails or slugs. Intermediate hosts of these worms, or prey animals which have consumed infected, intermediate hosts.

Toxocara cati is another protozoa seen in cats. It causes diarrhea. This organism is found in many species of animals, and Dr. Kirkpatrick and his colleagues are conducting a study to identify the different types of Giardia. They are also trying to determine if Giardia can be transmitted from animals to humans. In older cats, Giardia rarely causes symptoms, though the animals are carriers and shed cysts which are infective to other cats.

Toxoplasmosis is potentially a more serious protozoan disease. Toxoplasma gondii needs the cat as a host to complete its life cycle. Toxoplasma affects many animals, but only the cat spreads the disease through shedding of infectious cysts. In humans toxoplasmosis can cause flu-like symptoms. The disease is dangerous to women in the first trimester of pregnancy, as it may cause congenital malformation in the fetus. Pregnant women should avoid handling the litter pan, and it should be cleaned and disinfected frequently. A bloodtest is available to determine whether a cat harbors the organism.

Many infected cats show no signs of disease. Toxoplasmosis can be a serious problem in young cats, as the motile stage of the organism may invade other tissues. Signs often resemble those of other diseases, depending on the location of the protozoa. They have been found in the eye, brain, intestines, spinal cord and other parts of the body. Toxoplasmosis is spread by ingestion of the infectious oocysts, in cat feces, or tissue cysts in many kinds of meat. Cooking the meat destroys the protozoa. Cats should not be fed raw meat. The organism, in the oocyst stage, also survives in soil. In many areas there are many outdoor cats, gardeners should wear gloves to work in the soil. Just one Toxoplasma gondii can start an infection as the organism multiplies within a host.

Diagnosis of these parasitic diseases is made by microscopic examination of fecal material. "It is important that an owner bring a fresh stool sample when the cat is taken for its annual check-up," said Dr. Kirkpatrick. "This is part of the exam. Also when acquiring a new kitten, it should be checked for parasites even though it may already have been dewormed."

He recommended that cats which live indoors exclusively be checked annually for parasites. Outdoor cats need to be checked at least twice a year. He also recommended against routine deworming. "For a drug to be effective, it has to be the correct one," he said. "Many deworming drugs work only for a particular parasite, some only on one stage of the life cycle. In order to utilize the most effective drug, the sample has to be checked by the veterinarian to determine which drug is needed to control the parasite. Often multiple dewormings are needed to eliminate the organism. It is best to consult the veterinarian before deworming an animal, particularly young kittens."

Worms are not the only parasites affecting cats. Single-celled organisms, protozoa, may also cause intestinal signs. Isospora spp. ("coccidia") rarely cause problems in older animals, but kittens are susceptible, developing coccidiosis, which manifests itself as diarrhea. Giardia is another protozoa seen in cats. It causes diarrhea. This organism is found in many species of animals, and Dr. Kirkpatrick hopes to determine how common parasite infections are in pets in this area. He hopes to determine how many of these infections are among cats and dogs and whether certain species are more prevalent than others. The researchers are also looking at the geographic areas where the parasites are found, and they hope to determine whether certain parasites are more prevalent in specific geographic areas.

"It is thought that threadworm (Strongyloides) may be transmitted through the milk of an affected queen. Although it seldom causes disease in cats, Strongyloides is capable of infecting humans."

Dr. Kirkpatrick is conducting a study with Dr. Lawrence Glickman, Chief, Section of Epidemiology, to determine the species of parasites found in pets in this area. He hopes to determine how many of these infections are among cats and dogs and whether certain species are more prevalent than others. The researchers are also looking at the geographic areas where the parasites are found, and they hope to determine whether certain parasites are more prevalent in specific geographic areas.
Rare Breeds

The Greater Swiss Mountain Dog ("Grosser Schweizer Sennenhund") will be eligible to compete in the Miscellaneous Class at AKC dog shows, obedience trials, and tracking tests as of October 1, 1985. This dog is believed to be a descendant of Mastiff-type dogs brought by the Romans during their invasion of Helvetia. For centuries this was the most common working breed in Switzerland. His willingness to work made him a companion for the Alpine herdsman, and he was called upon to perform many farm chores in addition to herding and guarding. At one time, he probably was the best-known draft dog in the world.

Invasions of Helvetia. For centuries this was the Swiss breeders "rescued" this Alpine herding type dogs brought by the Romans during their industrialization took over, the need for his guarding and herding diminished, and the breed nearly vanished. In the early 1900s, concentrated efforts by Swiss breeders "rescued" this Alpine herding dog. The first Greater Swiss Mountain Dogs were imported into the United States in 1968.

Dogs competing in the Miscellaneous Class at AKC shows do not receive championship points, and they must have an ILP number before competing in AKC events.

Other breeds presently eligible for the Miscellaneous Class are Australian Kelpies, Border Collies, Cavalier King Charles Spaniels, Finnish Spitz, Miniature Bull Terriers, and Spinoni Italiani. After February 1, 1986, Chinese Cresteds will be eligible.

The United Kennel Club has opened its registry to Chinese Shar-Pei. This breed has existed for centuries but its survival was threatened in the 1940s when keeping dogs was forbidden, since it was a sign of the leisure class. Most dogs of all breeds in China were destroyed. A few Shar-Pei were smuggled into Hong Kong, and in the 1970s the breed became established in the United States. The breed has very loose skin with profuse wrinkles, especially on puppies. The dogs also may be registered with the Chinese Shar-Pei Club of America, Inc., which maintains a registry and stud book. This Club has over 40 affiliated regional clubs and is working for AKC recognition. This requires a viable national club which maintains a registry and stud book and promotes the breed through match shows and obedience trials. At the present time, the Chinese Shar-Pei is not recognized by AKC.

Animal Health Technician Program

Harcum Junior College's Animal Health Technician Program hosted a dinner for the University of Pennsylvania faculty and staff who train Harcum's animal health technician nurses. During the dinner, Dr. Norma Furst, president of the College, announced that Dr. Nadine Hackman (V'80) was appointed director of the Animal Health Technician Program.

Sixteenth Annual Symposium

Our Sixteenth Annual Symposium, Your Veterinarian and Your Dog, will be held on Saturday, January 25, 1986, at the Veterinary Hospital of the University of Pennsylvania (VHUP), 3850 Spruce St., Philadelphia, PA 19104-6010.

A Veterinarian's Observations on the Airline Transport of Dogs will be the topic of our visit. Sixteen Annual Symposium, Your Veterinarian and Your Dog, will be held on Saturday, January 25, 1986, at the Veterinary Hospital of the University of Pennsylvania (VHUP), 3850 Spruce St., Philadelphia, PA 19104-6010. A Veterinarian's Observations on the Airline Transport of Dogs will be the topic of our visit. Sixteen Annual Symposium, Your Veterinarian and Your Dog, will be held on Saturday, January 25, 1986, at the Veterinary Hospital of the University of Pennsylvania (VHUP), 3850 Spruce St., Philadelphia, PA 19104-6010.

Update on Blood Diseases will be discussed by W. Jean Dodds, D.V.M., Adjunct Associate Professor of Medicine (Hematology); Chief, Laboratory of Hematology, New York State Department of Health, Albany.

National Brands, Generics and Specialty Dog Foods will be the topic of David S. Kronfeld, Ph.D., D.Sc., M.V.Sc., M.R.C.V.S., Elizabeth and William Whitney Clark Professor of Nutrition. Acting Chairman, Department of Clinical Studies (New Bolton Center). Commonly Encountered Skin Problems in Dogs will be discussed by Robert M. Schwartzman, M.D., M.P.H., Ph.D., Professor of Dermatology and Chief, Section of Dermatology.

The program will begin at 9:30 a.m. with adjournment scheduled for 4:00 p.m. There will be a question-and-answer session after each presentation. Questions may be submitted in advance. The cost, including lunch and parking, is $25. Attendance is limited to 200.

spaces between premolars which may give the mistaken impression that teeth are missing. In the short-faced breeds, teeth may appear crowded and out of place.

Most of the AKC breed standards will define the "bite" required for that breed. For a scissors bite, the incisors of the lower jaw must touch the inner surface of the upper incisors. If the lower jaw protrudes, the dog is "undershot." If the lower jaw is short and the lower incisors are well back of the upper incisors, the dog is "overshot." What is correct for one breed could be a disqualification in another. Check the breed standard!

**Book Review**


This book provides sound information which should be helpful to the novice as well as the experienced dog breeder. Dr. Holst gives scientifically correct explanations which make for better breeding management. The book avoids misinformation, erroneous assumptions and "old wives' tales" which have been repeated many times. It should be studied carefully by those who want the right answers. The reproductive processes in the dog are not fully understood at this time, but continuing research will fill the gaps in our knowledge.

What criteria should be used in making the decision to breed or not to breed? First is awareness of our responsibility to keep each breed pure, strong and correct. Second, we should study and learn everything possible about the breed. Third, the dogs used for breeding must be objectively evaluated and must conform as closely as possible to the standard for the breed. Fourth, the dogs used for breeding must be in excellent health, free of hereditary defects and have an excellent temperament. A fifth consideration is your commitment to the puppies; raising dogs is a time-consuming, demanding and expensive project.

The book has chapters on the anatomy of the reproductive system of the dog and bitch, the estrous cycle, mating and whelping, puppy problems, and infertility.

The author goes into considerable detail about the correct time for mating. The "heat" period lasts approximately eighteen days—nine days of proestrus and nine days of estrus, the period during which the bitch will allow mating. In most cases, a single mating four days before ovulation until three days after ovulation (usually the tenth to thirteenth day of heat) will result in an excellent chance of conception, assuming both the dog and bitch are fertile. However, proestrus may last for one or two days to fifteen days. It begins with the first appearance of a blood-tinged vaginal discharge and ends with the bitch's first acceptance of estrus. The period during which the bitch will allow mating may last for one or two days to several weeks. Ovulation occurs about the third day of estrus, and the puppies all will be the same age regardless of the number of matings and the number of days between matings. When the length of proestrus and estrus differ from the average, vaginal cytology and artificial insemination are helpful. Both are well-covered in the book. Record-keeping is essential. Every bitch has her own cycle. In many cases of suspected infertility, the problem is simply breeding at the wrong time.

The author discusses signs of trouble at whelping time, criteria for dystocia, what to do in case of trouble, and helping the newborn puppies. A healthy puppy is warm and will usually be quiet. Puppies are never really still while asleep. They are continuously jerking and twitching, stretching and shifting their position—this pattern is called "activated sleep."

Clear directions are given for dew-claw removal and feeding puppies by stomach tube. Instructions for tail-docking do not include a caution that breed standards must be considered: too much taken off can ruin a puppy for show purposes. Nails should be trimmed at least once a week starting with the very first week.

These brief excerpts from the book give the answers to frequently-asked questions. There is a wealth of information presented clearly and concisely. It comes very close to being "All You Need to Know About Canine Reproduction."

**Cold Weather Notes**

Antifreeze is very toxic to dogs. They seem to love it, and a very small amount can be fatal. Prompt veterinary attention is necessary if any is ingested.

Dogs kept in warm, usually overheated apartments, should wear a coat or sweater when they are taken out in windy, cold weather. This is advisable for any short-haired dog, especially toy breeds.

Most dogs may be kept outside in cold weather but they need a dry bed and protection from the wind. Avoid shifting between heated and unheated kennels. Different breeds have different requirements so there can be no general rule about how much heat and protection is necessary. All young puppies must be kept warm.

City dogs often walk on sidewalks which have been salted. It is advisable to wash their feet with warm water. Dry with a towel and check between the pads.

Regular grooming is a "must." Bathing usually will not be necessary if the dog is kept clean by brushing and combing. As a general rule, bathing should not be done routinely.

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**Haji's Treasure and Micki Bracken discharged**

Haji's Treasure and Micki Bracken, two Thoroughbreds which were injured in separate incidents at Pimlico in May, were discharged from New Bolton Center, the large animal facility of the University of Pennsylvania School of Veterinary Medicine.

Haji's Treasure had undergone emergency surgery after breaking down in the May 18 Preakness. A team of surgeons, led by Dr. David Nunamaker, removed shattered sesamoids in the horse's right foreleg and inserted a plate to fuse the flexed joint. Haji's Treasure was discharged in October and flown to California where he continues to recuperate.

Micki Bracken had suffered total disruption of the suspensory apparatus, complicated by the open nature of the compound wound, during the running of the Black-Eyed Susan Stakes on May 17. Dr. Nunamaker and a team of surgeons placed an external fixation device on the filly's leg. The device, developed at New Bolton Center, is used in severe breakdown injuries. It permits the animal to bear weight on the injured leg. Micki Bracken was discharged to an out­ farm for recuperation prior to vanning to Florida.

Mrs. Marie A. Moore at the luncheon given in her honor at VHUP on September 18, 1985. Seated to the right of University President Sheldon Hackney is Mrs. Anne Eldredge.
Advances in the Treatment of Aspergillosis

The environment is filled with microorganisms invisible to the naked eye. One of these is Aspergillus, an airborne fungus. Usually Aspergillus is harmless. It is inhaled and nothing happens. However, to individuals who are immunosuppressed because of an organ transplant, chemotherapy or disease, it can be lethal. Aspergillus also affects some dogs by causing an acute or chronic rhinitis. The first symptoms noticed usually are sneezing, nasal pain and a discharge which becomes more copious and purulent as the disease progresses. Often the animal will have nosebleeds which can be severe.

Aspergillus grows in the nose and the sinuses,” Dr. Sharp said. “It destroys the turbinates, a network of fine bones in the nose. If the infection occurs around a major bloodvessel in the nose, it weakens its wall and prolonged bleeding can result. Dogs can lose a lot of blood in this way.” He explained that in horses the organism can grow around the carotid artery as it lies in the gutteral pouch, which is an enlargement of the horse’s eustachian tube. “Horses have died to death in 10 to 15 minutes when the artery ruptures due to a weakening caused by the fungus.”

Aspergillus is not a common disease in dogs. “We don’t know why certain dogs get it.” Dr. Sharp said. “It appears that breeds with longer muzzles are more affected. In all the cases reported only one short-faced dog has been mentioned, a boxer. In addition, one bulldog with the disease has been seen at VHUP. All the other cases were in mesocephalic or dolichocephalic breeds.”

Canine aspergillosis, first described in 1955, is very difficult to treat. “Many of the early antifungal drugs were quite toxic,” explained Dr. Sharp. “The drugs currently available are only effective in less than half the cases treated.” Dr. Sharp, together with Dr. Colin E. Harvey and Dr. Joan A. O’Brien, professors of surgery and medicine at the School, are now investigating the efficacy of two new drugs. The hope is that...
Dr. Lawrence Soma (V’57), professor of anesthesia, received a grant from the Grayson Foundation to study “High frequency positive pressure ventilation in the horse.” The goal of the study is to develop more effective and efficient methods of delivering oxygen and removing carbon dioxide from horses under anesthesia and newborn foals in intensive care.

Eric Smith, a senior student, is the recipient of the Joseph S. A. Millar Memorial Scholarship awarded by the New Jersey Veterinary Education Foundation.

SmithKline Beckman Company dedicated Scheidy Laboratories, a new research facility honoring SmithKline’s longtime Veterinary Medical Director, Dr. Samuel Scheidy (V’29), in June at the company’s Applebrook Research Center near Philadelphia. Mrs. Hennette Scheidy, Dr. Scheidy’s widow, was honored guest at the dedication.

The Penn Animal Leash holder, designed by Dr. James Buchanan, professor of medicine (cardiology), has received patent number Des. 277,055, issued January 8, 1985. The PAL holder is one of the many unique features at VHUP. The holder, made of tempered stainless steel spring steels, can be used in daily use at VHUP without deformation. The device is easy to install. PAL holders are available with a donation of $10 (or 3/525). Make checks payable to VHUP Heart Fund—JB and send the order to Dr. J. Buchanan, VHUP, 3850 Spruce Street, Philadelphia, PA 19104-6010.

Robert Sigafous, the farrier at New Bolton Center, received a grant of $12,448.96 from Cyrus Rikel, Colorado Springs, CO, to develop a protective, supportive and cushioning boot for horses with laminitis, and the modification of this boot for other applications.

Dr. Barry Stupine, associate dean for administration, Small Animal Hospital, reported the results of a recent VHUP client survey conducted every three months. The group of clients, selected randomly, represent 5% of the total clients seen in a three-month period. They were contacted by phone and asked 23 questions. In more recent surveys, 97% made favorable responses to questions about VHUP, though 21% complained that they could not find the hospital. Barry Stupine hopes to have a more obvious sign at the Spruce Street entrance so that this problem can be eliminated.

Lawrence J. Gerson, V.M.D., has been named “Veterinarian of the Year” by the Pennsylvania Veterinary Medical Association during the Annual Meeting at Hollidays in Lancaster, Pa. Dr. Gerson is a 1975 graduate of the University of Pennsylvania School of Veterinary Medicine and serves as a Second Vice President on the School’s Veterinary Medical Alumni Society Executive Board. Dr. Gerson is also active in the Western Pennsylvania Veterinary Medical Association as well as other professional organizations.

these will prove to be more effective than two drugs previously studied by these researchers, giving in a recent study conducted by Dr. Harvey, it was shown that only 43% of the dogs treated for aspergillosis improved or were clinically normal six months after treatment. Dr. Harvey examined the records of the dogs lost to the disease at the School between 1978 and 1981. Follow-up information was obtained from the owners by telephone.

These dogs had received thiabendazole, an antifungal drug, orally for six weeks. In 26 animals, surgery had been performed to remove the affected turbinates. Of these, 19 were treated with nasal flushes of thiabendazole for a number of days. The nasal cavities of dogs not treated surgically were flushed with a water-diluted solution of povidone-iodine. Thiabendazole was administered daily to all dogs studied. There were side effects: 50% of the dogs had reduced appetite when the drug was first given; in 25%, vomiting or diarrhea was seen as well. When the drug was withdrawn and then gradually reintroduced, the side effects ceased in these animals.

Dr. Harvey discovered that, contrary to previously published reports, the combined regimen of surgery and drug therapy did not improve the results of treatment. He found that animals treated solely with the drug responded better. It is not known why this was the case; however, it may be possible that the debilitating and immunosuppressive effect of surgery and general anesthesia was responsible. It has been found that some dogs with aspergillosis have an abnormal immune system.

Dr. Sharp conducted a study at the University of Liverpool Veterinary School, examining the efficacy of ketonazole, a more recent antifungal drug. Fifteen dogs diagnosed with aspergillosis were treated with the drug, administered orally for up to 18 weeks. There were few side effects. Six months after treatment 47% of these dogs were free of symptoms. This success is similar to Dr. Harvey’s findings. “Ketonazole is useful treatment for canine nasal aspergillosis,” Dr. Sharp said, “but it is no more effective than thiabendazole.”

Dr. Sharp, Dr. Harvey, and Dr. O’Brien are now investigating the efficacy of fluconazole, a new antifungal oral medication. “The study is supported by the drug company, and we would like to see more dogs with aspergillosis,” he said.

Another drug being investigated by the researchers is enilconazole, a topical drug. “We used it at the University of Liverpool on five dogs and cured them,” he said. “Here it has been used on two dogs successfully.” It is a topical drug, and the dog’s nasal passages are flushed with it twice daily. For this treatment the dog should be hospitalized. A tube is inserted into the sinuses and left in place for two weeks. It would be difficult for the owner to handle the twice daily flushing. The drug enilconazole is promising, but we have to treat more cases to determine its real efficacy against Aspergillus.

Practitioners who suspect aspergillosis in a patient can send a blood sample to Dr. Sharp for the ELISA test. Once the disease is diagnosed, the animal could be included in the study. “Aspergillosis, while not a common disease, can be devastating because it is so difficult to treat,” said Dr. Sharp. “In the past, many dogs were euthanized as the disease progressed. We hope that our studies can identify a more effective drug and a better regimen.” Practitioners who have patients with the disease can contact Dr. Sharp, Dr. O’Brien, or Dr. Harvey at the School of Veterinary Medicine, University of Pennsylvania, 38th and Spruce Streets, Philadelphia, PA 19104-6010, for additional information about the research.

Dr. Sharp is an assistant professor in soft tissue surgery at the University of Liverpool. He is on a one-year leave of absence to do research and surgery here at the School.
Parenteral Nutrition for Critically Ill Calves

Many human lives would have been lost during the last 15 years had it not been for the development of parenteral nutrition for critically ill patients. Intravenous feeding is standard practice in human medicine, and it has been shown that long-term parenteral nutrition is feasible and does not cause major ill effects. Parenteral feeding of critically ill animals is not standard practice. Now researchers at New Bolton Center have used partial parenteral feeding of neonatal calves and foals with success. It all began Christmas Eve, 1982. "That night, seven critically ill, neonatal calves were admitted to the Intensive Care Unit at New Bolton Center," said Dr. Thomas J. Divers. "They had enteritis and were malnourished and required nutritional support in order to survive.

These calves were unable to tolerate adequate amounts of milk or milk replacer and had been fed predominantly an electrolyte solution the previous five days. "We administered a solution of dextrose and amino acids intravenously," Dr. Divers explained. "The calves were kept on this for periods ranging from 3 to 14 days. In addition, they received small amounts of milk to provide additional calories and vital micronutrients such as vitamins and minerals. "We really don't know enough about the micronutritional and vitamin requirements of sick calves. We will therefore continue to feed some milk to these calves until more is known about their requirements and appropriate substitution is made to the parenteral nutrition."

Since that December night, more than 30 calves with enteritis and other life-threatening diseases have come to New Bolton with good success. Enteritis, a common problem in calves, affects about 10 to 20% of the newborn animals. The infection, most frequently caused by Escheria coli, Rotavirus, Coronavirus or Cryptosporidium, results in diarrhea, dehydration and rapid weight loss. As neonatal calves have very little energy reserves, the enteritis can result in starvation. "Normally the sick calf is fed milk, milk replacer and electrolyte solution," Dr. Divers said. "However, there is a percentage of animals that cannot tolerate normal amounts of milk or milk replacer during a bout with enteritis. The electrolyte solution alone may keep the animal hydrated, but it does not meet the energy requirements of the sick calf. These animals can starve to death despite having adequate hydration. It is this type of case that is often admitted to our neonatal unit and placed on parenteral nutrition."

To better meet the nutritional requirements of the critically ill, neonatal calves, Dr. Divers and his colleagues, Dr. Thomas O. Hansen, Dr. Raymond Sweeney and Dr. David Galligan, recently added lipids to the intravenous feedings. "Lipids provide greater calorie density and can meet the energy requirements of the calf better," said Dr. Divers. "If only dextrose and amino acids are given, the amino acids might be utilized to meet energy requirements rather than the needs for growth and weight gain. With the addition of lipids to our parenteral nutrition formula, we can now provide adequate amounts of energy and protein to the critically ill calf. These calves usually gain weight in spite of having a life threatening disease and being fed only a small percentage of the daily milk requirements."

Very little information exists about the nutritional requirements of sick calves. "We know the needs of a healthy animal, but we don't really know the metabolic needs of a sick calf. To get a better understanding we are now conducting a study," Dr. Divers said. Blood is drawn daily from calves on parenteral nutrition, and the samples are sent to a supportive company, a manufacturer of intravenous solutions, "Travenol Laboratories has the sophisticated equipment necessary to analyze these samples, and from these analyses we hope to gain an insight into the nutritional needs of critically ill calves."

While further studies are necessary, the work done so far at New Bolton Center has shown that partial parenteral feeding of critically ill calves is a valuable method of treatment. Greater than 80% of the calves that have received parenteral nutrition have survived. It is also a method which can be used by the veterinarian in the field. "These feeding solutions are readily available as a human product," said Dr. Divers. "A catheter is inserted in the jugular vein, and it can remain there for three days. The fluid containers with the PN can be easily suspended in the stall, and with the use of administration sets, the flow rates can be controlled. All that has to be done is to change the solution bottles every 12 hours, and the dairyman can do that."

He pointed out that the commonly encountered complication of thrombosis, seen in foals which need a long-term intravenous treatment, is not seen in calves. "We don't know why this is so, but calves do not require the deep vein catheterization foals need."

Dr. Divers explained that partial parenteral nutrition is used primarily for valuable calves as the treatment is not inexpensive. The patients at New Bolton Center have been mostly embryo transfer calves, which have a greater value. "These animals, even though they are just a few days old, are valued from $2,000 up to one half million. Breeders are willing to spend the money to save these animals."

Recently partial parenteral nutrition has been used in foals at the neonatal unit. So far, six foals have been treated and one, a botulism case, was fed intravenously for 20 days. It recovered. "We hope that the research will yield more detailed information about the nutritional requirements of sick neonatal calves." Dr. Divers said. "Our work has shown that partial parenteral nutrition is a valuable form of treatment for critically ill, neonatal calves and foals."

Dr. Divers is associate professor of medicine at the University of Pennsylvania School of Veterinary Medicine. Currently, he is acting head of the Section of Medicine, New Bolton Center. Dr. Richard Divers is an instructor in nutrition at New Bolton Center. Dr. Hansen is a resident in medicine there, and Dr. Galligan is an instructor in nutrition at New Bolton Center.

AKC Funds Canine Genetic Disease Information System

Through the support of the American Kennel Club, a Canine Genetic Disease Information System is being established here at the School by Dr. Donald F. Patterson and his colleagues in the Section of Medical Genetics. "As the number and variety of genetic disorders known or suspected to occur in the dog have continued to increase, it has become apparent that the rapidly expanding body of available information cannot be efficiently organized, kept up to date month-by-month, and made available to breeders, dog breed clubs and veterinarians by any system we now use," said Dr. Donald F. Patterson. "Needed is a computerized system which will enable the user to gain access to all of the currently available information. When this System is operational it will have a number of important benefits to the dog world. It will create a truly comprehensive source of information to help recognize genetic diseases that occur in each of the breeds. It will enable breed clubs to keep track of known and suspected genetic disorders in their breeds. In addition, the System will provide current information regarding diagnostic criteria, modes of inheritance and tests for the recognition of carriers. And, it will assist breeders and veterinarians in developing programs to reduce the frequency of genetic diseases in the purebred dog."

It will be three years before the System is fully operational. The task is huge, since the computer program must be developed, a literature search conducted, and the information stored in the computer. The System will eventually contain all published information obtained from veterinary institutions and breed organizations. Once the information base is established, it will be kept current and it will be possible to get up-to-date information on genetic diseases in any breed.
Dr. Charles W. Raker Retires—A Tribute

Dr. Charles W. Raker joined the faculty of the Veterinary School in 1950 as assistant professor of veterinary medicine at the invitation of Dr. John D. Beck, then professor of medicine. Charlie graduated in 1942 and for the next eight years he was engaged in practice.

In 1950, Bolton Farm, located in Bucks County, was still in existence, and Dr. Raker became director of this facility. New Bolton Center was acquired in 1952, and at this time Dr. Raker began his distinguished career in equine surgery when he was appointed assistant professor of surgery and head of the Large Animal Clinic. Dr. Raker became professor of surgery in 1957, and in 1958 he received a joint appointment as professor of comparative surgery in the Graduate School of Medicine, University of Pennsylvania. Charlie served as chief, Section of Surgery, from 1962 until 1975.

In 1967, Dr. Raker received a signal honor when he was named the Lawrence Baker Sheppard Professor of Surgery. This was the first endowed chair in any veterinary school in the United States. Mr. Lawrence Sheppard, who endowed the chair, was the owner of Hanover Shoe Farms, Inc., one of the top thoroughbred establishments for Standardbred horses in the world.

Dr. Raker is a founding diplomate and charter member of the American College of Veterinary Surgeons and served as president of this group in 1975. His outstanding contributions as a teacher have been recognized through the Norden Distinguished Teaching Award in 1965 and the prestigious Lindback Award by the University of Pennsylvania in 1977. In 1967, he was named Veterinarian of the Year by the Pennsylvania Veterinary Medical Association.

These and other tributes reflect the high place which Charlie Raker came to occupy in the professional and academic communities, but perhaps no honor is greater than the esteem in which he is held by his colleagues in the Veterinary School. In 1976, when Dr. Raker relinquished his position as Chief of Large Animal Surgery, Dean Robert R. Marshak commented that "the magnitude of change in the sweep and sophistication of horse surgery gained in the past two decades can probably be appreciated only by those privileged to have worked in close association with Dr. Raker, Dr. Jacques Jenny, and their small group of disciples."

Marshak characterized Charlie by saying, "his physical stamina was matched by an exceptional surgical talent, a keen intellect and a strong aversion to sloth or procrastination in students and staff."

Without question, Dr. Raker was a key individual in the development of New Bolton Center as one of the top facilities for equine surgery in the world. From his pioneering work with Jacques Jenny on orthopedic surgery to his more recent interest in the medical and surgical treatment of respiratory diseases in horses, Charlie has been a leader, not only in his fields of work but as a person. One need only to talk with him briefly to perceive his warm feelings and sincere pleasure in being part of the career development of young people—students, residents and interns. Upon his retirement he was deeply touched by receiving a case of 14 bottles of California wine (each different!) from 14 California veterinarians who had passed through his department as residents and interns.

In today's era of great specialization, it is refreshing to hear someone of Dr. Raker's caliber say, "I like to teach."

Charlie is very proud of New Bolton Center and when asked about those things which impressed him most in the growth of the Center, he quickly mentioned the impressive record of the Medicine Section under Dr. Robert Whitlock. Dr. David Nunamaker's orthopedic work and equine colic surgery also came in for high praise.

On October 4, 1985, Dr. Raker was honored by a full-day symposium, entitled "A Tribute to Dr. Charles W. Raker," at the Museum of the University of Pennsylvania. Many of those who spoke were former students of Charlie Raker, and much of the program was devoted to fields of work developed by him.

At dinner following the symposium, Dean Marshak described Dr. Raker as "one of the most admired and looked-up-to teachers of his generation. To his students he is a conscientious, acute, sympathetic and stimulating teacher. He never allowed himself to intimidate or pillory the weaker among them or ignore them, or to treat them with disdain. He is attached to his students and follows their subsequent careers with great interest and sympathy."

In further remarks Dr. Marshak stated that "when he lectures there appears to be nothing between him and the subject of his exposition or criticism... in clinical rounds he speaks his mind with candor and precision and with a great natural courtesy that is an essential attribute of his character... he is a just man who has made his example and his influence dominant in his generation."

Upon reflection, Dr. Raker says that one of the great pleasures in his work was the opportunity "to meet so many nice people at all levels." We in turn have been privileged to have known and worked with such a nice human being as Dr. Raker!

John E. Martin, V.M.D.

A different operation at New Bolton. Hollywood comes to film for Ripley's Believe It Or Not.

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Medical Genetics
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Malformations of the rear legs. Most are congenital malformation syndrome in shi tzus.

As diagnostic techniques become more sophisticated, the number of genetic diseases discovered will increase. Dr. Patterson pointed out that when pregnant animals are exposed to environmental agents called teratogens, the offspring may have congenital defects that resemble genetically determined abnormalities. Teratogens include radiation and certain chemicals. For example, it is known that cats which eat the plant veratum during a particular stage of pregnancy will give birth to cyclopinian lambs.

One of the more common forms of sexual abnormalities can be due to exposure of the fetus to androgenic steroids. Sometimes it is difficult to determine whether a defect is primarily genetic in origin or is due to environmental teratogens. In these cases, research into the structure of the chromosome, the pedigrees of the affected animals, and specialized biochemical tests may provide the answer.

The researchers in the Section are also studying chromosomal abnormalities. The cytogenetics laboratory has defined the normal Giemsa banding pattern of dog chromosomes, and this has aided in the identification and characterization of hereditary defects in the sexual development found in American cocker spaniels and miniature schnauzers. These and other defects in the development of the reproductive tract are being studied by Dr. Vekki Meyers-Wallen and other members of the Section of Medical Genetics.

Dr. Meyers-Wallen is investigating sex reversal in cocker spaniels and Persistent Mullerian Duct Syndrome in miniature schnauzers. A cocker spaniel with the disorder looks like an abnormal male or female, having undescended testes or oovestes (a combination of ovary and testes) and a vulva-like structure. The chromosome constitution of such dogs is like that of a female; 78,XX. Miniature schnauzers with Persistent Mullerian Duct Syndrome appear like normal males, though they are cryptorchid. Internally these animals have a uterus. Their chromosome constitution is 78,XY and rarely 79,XXY.

In normal development the testes of the embryo produces Mullerian inhibiting substance (MIS), which inhibits the development of a uterus or oviducts in a male fetus. It is thought that these defects are a result of MIS deficiency or refractory response to MIS by Mullerian structures (oviducts and uterus) during embryonic development.

Dr. Meyers-Wallen is studying whether the Mullerian duct persistence is associated with deficiency of MIS or whether the gene mutations responsible for these two defects in Mullerian duct regression are autosomal or x-linked. Sex reversal has been described in other animals and humans. So far, the miniature schnauzer is the only breed described that closely resembles the Persistent Mullerian Duct Syndrome in humans. Investigation of these problems in dogs will lead to a better understanding of the disorder and may lead to methods of prevention in humans and dogs.

In 1983 the Inherited Eye Disease Unit (IEDSU) was established within the Section of Medical Genetics. "This is a clinic devoted to inherited eye disorders in all animal species," said Dr. Gustavo D. Aguirre, associate professor of ophthalmology and head of the IEDSU.

The unit provides clinical examinations and genetic counseling pertaining to eye disorders. Dr. Aguirre and his colleagues have developed diagnostic methods through which dogs with inherited eye disorders can be identified early in life. "The ophthalmological manifestations of these diseases vary from breed to breed," Dr. Aguirre said. "Many do not become evident through ophthalmic examination until later in life. Often the animal has already been used for breeding." By means of an electroretinogram (ERG), the researchers at the School can detect PRA in certain breeds long before the disease can be detected in any other examination. If the animal can be screened prior to becoming a breeding, the disease can be controlled.

In addition to the eye clinic, the Section of Medical Genetics also offers clinics in pediatrics, reproduction and genetic problems. "In our pediatric clinic we see not only young animals for routine examination but also animals with severe problems," said Dr. Jezyk. "Many of the genetic diseases do not manifest themselves until the animal is over six months old." If an animal is identified as having genetic disease, often counseling with the breeder takes place to determine where the disorder originated. "We do genetic counseling," said Dr. Jezyk. "Often we can identify a carrier and then can advise the breeder about steps to take to eliminate the disorder from the breeding program." Recently the National Institutes of Health designated the Section of Medical Genetics as the National Reference Center for Animal Models of Human Genetic Disease.

Many of the genetic diseases found in companion animals provide valuable models for these same diseases in humans. Through their research, the members of the Section of Medical Genetics hope to unravel the mysteries of the causes and control of genetic diseases in animals, but also find new ways, in many cases, of approaching genetic diseases in man.

Donation by the Kennel Club of Philadelphia

William L. Kendrick, president of the Kennel Club of Philadelphia, announced a $12,000 donation to the University of Pennsylvania School of Veterinary Medicine. "We greatly appreciate this generous donation by the Kennel Club of Philadelphia," said Dean Robert R. Marshak. "It will enable us to help relieve the financial distress of some of our students, as $6,000 will be placed in the scholarship fund to be used for student financial aid. The balance will be utilized to purchase a gastroduodenoscope and an observscope, instruments much needed for the diagnosis and study of gastrointestinal diseases.

This gift by the Kennel Club of Philadelphia represents the largest contribution ever received by the School from an all-breed club.

GME Seminar

Granulomatous meningo-encephalitis (GME) will be the topic of a lecture series on May 25, 1985, in Washington, D.C. The lectures, part of the neurology program held under the auspices of the American College of Veterinary Internal Medicine Fourth Annual Forum, are being organized by Dr. Sheldon Steinberg, who is also chairman of the neurology meeting. "Mr. Gilbert Kahn, through the Charing Cross Research Fund, is supporting research into various aspects of GME," said Dr. Steinberg. "He has provided funds which enable us to assemble leading researchers into this disorder for the session in Washington."

The four speakers will be Dr. John Y. McGrath, professor of pathology at the University of Pennsylvania School of Veterinary Medicine; Dr. Kyle G. Braund, Scott-Ritchey Laboratories, Auburn University; Dr. Robert J. Higgins, Department of Veterinary Medical Pathology, School of Veterinary Medicine, University of California, Davis; Dr. Mark Vandervelede, Institute for Comparative Neurology, University of Berne, Switzerland.

Funding for Agricultural Research

The School of Veterinary Medicine has received a grant totaling $87,590 in funds for research projects at New Bolton Center. The funded projects are as follows:

• Economic Data Envelopment Analysis of Veterinary and Nutritional Services to Dairy Herds
• Serological Identification of Swine Herds with Trichomoniasis by ELISA, as a Basis for Control
• Shipping Fever in Feeders Calves
• Reproductive Failure in the Pig

Many of the genetic diseases found in companion animals provide valuable models for these same diseases in humans. Through their research, the members of the Section of Medical Genetics hope to unravel the mysteries of the causes and control of genetic diseases in animals, but also find new ways, in many cases, of approaching genetic diseases in man. H. W.
The Dean Abroad

Dean Robert R. Marshak was presented to HRH The Duke of Edinburgh on the occasion of the unveiling of Adrian Jones' statuary group, "Duncan's Horses," at the Royal Veterinary College, North Mymms, Herts., England. A maquette of the statuary group was presented to the School during the Centennial Celebration last year.

While in England, Dr. and Mrs. Marshak visited Dr. J. Alfred Wight, better known as James Herriot, and toured the Yorkshire countryside and the clinic made famous by Herriot's books. Dean Marshak also presented Dr. Wight with the Centennial Medal of the School for his contributions to veterinary medicine.

The Dean and Mrs. Marshak then travelled to Israel to visit the new veterinary school at Hebrew University. Here, Dr. Marshak presented the Centennial Award to Dr. Jonathan Adler (V'54) and Dr. Uri Bargai (V'59), who could not attend the awards presentation last year.

Reactivated Grief and Stress in Owners When Their Pet Dies

Recent research concerning the relationships between people and their pets has established that many owners perceive their animals to be like members of the family. Consequently, the lives of these owners tend to be structured around and intertwined with the needs and welfare of their pets. Pets influence what their owners do and how they feel.

The Social Work Service at the VHUP, which helps owners cope with their difficulties during the critical illness, death or euthanasia of a special pet, recently studied how the loss of a pet affects the lives of owners. The cases of 196 owners were reviewed to examine how often and how much other life stresses influenced owner's feelings and behaviors during illness or death of their pet. Ninety-nine of these owners indicated that their pet's medical problem or death had caused them to recall and struggle with other recent illnesses and deaths of family members and friends.

Seventeen owners talked about a parent's death, ten about the death of a spouse, six about friends and siblings, and eight about the death of another pet. One-half of these owners mentioned that their pet's death added additional stress to other difficulties presently occurring in their lives. Some of the specific stresses were: eleven owners being ill themselves and reflecting on their own future through the illness or death of their pet; twenty-two owners were dealing concurrently with critically ill parents, children, spouses or friends. A number of other owners mentioned marital and monetary difficulties.

Perhaps the clearest way to explain how a pet's death becomes a part of other family stresses is by relating the following experience of Mr. and Mrs. E. Their 15-year-old dog had been referred for surgery. However, cancer had reached the point where treatment was not feasible and the pet was beginning to suffer. As the E's struggled with the decision about euthanasia, Mrs. E. mentioned how she had cared for her mother who had died from cancer. Mrs. E. said she had "known" when her mother was suffering too much and had prayed for death to come; it came shortly thereafter. Many of the same sad and upsetting feelings were surfacing during her dog's illness, yet she said she didn't yet have that "feeling" the time was right. Mrs. E. associated her pet's illness and pending death with her mother's illness and death. In effect, she relived her mother's death while anticipating the death of a special pet. Clearly these similar experiences, while not the same in meaning, elicited the same responses, and the earlier death influenced and exacerbated the grieving for her pet.

This brief, descriptive study suggested several things. First, a pet's illness and death appears to generate the same type of emotional thoughts and feelings that human death produces. Secondly, when owners have had experiences with human illness and death, they appear likely to associate these events with illness and death of their pets. The result may be that not only do these owners grieve for their pets, but they also grieve once more for deaths in the past. The resulting "double grief" phenomenon can make a pet's death a troublesome and difficult emotional experience.

Helaine Grevenberg, M.S.W.
Alumni Annual Giving

Alumni Annual Giving is off to a fine start with Dr. Charles Raker as the 1985-1986 chairman. Although recently retired from the faculty, Dr. Raker's concern for the well of students, alumni, and animals remains strong. This year alumni contributions can be designated for specific areas: NEW BOLTON CENTER, THE SMALL ANIMAL HOSPITAL, or THE SCHOOL. Gifts may also be contributed in HONOR OF or in MEMORY OF an individual (or animal) of your choice.

Now is the perfect time to make that year-end gift. All contributions are tax-deductible to the extent allowable by law. And you'll receive more than just a "Thank You" with gifts of $250 and above. The following chart indicates the complimentary continuing education courses and alumni events available to those whose generous contributions are the mainstay of Alumni Annual Giving.

For further information on Veterinary Alumni Annual Giving, Alumni Relations, or Continuing Education, please contact:
Ashra Markowitz
University of Pennsylvania School of Veterinary Medicine
3800 Spruce Street
Philadelphia, Pa. 19104-6010

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All Contributions benefit Veterinary Alumni de novo to the School of Veterinary Medicine. The University of Pennsylvania alumni offer additional benefits to those who give to the Benjamin Franklin Society.

Second Century Fund Report

During the fiscal year, ending June 30, 1985, the Second Century Fund Campaign raised $5.6 million, bringing the Fund to $20.2 million. Among the gifts received during that period were:

- Endowment of the Marie A. Moore Chair in Humane Ethics and Animal Welfare.
- Completion of funding for the Marilyn M. Simpson Professorship in Equine Medicine.
- Partial funding to endow the Charles W. Raker Professorship in Surgery in recognition of Dr. Raker's retirement and distinguished career as Lawrence Baker Sheppard, Professor of Surgery.
- Support of $25,000 each from the Beech Fund (NY) and the Gelb Foundation for the sports medicine program at New Bolton Center.
- A commitment of $250,000 from Windfields Farm Maryland for various equine programs at New Bolton Center.
- A bequest of $50,000 from the Estate of Sara Montgomery for student aid.
- A bequest of $250,000 from the Estate of Judith San for a fellowship in research in diseases of dogs, assigned to Medical Genetics, and our first endowed, named research fellowship.
- A gift of $30,000 of cages and related equipment for Laboratory Animal Medicine.

is Dr. William H. Miller, Jr., assistant professor of dermatology.

Saturday, May 17, 1986, marks ALUMNI DAY on the PHILADELPHIA CAMPUS; our annual business meeting, a terrific buffet luncheon, special entertainment, tours of the Small Animal Hospital, and trip to Old Philadelphia will keep you busy all afternoon. The evening festivities will include a reunion dinner for all veterinary alumni and dancing until dawn at the Franklin Plaza Hotel in Center City Philadelphia. Transportation will be available from the hotel to the School. Mark the date on your calendar today!

Dave Meigs, President of the Veterinary Medical Alumni Society asks, "Have you returned your class newsletter information yet?" You can span the years in just a few minutes by completing your questionnaire and returning it to the Alumni Office. Class newsletters will be published during the month of February. Don't miss the opportunity to let your classmates know how you have fared.

Continuing Education

Dr. Tom Divers and Dr. Charles Newton have planned a solid, practitioner-oriented, professional continuing education program for 1986.

The New Year begins with the PENN ANNUAL CONFERENCE. Five-fundraised practitioners from the mid-Atlantic region attended last year’s Conference, and we hope you will be among those to join us again this year.

Date: Wednesday, January 29, and Thursday, January 30, 1986.

Place: Adam’s Mark Hotel, City Line and Monument Avenue, Philadelphia.

Two laboratories will be held in conjunction with the Conference.

Small Animal Surgical Diseases of the Colon, Rectum and Perineal Area—Dr. Dudley E. Johnston.


Wednesday, January 29, and Thursday, January 30, 1986

Wednesday, January 29—Small Animal
9:15 a.m.—12:00 a.m.
Mark Opperman/Marketing in Veterinary Medicine

10:00 a.m.—10:30 a.m.
Stephen Katz—Pet Insurance

11:00 a.m.—12:00 noon
Robert S. Brodie Memorial Lecture: Ronald R. Keiper, Ph.D. The Biology of the Assateague Ponies

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Dr. Keiper will describe the behavior, ecology, and social organizations of the Feral Ponies of Assateague Island. The presentation will highlight interaction with other animals, population dynamics, reproduction rates, effects on the environment and interaction with humans.

Mark Opperman/Practice Management 2:00 p.m. - 5:00 p.m.

Walter Woolf/Animal Transport 2:00 p.m. - 5:00 p.m.

Steven Arnoczky/Canine Stifle Surgery 2:00 p.m. - 5:00 p.m.

Geraldine Kaufmann/Supportive Care of the Critical Animal with a Viral Infection 2:00 p.m. - 5:00 p.m.

Susan Johnson/Gastrointestinal Topics: 1) Diarrhea 2) Liver Disease

Thursday, January 30—Small Animal 9:00 a.m. - 12:00 noon

Eileen White/Women in Veterinary Medicine 9:00 a.m. - 12:00 noon

Dennis Chew/Disorders of Fluid Balance 9:00 a.m. - 12:00 noon

Bonnie Dalzell/Abnormal Locomotion in German Shepherd Dogs with Connective Tissue Laxity 9:00 a.m. - 12:00 noon

Carl Kirkpatrick/Small Animal Radiology 9:00 a.m. - 12:00 noon

Douglas Maclntire/Caroline Prymak/Emergency Evaluation of Gastric Torsion/ Volvulus 2:00 p.m. - 5:00 p.m.

Dudley Johnston/Surgical Diseases of the Colon, Rectum and Perineal Area 2:00 p.m. - 5:00 p.m.

Colin Harvey/Oral and Dental Diseases in the Cat 2:00 p.m. - 5:00 p.m.

Robert H. Whitlock Named First Simpson Professor

Dr. Robert H. Whitlock of the University of Pennsylvania School of Veterinary Medicine has been named to the School's newly created Marilyn M. Simpson Chair in Equine Medicine. Whitlock, chief of the Large Animal Medicine section in the department of clinical studies at the School's New Bolton Center, is known for his research on metabolic and gastroenterologic problems in horses and dairy cattle. The chair was created with a $1.25-million gift from the Marilyn M. Simpson Charitable Trust, with contributions from members of the Rockefeller family. Before her death, Mrs. Simpson of Katonah, N.Y., daughter of the late Abby Rockefeller Muñoz, helped establish the Center for the Interaction of Animals and Society at Penn's Veterinary School in 1977.

"It's a double honor and pleasure to announce at the same time the Marilyn M. Simpson Chair and the appointment of Dr. Whitlock as its first holder," said Dr. Robert Marshall, dean of the School of Veterinary Medicine. "Mrs. Simpson was intensely interested in equine medicine, research and treatment. She wanted this work to be of the highest caliber and visited our campus many times to see for herself the advances being made. It's very appropriate that her long-time interest in equine medicine will be carried forth here through the establishment of this chair bearing her name."

The appointment of Dr. Whitlock, he said, "adds further significance to the Simpson Chair.

2:00 p.m. - 5:00 p.m.


2:00 p.m. - 5:00 p.m.

Victoria Voith/Feline Behavior

2:00 p.m. - 5:00 p.m.

George Farnbach/Epilepsy: A Second Look

Wednesday, January 29—Large Animal 9:15 a.m. - 12:00 noon

Ian George Mayhew/Equine Neurology 9:15 a.m. - 12:00 noon


12:00 noon - 2:00 p.m.

Jill Beech/Thomas Divers/Corinne Sweeney/Equine Antimicrobial Therapy 2:00 p.m. - 3:15 p.m.

Dearh Dickson/Arthroscopic Surgery 3:15 p.m. - 5:00 p.m.

James Orsini/Radiology Panel: An Equine Film Reading Session

2:00 p.m. - 5:00 p.m.

William Reblin/Bovine Infectious Respiratory Problems

Thursday, January 30—Large Animal 9:00 a.m. - 5:00 p.m.

Full Day Continuing Education Course: Equine Reproduction

Note: *This Equine Reproduction program is a complete, 8-hour, Professional Continuing Education course. The $75 Penn Annual Conference registration fee does not qualify for admission to this seminar. A registration fee of $150 entitles you to:

1) Complimentary Penn Annual Conference registration on Wednesday and Thursday
2) Course Admission on Thursday
3) Lunch on Thursday
4) Full Day Continuing Education Course: Equine Reproduction

9:00 a.m. - 12:00 noon

Douglas Byard/Foal Diseases

9:00 a.m. - 12:00 noon

Clive Gay/Food Animal—Trace Element Problems in Ruminants

2:00 p.m. - 5:00 p.m.

Ray Sweeney/Thomas Divers/Lawrence Hutchinson/Herd Investigation and Clinical Research Presentation

Intensive one-day seminars for the small animal practitioner are planned through the Spring.

Surgical Approaches to the Bones and Joints of Dogs—A Laboratory: Dr. Charles Newton—Wednesday, February 19, 1986.


Small Animal Radiology—Lecture and Film Reading Session: Drs. Darrell Biery, W. Harker Rhodes, and Jeffrey Wortman—Wednesday, June 5, 1986.

The Nutrition Department at New Bolton Center will present a seminar on "Nutritional Interactions with Productivity and Health of Dairy Cows" on Wednesday, May 28, 1986, at New Bolton Center.

Robert H. Whitlock has written extensively on chronic gastroenterologic problems which pose a perplexing diagnostic problem and are difficult to treat. He is also known for his studies of botulism and salmonellosis in horses and for his extensive search for the cause and cure of Potomac Horse Fever.

Whitlock received his D.V.M. in 1965 and his Ph.D. in 1970 from Cornell University. He is a member of the American Academy of Veterinary Pharmacology and Therapeutics and the Animal Health Advisory Committee for the Pennsylvania Department of Agriculture.

His studies have contributed to the New Bolton Center's international reputation for excellence in equine medicine. Since the founding of the center in 1952, there has been a major thrust to provide in a rural area—as an adjunct to the facilities of a metropolitan medical and research complex—a campus where students, teachers and research scientists could focus on the health and productivity of our large animal populations. "The New Bolton Center is located in Chester County, 30 miles south of the University's main campus in downtown Philadelphia. "It's a tremendous honor and challenge to be chosen as the first person to fill the Simpson Chair," said Dr. Whitlock. "I will pursue my research with added energy and sense of responsibility to equine medicine."

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IEDSU receives grant

The Inherited Eye Disease Studies Unit at the University of Pennsylvania School of Veterinary Medicine received a $50,000 grant from the Frances V. R. Seebe Trust through the efforts of the Canine Eye Registration Foundation, Inc. (CERF) and Mrs. R. Kenton Musgrave, a poodle breeder. "These funds are to be used by the Inherited Eye Disease Studies Unit of the Section of Medical Genetics exclusively for research into the diagnosis, cause and cure of eye diseases," said R. Kemon Musgrave, a representative of the trust. "And specifically, to investigate the problem of progressive retinal atrophy, with emphasis on early detection of PRA, both in affected animals and in non-symptomatic carriers of the disease."

CERF, a non-profit, tax-exempt foundation, functions as a registry for clear-eyed dogs and serves as a center for the accumulation of vital statistics on both normal dogs, and dogs with hereditary eye disease, according to breed and disease. "There is a great need for means of identifying carriers, particularly for the late developing types of PRA," said Mrs. Dolly Trauner, secretary-treasurer of the organization. "CERF has established an auxiliary committee which is actively engaged in raising funds for research into carrier identification. The committee is chaired by Mrs. Bernie Dolen. These funds are being raised for the IEDSU so that Dr. Aguirre and his colleagues can continue their work toward the end of carrier identification for PRA." The organization already has raised some funds and is actively engaged in contacting the breed clubs of the 79 breeds known to have forms of PRA. "It will take a great deal of money and research to find a test to identify the carriers before they become part of the breeding pool," said Mrs. Trauner. "But it is so important to identify these dogs."

"The grant received from the Frances V. R. Seebe Trust will greatly help us in our studies to provide new methods of early diagnosis of affected animals," said Dr. Gustavo Aguirre, director of IEDSU. "More importantly, it will enable us to develop alternate methods for identification of carrier animals."

Calendar

| January 25 | 16th Annual Symposium, Your Veterinarian and Your Dog |
| January 29 & 30 | Penn Annual Conference |
| February 19 | Surgical Approaches to the Bones and Joints of Dogs, Continuing Education program, VHUP |
| March 22 | 9th Annual Feline Fanciers Symposium |
| April 16 | Current Topics in Small Animal Nephrology, Continuing Education program, VHUP |

Bellwether

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