Computer Program Reduces Feed Costs

"If we cut our expenses by one penny per cow per day, we can save $1,500 a year," said Sam Shotzberger, manager of Landhope Farm in Kennett Square, PA. Actually, Shotzberger has been able to save a lot more, thanks to the Production Medicine Services offered by the University of Pennsylvania's Center for Animal Health and Productivity at the Veterinary School's New Bolton Center campus.

"Fifty to 60 percent of the value of milk is in feed costs," said Drs. David Galligan and James Ferguson of the Section of Animal Health Economics and Nutrition. "And as the price of milk drops, keeping the feed costs in line becomes more critical." Dr. Galligan, Dr. Ferguson and other colleagues of the Center have developed a number of computer programs that help producers make better decisions. One program, DAIR YLP, written in Lotus 1-2-3, allows precise calculations of nutritional value of rations, calculations of the cost if ingredients are changed or substituted, and formulation of the most economical feeding program to meet the nutritional requirements of a herd. The program takes into consideration the lactation stage of the various production groups within the herd, allowing to feed for optimal economic production. The spreadsheet is interactive, thus the veterinarian can assess different feeding programs and calculate costs rapidly.

Since utilizing the Production Medicine Services, supervised by Dr. Ferguson, Shotzberger has reduced the feed costs on his 400 cow herd by about $1,600 a month, about 15 percent. Milk production has gone up and the cows are healthier. The Landhope herd is kept in large open barns in separate groups, divided according to production. Cows receive a total mixed ration formulated according to each group's needs. A large shed holds mounds of cottonseed, soy meal, distiller's grains, Silage is stored near-by in trenches and the barn is used to store the minerals and other ingredients. Seven different components make up the ration and the farm personnel mixes 10 different rations daily for the various members of the herd. The farm uses approximately 20 tons of feed a month. Training the personnel to mix these rations properly is an important part of the successful implementation of the program. To that end, Dr. Ferguson has worked with Shotzberger and given brief presentations to the farm personnel on a routine basis. Various herd and management problems along with their potential solutions are discussed at these meetings.

At the farm of Steven L. Stoltzfus 40 cows are kept in an enclosed barn and a stanchion feeding system is used. The 14 draft horses are in stalls near-by. Stoltzfus, an Amish farmer, has been working with (continued on page 9)
**From the Dean**

Dear Friends:

The dust has finally settled on the State budget. The School of Veterinary Medicine was most fortunate in having the Governor’s recommended cut of some $6.9 million restored, but we did not obtain an increase over our fiscal year 1990-91 appropriation. While the restoration is good news, the lack of an adequate increase has forced us to further staff reductions by some 20 positions. Unfortunately, a continued lack of funding increases will shortly place the School in an untenable position.

I thank all of our readers who contacted the legislature and Governor’s office on our behalf. Your help plus that of our agricultural constituencies, alumni, students and their parents certainly provided an awareness of the School’s importance.

Included in this issue of the Bellwether are the summarized results of an important economic impact study. As you will see, the School of Veterinary Medicine represents far more to the Commonwealth of Pennsylvania than an intellectual resource. Our value to this great State and its citizens can be quantitated and defined in terms that everyone understands — dollars.

We are proud of our intellectual strength in research, teaching, and service, but we are equally proud of being a strong economic force throughout the State of Pennsylvania.

Sincerely,

Edwin J. Andrews, V.M.D., Ph.D.
Dean

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**Dedication of Bruce J. Heim Antique Furniture Collection**

The Bruce J. Heim Antique Furniture Collection was dedicated on June 21, 1991 at New Bolton Center. The tenant house there is home to the H. Scholarships Foundation, and board members Daniel Mullay, Hutton and Mr. Jim Cunningham.

The dedication was attended by Mrs. Barbara Pallet, Mr. Daniel Mullay, Dr. Barbara Vail, V’91 and Dr. Kirk Smith, V’91.

The Bruce J. Heim Antique Furniture Collection, designed and recreated for the New Bolton Center location by his long-time friend, Mr. Daniel Mullay, provides a permanent setting for the classic examples of English furniture.

New Bolton Center, synonymous with superb veterinary care for large animals, provides a fitting backdrop for this fine collection assembled by Bruce J. Heim’s home in Basking Ridge, New Jersey, were designed and recreated for the New Bolton Center location by his long-time friend, Mr. Daniel Mullay, to provide a permanent setting for the classic examples of English furniture.

New Bolton Center, synonymous with superb veterinary care for large animals, provides a fitting backdrop for this fine collection assembled by Bruce J. Heim, a man devoted to animals and deeply committed to furthering the education of young people. Mr. Heim endowed the first two Dean’s Scholarships at the Veterinary School.

The dedication was attended by Mrs. Barbara Pallet, executive director of the Bruce J. Heim Foundation, and board members Daniel Mullay, Jim Cunningham and Tom Hutton. Also present were two Bruce J. Heim Dean’s Scholars, Dr. Barbara Vail, V’91 and Dr. Kirk Smith, V’91.

**Charles S. Wolf Honored**

Charles S. Wolf, the chairman of the School’s Board of Overseers for 25 years and a trustee emeritus of the University, was awarded an honorary degree by the University. Following is the citation:

“A double alumus of the Wharton School, and a member of Penn’s basketball team in your student days, you went forth to conquer the world as a successful industrialist and community leader, and came home to stay when you were elected a Trustee of the University of Pennsylvania over twenty years ago, and harnessed to serve as Chairman of Overseers of the School of Veterinary Medicine.

Demanding of others no more than the hard work you put in yourself, you are an ideal boss as well as sought-after volunteer. Preferring involvement to standing on the sidelines, you nonetheless think long and hard before taking action, and your wise and inspirational leadership and analytical consideration have benefited three presidents as well as three deans at Penn. Believing that “free enterprise depends on free education,” with a voice that is heeded on the Commonwealth front, you have brought your sage and courtly counsel to bear in the State, as at the University of Pennsylvania. A pragmatic and successful man of business, you have long been an eloquent and heeded advocate for the liberal arts.

President and CEO of York Container Company, president of trustees of York College, past president and director of institutions in that locale from the orchestra to the YMCA, you are a fitting recipient of the Duke of York Award of the York Chamber of Commerce. Grateful to you for your spurring them to ever greater heights from the top of your particular hill - Mount Wolf - your colleagues and fellow Trustees at the University of Pennsylvania celebrate you, Charles Samuel Wolf, a friend trusted and true, and red and blue. Adding their acclaim for your magnificent generosity with your time and treasure, they take pride and pleasure in presenting you, along with warmest wishes on a significant birthday, with their medal and their preferment, the honorary degree, Doctor of Laws.”

From left to right: Mrs. Barbara Pallet, Mr. Daniel Mullay, Dr. Barbara Vail, Dr. Kirk Smith, Mr. Tom Hutton and Mr. Jim Cunningham.
IMPACT STUDY: Exploring the Role of the University of Pennsylvania School of Veterinary Medicine

A study by KPMG Peat Marwick concludes that the University of Pennsylvania's School of Veterinary Medicine contributes more than $1 billion and nearly 2,000 jobs to the Commonwealth's economy. These are the highlights of the study commissioned by the School as part of its long-range planning program. The study portrays the School as a major contributor to Pennsylvania's and the nation's agricultural and biomedical industries in three major areas:

- Manpower: through the training of highly qualified practitioners, specialists and biomedical scientists to meet present and future needs of the agriculture and biomedical industries; and through providing quality continuing education programs for practicing veterinarians.
- Economic development: by providing unique programs and outreach from the Center for Animal Health and Productivity; and by delivering highly sophisticated veterinary medical services.
- Research/technology transfer: by creating new knowledge through basic and applied biomedical research, including behavioral research, comparative medicine and public health.

KPMG Peat Marwick describes the School as a recognized world leader, not only in veterinary medicine and education, but in the furtherance of biomedical research. Its faculty are in demand as speakers at international conferences and their calibre is further recognized in the large number of endowed professorships at the School.

For more than a century, says the study, the School has led the way in improving the health, productivity, and economics of food-producing animals. It was the first to use tuberculin to control bovine disease; today, researchers are studying Johne's Disease and Salmonella enteritidis while others are developing recombinant vaccines against a multitude of animal diseases.

Ongoing research promises future benefits in the fields of biotechnology and aquaculture and in the prevention and treatment of diseases potentially affecting about 80 million Americans and having an estimated market value of $70 billion annually. "Such research breakthroughs will contribute to improved human health and prevention of disease," states the study.

The Commonwealth of Pennsylvania has historically recognized the importance of the Veterinary School to the agricultural industry in the State. It currently appropriates $15 million to support the teaching, research, diagnostic, and treatment activities of the School. This amounts to a third of the School's current operating budget, proportionately far less than state support to land-grant veterinary schools across the nation which receive up to 50 percent of their operating budgets from their states.

By almost any measure one chooses, the return on the State's investment is enormous. The following is a detailed breakdown of the economic impact of the Veterinary School on the economy of Pennsylvania.

The Veterinary School's Economic Impact on the Commonwealth

Total Impact

The School's impact of more than $1 billion on the economy of Pennsylvania is both direct and indirect. The direct impact is the total dollar value of school-related expenditures in specific geographic areas; the indirect impact is the additional spending and jobs created by the recycling of those original school-related expenditures in the economy.

Technology Transfer Impact: The School's teaching, research and service activities have a potential economic impact of $914 million in Pennsylvania.

- Enhanced income and expenditures: $104 million in US; $42 million in PA
- Food animal health and productivity: $18 billion potential in US; $714 million potential in PA
- New veterinary products: $14 million potential in US
- New Bolton Center services: $239 million in US; $153 million in PA

The direct expenditures shown here for the University of Pennsylvania School of Veterinary Medicine

Source
- School-related expenditures
- Teaching
- Research
- New Bolton Center Services

Impact in Pennsylvania
- $94M Income impact
- 1.913 Employment impact
- $42M impact
- $714M impact
- $156M impact
- Total: $1.008M income impact

Multiplier Effect: The total economic impact of the School-related expenditures is $93.5 million in Pennsylvania.

- Income Multiplier: $35.5 million in Philadelphia
- Employment Multiplier: 1.7189

Multiplied Effect Employment Multiplier
- Philadelphia: 1.7189
- United States: 3.2591

Technology Transfer Impact: The School's teaching, research and service activities have a potential economic impact of $914 million in Pennsylvania.
The Use of Animal Models Assists Researchers in Today’s Scientific Discovery

The use of animal models in biomedical research is critical for continued progress to combat disease and to discover new and better treatments for existing illness and conditions. The vast majority of scientists and researchers involved in medical exploration agree that without the use of animal models, major medical advances would not have been achieved nor would current research techniques be available.

To solve health problems, researchers must have scientific data that is relevant to the human condition. Data from human experiments is the most scientifically relative. But such experimentation, in many cases, is ethically unacceptable. Few people would offer themselves or a family member as the first subject of research to understand and cure diseases such as AIDS or Alzheimer’s. The U.S. Government requires that most safety testing be designed and based on results of animal experimentation and a knowledge of the history of the disease or condition under study. After humans, animals offer the most accurate means to assess human biological reactions and responses. Nonanimal research models are used in research labs across the country whenever possible. Biological models such as cell and tissue cultures, and nonbiological techniques such as mathematical and computer modeling, are used where appropriate. However, since these methods cannot mimic all the complicated interactions that occur in humans or animals, animal testing is still necessary. Knowledge gained from animal research has helped scientists develop many adjunct techniques that are reducing the numbers of animals required.

Impact Study continued from page 3

Activity Impact: Food production research reduces farmers’ losses and increases their output.

<table>
<thead>
<tr>
<th>Activity: Research Products:</th>
<th>Economic Impact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Supply</td>
<td>Prevention and treatment of diseases and disorders impairing the productivity of the food industry</td>
</tr>
<tr>
<td></td>
<td>$17.7 billion in losses can be avoided or productivity gained in the United States agriculture industry ($714.5 million in Pennsylvania)</td>
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</tbody>
</table>

Additionally, the research into marine animal medicine at Woods Hole, Massachusetts should have a significant impact on the growing aquaculture and biotechnology industries in the United States and in Pennsylvania.

Activity Impact: As a result of the School’s teaching activities, its alumni increase their earning power.

<table>
<thead>
<tr>
<th>Activity: Teaching Product:</th>
<th>Economic Impact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Products:</td>
<td>3,400 living VMDs able to earn an additional $30,892 per year on average (1356 VMDs in Pennsylvania)</td>
</tr>
<tr>
<td></td>
<td>Additional $104 million expended in the national economy per year, on average ($41.6 million in the Commonwealth of Pennsylvania)</td>
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</tbody>
</table>

Activity Impact: The School’s services offered through New Bolton Center treat over 24,700 large animals, reducing economic losses.

<table>
<thead>
<tr>
<th>Activity: Service Products:</th>
<th>Economic Impact:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nearly 8,700 horses, 14,300 cattle and 1,700 other valuable animals treated</td>
<td>Approximately $239.2 million in losses avoided annually (approximately $157.6 million in Pennsylvania)</td>
</tr>
</tbody>
</table>

Health Care Services to Large Animals

Future Potential Impact: The School is involved in activities which have not yet resulted in specific exportable products, but could potentially have a significant impact, such as:

- Many sources expect the School to be an important contributor to the biotechnology industry and the aquaculture industry, among others.
- The School's investigators are researching causes, prevention, and treatment for diseases that could potentially affect about 80 million animals.
- The estimated market for these treatments being researched is over $70 billion annually. Such research breakthroughs will contribute to improved human health and prevention of disease.

The Role of Animals in Current Research and Testing

Biomedical research with animals has four major goals:

- To provide biological knowledge upon which disease prevention can be based;
- To provide models for the study of naturally occurring diseases of humans and animals;
- To test potential therapies, diagnostic and surgical procedures, and medical devices;
- To study the safety and efficacy of new drugs or to determine the potential toxicity of chemicals to which animals will be exposed.

Researchers must understand the biology and physiology of higher organisms before they can make advances in the treatment and prevention of disease. Animal models provide information on the mechanisms of disease and an organism's own defensive response. Scientists study animal models for clues as to how the disease is transmitted and how genetic susceptibility and other factors may predispose an individual to disease. In the case of infectious disease, scientists attempt to isolate the disease-causing agent in the affected animals as the first step toward development of a vaccine.

Data from animal studies is essential before new therapeutic techniques and surgical procedures can be tested on patients. Researchers must use animal models to develop and refine techniques to determine if the techniques will achieve their purpose without risking harm to the patient. Animals are also essential to measure a drug's beneficial or harmful effects on organs and tissue. Moreover, data documenting efficacy and safety is required by the Food and Drug Administration (FDA) before a new drug is approved for testing in clinical trials on humans. Such testing remains the best predictor of adverse risks such as cancer, reproductive disorders and birth defects.

Two of the most controversial tests are the Lethal Dose 50 (LD50) and Draize tests. The LD50 test provides data on how toxic a substance is by determining the dose needed to kill 50 percent of a test group of rodents. The classical LD50 test using large numbers of animals is rarely used today. The maximum tolerable dose is important information for some cancer chemotherapeutic agents where the clinically effective dose is near the lethal dose. The doses that animals tolerate on an acute basis provide information for risk assessment and also determine doses for further studies. Many toxicologists believe that fewer animals can be used to achieve sufficient data, and work is being done to develop nonanimal methods.

There are two Draize tests: one for the eye and one for the skin. The Draize eye irritancy test measures how safely a substance is to the eye by putting drops of a substance on rabbits' eyes. While modifications of this test and alternatives are being explored, many scientists and the FDA believe that this is still one of the best predictors of the effects a chemical would have on the human eye. The skin test is performed in a similar fashion, by exposing a chemical substance to an animal's skin to measure possible irritancy.

Duplication and Validation of Research

Both government and private research institutions practice stringent review processes when approving research projects because of concern for the number of animals used and because of the cost of research. Experts review research proposals to measure the importance of a project, its scientific merit, the competence and the appropriateness of research models.

NIH, the major single source of funding for U.S. biomedical research, requires each grant application to include a bibliography of all relevant scientific literature to avoid unnecessary duplication of research. The cost of research plays a significant role in deciding appropriate ventures. The NIH, for example, is able to fund only about one-third of all research proposals judged worthy of support, and
therefore, selects projects which will have the most impact on human and animal health. Similar research guidelines are used at pharmaceutical companies and universities. The Salk Institute in La Jolla, CA, one of the world's premier research organizations, is one of many facilities with stringent research guidelines. The facility depends upon animal research for current work on AIDS, cancer and Alzheimer's disease. According to Dr. Kenneth Klivington, assistant to the president at the institute, scientists must submit detailed research plans to the institute's animal welfare committee for project approval. "It is the responsibility of this committee to consider the validity of the argument for the necessity of using animals, the number of animals needed, and whether alternatives exist to be used, as well as treatment before and after the procedures, are in accordance with government guidelines and the principles of humane treatment," he said. "Animals are never the first choice as subjects for research. Scientists at the institute use the most modern methods available for biomedical research, and when possible conduct their research with the aid of computer simulations of biological systems and cells grown in tissue culture, when there is absolutely no alternative way to answer important questions, scientists turn to research in animals."

**Animals Used in Research**

**Rats, Mice and Other Rodents ... 85% to 90%**

**Dogs and Cats ... 1% to 1.5%**

**Nonhuman Primates ... 0.5%**

The remaining percentage includes small numbers of a variety of animal species.

(Source: Office of Technology Assessment Study - "Alternatives to Animal Use in Research, Testing and Education.)

**The Use and Source of Animal Models**

The Office of Technology Assessment estimates that between 17 and 22 million animals are used per year in biomedical research. The majority of these animals, approximately 85 to 90 percent, are rats, mice and other rodents; 1 to 1.5 percent are dogs and cats; 0.5 percent are nonhuman primates; and the remaining percentage includes rabbits, birds, and domestic and wild animals.

According to the Institute of Laboratory Animal Resources, rats were the most commonly used species in 1968 and 1978, the largest decline occurring with nonhuman primates, dogs, cats, and birds.

The reasons for this decrease are complex and include the refinement of research techniques, development of alternatives and a decrease in research funding. Funds for research have failed to increase at the same rate as costs of acquiring and caring for laboratory animals. Researchers have also lowered the incidence of spontaneous disease among lab animals. Today the same research objectives can be obtained with fewer animals because of improved methods for breeding, rearing, genetic control and environmental enrichment.

The overwhelming majority of lab animals are rats and mice bred for this purpose by licensed suppliers. Large animals, such as swine, cattle, and sheep, are obtained from farms and agricultural resources. Most nonhuman primates used in research come from scientific breeding centers, not from the wild.

Many cats and dogs necessary for research are bred for this purpose by licensed suppliers. Large numbers of animals have been abandoned in public pounds and animal shelters. Estimates vary widely, but of the approximately 16.2 to 27 million cats and dogs left in pounds and shelters each year, only 16.7 million (approximately 138,000 dogs and 50,000 cats) are used in research annually. The majority of these pound animals, between 10 and 16.7 million dogs and cats, are put to death by animal care and control agencies each year, according to the American Humane Association's 1989 statistics. The remaining animals are claimed by their owners or adopted. While the majority of lab animals are rodents, other species are used in small numbers to provide data not fully available by using rodents. The dog model, for example, continues to assist scientists in discovering new therapies for cardiovascular disease, and it has been used to refine surgical techniques. Nonhuman primates, also used in small numbers, help scientists investigate reproductive disorders, hepatitis, deafness, head injuries, and eye disorders. In general, nonhuman research today does not currently include the use of mice to study immunology and calves to help improve the performance of artificial heart valves. Whether such procedures administered by the FDA do not specify the use of animal testing, said Dr. John Augsburg, assistant to the director of the Center for Veterinary Medicine at the FDA. However, the FDA position is that the use of animal tests by industry to establish the safety of regulated products is necessary to minimize the risks from such products to humans and animals. Consideration should be given to the use of validated and accepted alternatives before animal research procedures are initiated. Thus, many procedures intended to replace animal tests are still in various stages of development and it would be unwise for the FDA to urge manufacturers not to do any further animal testing. It appears to be a little chance of replacement animal testing in the foreseeable future."

**Care of Lab Animals - Laws and Regulations**

The care of lab animals in universities, medical schools, hospitals, pharmaceutical companies and other research facilities is monitored by the U.S. Department of Agriculture (USDA), under the provisions of the Animal Welfare Act (AWA). The AWA has been amended three times since its passage in 1966. USDA officials make periodic unannounced inspections to ensure compliance with stringent standards for housing, feeding and watering, cleanliness, ventilation and veterinary medical care.

The U.S. Public Health Service (PHS) has an Animal Welfare Policy that applies to all NIH-funded projects involving animals. The NIH requires that the institutions follow the Guide for the Care and Use of Laboratory Animals, prepared by the Institute for Laboratory Animal Resources of the National Research Council. The organization also serves as a scientific forum for laboratory animal medicine and care.

The American Association for the Accreditation of Laboratory Animal Care (AAALAC) offers a laboratory accreditation program. In addition, the FDA and the Environmental Protection Agency (EPA) have Good Laboratory Practices regulations (GLPs).

The AWA calls for the use of anesthetics and analgesics for potentially painful procedures and for postoperative care. These regulations, along with animal care regulations within each facility, ensure that animals receive the best care and the least pain and distress. USDA statistics state that approximately 95 percent of all lab animals in federally protected facilities are not exposed to pain or distress. Of the remaining percentage, many animals are involved in studies of pain itself, and pain-relieving drugs or analgesics are administered as part of the research. Dr. M.H. Cook, of the USDA's Animal Plant Health Inspection Service (APHIS), said most of the 1,100 USDA-regulated research facilities consistently comply with federal standards, and have often initiated improvements for animal care called for in the AWA amendments before they have become law.

APHIS inspectors follow strict guidelines to ensure adequate temperature, housing and feeding, and other regulations are met. "We find that, in general, the scientific community does a good job and is concerned about the care of lab animals," Dr. Cook said.

The most recent amendments to the AWA address animal care and use committee oversight of animal programs. Research facilities have established animal care committees to review laboratory animal care and use issues, including the researchers' consideration of alternatives and the appropriate animal welfare aspects of research procedures. This concept has been a long-standing prerequisite by AAALAC for accreditation. AAALAC, formed in 1965 and based in Bethesda, MD, is an independent, non-profit organization which offers a peer review accreditation program. The highly regarded AAALAC Accreditation Program is voluntary, but has teeth. It is AAALAC's intent to work with institutions to improve and maintain quality animal programs. However, organizations that do not conform with AAALAC criteria are denied accreditation, allowed to withdraw, or revoked from AAALAC accreditation. Less than 1 percent of the programs evaluated by AAALAC fall into this category.

**Animals and Research Statistics**

- There are approximately 56 million cats and 54 million dogs in the U.S.
- It is estimated that every hour more than 2,000 dogs and 3,500 cats are born.
- Animal shelters take in 16.2 to 27 million dogs and cats annually.
- Between 10.1 and 16.7 million dogs and cats are put to death in pounds and shelters annually because they were neither claimed by owners nor adopted.
- Approximately 1.1 percent of the dogs and cats from pounds and shelters, that would otherwise be euthanized, are claimed by their owners.
- Rats, mice and other rodents comprise 85 to 90 percent of all research animals.
- Only 1 to 1.5 percent of research animals are dogs and cats, and 0.5 percent are nonhuman primates.
- There has been a 40 percent decrease in the number of animals used in biomedical research and testing in the U.S. since 1968.
- Approximately 17 million to 22 million animals are used in research each year.

(Sources: The American Humane Association, USDA, Foundation for Biomedical Research, Newsweek)

**"The Three Rs" and Trends in Alternatives**

Most research organizations and scientists are following a practice known as the "Three Rs," which stands for replacement, reduction and refinement.

Replacement refers to the use of nonanimal techniques instead of animal models or a lower species of animal when possible. For example, rabbits are no longer used for pregnancy testing, and some preliminary drug toxicity testing can be done using cell cultures, rather than animal species.

Reduction refers to areas where the number of animals used can be reduced. The number of animals used in acute toxicity testing is being reduced as scientists have discovered ways to obtain accurate toxicity data using fewer animals. In addition,
The 14th Annual Feline Fanciers Symposium was held April 13, 1991 at VHUP. Following are summaries of the three presentations.

### Feline Reaction Patterns

**Dr. Karen Kuhl**, a resident in dermatology, discussed feline skin disorders and how these various diseases are manifested by different skin reaction patterns. Dr. Kuhl stated that while many disorders have specific patterns and can be identified fairly easily, it is not enough to make the diagnosis and treat the animal to relieve discomfort; the veterinarian must look further to determine the underlying cause of the skin disease to prevent recurrence.

The most common skin disorder in cats is eosinophilic granuloma complex which is divided into three groups: indolent ulcer (rodent ulcer), eosinophilic plaque, and linear granuloma.

**Indolent ulcer** appears as a red ulcerative lesion on the upper lip. In many cases the area involved may be small and the animal may not be bothered by it. However, the lesion can become very ulcerated and invasive, then it needs to be biopsied to rule out squamous cell carcinoma. Most indolent ulcers are due to allergies, either to fleas, food, or inhalants. There is evidence that some cats may have an inherited predisposition to the disease.

Eosinophilic plaque manifests itself by red, raised, ulcerated lesions on the abdomen, inner thighs, or under the tail. The cat itches and exhibits excess grooming behavior. In most cases the disease is due to allergies, however, deep fungal infections and neoplasia need also be considered in these cases. Therefore, depending on the history, biopsies for histopathological examination may be warranted.

Linear granuloma causes raised yellowish-red linear, itchy lesions, most commonly on the back of the rear legs. This is a collagenotic granuloma which also is sometimes lower lip swelling and a swollen chin. It is most often caused by allergies.

Some cats can have more than one form of eosinophilic granuloma at the same time. For many years these lesions were treated with steroids without looking for the cause. Now veterinarians can perform appropriate testing, discern which allergy is the most likely cause, and save the cat from a lifetime of steroid use.

Feline leukemia dermatitis, another common skin disorder, generally consists of multiple, small (mililary) crusts and papules (red, raised bumps) on the back, but occasionally extending to the neck and head. These lesions usually itch. The complex is easy to diagnose, but the most difficult problem is to determine the underlying cause which can be allergies to fleas, food, or inhalants (most common); bacterial infection. Fungal infection, mites and ectoparasites, drug reactions, autoimmune disease, and unknown causes. Dr. Kuhl stressed that appropriate diagnostics should be performed to avoid having to treat the cat with steroids for the rest of its life.

There are a number of other skin diseases. Allergies, ringworm, demodec, and rarely, psychogenic causes, are the culprits in “bald belly syndrome”, where the cat excessively grooms its abdomen, destroying the haircoat. If the cat has a bare belly with no hair stubble, it may have feline endogenous overgrooming disorder. Bald belly syndrome is seen more frequently in Abyssinians and Siamese and may be due to psychogenic causes in these breeds as they are quite high strung.

Facial dermatitis can often be quite unsightly as the cat scratches excessively at its head and neck, creating lesions that are ulcerated and encrusted. This disorder is often the result of food allergies, however, even mils, flea or inhalant allergies, notodermia, autoimmune diseases, and drug reactions may also be underlying causes. A history will give the veterinarian a clue; if the animal shows crusting first, then the most likely cause is autoimmune disease; if the animal scratched and then crusts appeared, the cause is most likely allergic. The problem generally begins around the eyes and in front of the ears.

When trying to determine the underlying cause of skin problems, the veterinarian needs the owner’s help. For example, if one asks: has it been a seasonal problem - this would indicate flea or inhalant allergy; are any other animals in the household affected - this would indicate ear mites, flea allergy, or notodermia; did the lesions come first or did the itch come first; where on the body did the problem manifest itself first; what medications were used in the cat’s treatment and how did it respond?

Dr. Kuhl then discussed a number of diagnostic procedures available. Skin scrapings are needed to look for demodex mites, notodercod, and chyle cells. Fungal cultures are necessary to diagnose ringworm. Blood tests are needed to determine the animal’s general health. Feline leukemia and feline immunodeficiency status should be determined as general health. Feline leukemia and feline immunodeficiency status should be determined as well.

Once the untreated cause of the skin condition has been found it can be treated. By far the most common cause of allergy is a flea bite allergy. Here it becomes important to not only treat the cat but also its environment. Dr. Kuhl stressed that fleas spend very little time on the cat and most of their time in the room in cracks, under the furniture, in the carpet, etc. Because many fleas have more than one host, evidence of fleas is rarely found on the animal.

Dr. Kuhl discussed a number of chemicals used for flea control and stressed that cats are very sensitive. Thus it is important to read the labels and check with your veterinarian. Pyrethrin and pyrethroids (e.g. permethrin, tetramethrin, allethrin, resmethrin) are usually quite safe. These chemicals kill fleas and repel them, though they lose effectiveness in about 48 hours. Some sprays contain piperonyl butoxide, a synergist which works with the pyrethrinso to kill fleas more effectively. It can be toxic to cats at levels of greater than 1.5%. It may also cause drooling at lower levels. Another synergist, N-octyl bicycloheptene dipropionate is a strong sensitizer. As the incidence of side effects and is often used with piperonyl butoxide so that a lower concentration of piperonyl butoxide may be used. Organophosphates should be avoided. There has been a report of neurologic problems developing after a cat was dipped with a dip containing d-limonene, therefore citrus extract dips should be avoided.

Flea-fighting products come in many forms. Sprays may be water or alcohol based. Water-based sprays are less expensive and kill the fleas at a slower rate. Alcohol based sprays dry quickly and kill fleas quickly but should always be avoided if the cat has an open wound. Also, animals must be kept away from an open flame. Because cats do not like to be sprayed, Dr. Kuhl recommended that owners purchase a bottle which can be sprayed in the room. It is then brushed on the cat. She also cautioned that nursing kittens should not be completely sprayed, only small amounts of the chemical should be dabbed on the backs. Organicophosphates or carbamates should not be used on kittens, only pyrethrins or pyrethroids.

Flea dips tend to be more toxic than sprays, especially for cats. Shampoos kill fleas but have no residual effects. Dr. Kuhl recommended for flea control, but are not as easy orcosmetically appealing. Dr. Kuhl strongly recommended against the use of systems, which are usually organophosphates and which are not licensed for use in cats.

The most important part of combating is flea treatment of the environment. The room, carpeting, and furniture have to be thoroughly vacuumed. Bedding needs to be washed and dried on a high heat setting. Then the area should be sprayed, even under the furniture. Floors should be allowed to dry before the animal comes back into the room.

Inhalant allergy is treated with a vaccine that hypoallerginises the animal. These injections can be given at home.

Ringworm is highly contagious and all cats in the household must be treated, even if they do not show signs of the disease. Treatment includes topical dips and/or oral antifungals. All cats should be completely clipped before dipping, including the whiskers. This decreases the risk of contaminating the environment and recontaminating the cat. The dips vary greatly in their protocols and may be used once or twice weekly. The oral antifungals require close monitoring by the veterinarian. One of these cannot be used in pregnant queens as it causes birth defects. The environment must be thoroughly vacuumed and all bedding, brushes, combs and the like must be destroyed. Heating and cooling vents should be cleaned and disinfected. Kittens should not be sold until two negative fungal cultures are obtained.

### Pet Loss: Losing a Member of the Family - What it is all About

In 1977 the University of Pennsylvania School of Veterinary Medicine entered into a joint project with the University’s Graduate School of Social Work. After a careful evaluation of the needs of the hospital, a full-time social worker was hired to counsel clients whose pets were seriously ill or dying. The idea of having someone work with and be available to upset pet owners originated at the University of Pennsylvania School. Since then, the concept of pet bereavement counseling has spread to other veterinary schools and clinics.

Kathleen Dunn, M.S.W., the current full-time social worker at the Veterinary Hospital of the University of Pennsylvania (VHUP), discussed pet loss. "Pets provide unconditional love. They take on many roles in a person’s life, they can be a companion, a buddy, a best friend, a child, a sister or brother. A pet is always there to love us and greet us. When a strong attachment forms between the owner and the animal, the pet becomes a person and a part of the family.”

People want the longest possible life for their pets. In fact, we would love our pets to live forever. Often, when an animal is brought to VHUP, it is because it has life-threatening disease. Ms. Dunn is
available, with the veterinarian, to help the upset owner at this very stressful time. "It is very difficult for the attached pet-owner to make a decision if euthanasia is recommended because the animal's quality of life is poor," she said. "Because of attachment and bonding to the animal most owners feel very guilty. The sentence I hear over and over is: 'I feel as though I am putting a member of my family to sleep. I feel as though I know the animal is suffering, but emotionally this is very difficult to do.' It is here that the role of the veterinarian becomes very important. He or she has to understand the emotional pain the owner is suffering at this time and has to understand the pet owner's concerns. Ms. Dunn explained that owners cope in different ways with euthanasia of the pet. Some take the animal home and have their veterinarian come to the house, feeling it least stressful on the animal. Some have the animal euthanized here at VHUP - wanting the vet who took care of it to do it, and often owners want to be with their pet and hold it while the drug is injected, saying 'my pet has always been there for me. I can't leave it at a time like this.' "We try to accommodate the client and the pet as much as possible," she said, "we respect the relationship the owner has had with the pet." Ms. Dunn explained that in the owner's grieving process the disposition of the pet's body is an important issue. "There are several options: owners can take the body back to bury on their property, or they have the animal interred in a pet cemetery, or VHUP can arrange for individual cremation where the ashes will be returned to the owner. The cremation process can be performed while the owner is present. We can also arrange for communal cremation, but then no ashes will be returned." Each pet owner feels differently, and individual wishes are an important consideration.

Ms. Dunn said that it is vital to the owner to be able to talk about the pet and the disposition of the body. "People will tell me that they want the ashes because they want to have a "memorial" for their pet, but to talk to their animal. Others want the ashes buried with them, and this can be arranged with their family. Others will scatter the ashes in a park or at the pet's favorite play area." Ms. Dunn explained the phases of grieving, such as anger and guilt. "People are often angry at themselves, they feel that they may not have taken the animal to the vet early enough, for example," she said. "They may also be angry at the surviving animals. People can be very irrational for the first 24 hours after a pet's death and it is important that they express their feelings: they will be calmer after the outburst." When a beloved pet dies, people go through a mourning and grieving process and are often surprised at the emotional reaction they are having - e.g., crying, sadness, and depression.

Guilt is another emotion that surfaces early in the grieving process. "People will ponder whether they were responsible for the illness or death because they forgot to give medication once or twice, or because they ignored some minor instructions from the vet," she said. "If I try to tell the students that owners may call repeatedly after a pet's death asking the veterinarian questions as to whether they were indirectly responsible. This is very important and the veterinarian must be understanding." Most often the calls come from very responsible owners who are feeling guilty and need reassurance they did everything possible for their deceased pet. The stress people are experiencing can be very intense.

Grief affects people differently. Some may not be able to eat, others may overeat; sleep may vary, some go to sleep during the first few nights, others cannot go to sleep for weeks. "Some people keep a pet for the companionship and bonding to the animal most owners have had with the pet. Others may call repeatedly after the pet's death asking for their dog to come to the house, and have their veterinarian come to the house, saying 'my pet has always been there for me. She was my everything. I don't know how I'll ever get over it.' Ms. Dunn has talked to many owners who took care of it to the best of their ability, sitting in the animal's last moments, while the drug is injected. "We counsel people to resume their activities as quickly as possible and to stay busy." Above all, it is very important that people talk about their loss, either with their family and friends, or, if that is not possible, with Ms. Dunn and the Pet Loss Support Group at VHUP. "We meet twice a month and help each other to work through the grief," Ms. Dunn said. "Often grieving for a pet stirs up memories of a previous loss, mostly of beloved human relatives, and it is important to talk about it at this difficult time." Again, people are surprised to find themselves thinking of a beloved relative who died. maybe of the same diagnosis as the pet or another serious illness. People can come to the grief support group as long as they feel the need. Quite often private vets refer specific clients, or people call who have read about the group. Ms. Dunn emphasized that it is important to work through the grief process. "It is a very difficult time for many owners." Ms. Dunn also mentioned that some owners are able to overcome the grief by obtaining a new animal, while others are not able to replace the pet because they cannot face the thought of having another animal. However, as time goes on - most of this group can't stand the silence in their house and eventually obtain another animal - they miss the companionship of a pet. "It is a very individual decision and each one has to work it through. What might be right for one owner, might not help another.

Ms. Dunn touched briefly at how to deal with the depth of suffering, "We counsel people to resume their activities as quickly as possible and to stay busy." The sentence I hear over and over again is: "I feel as though I am putting a member of my family to sleep. I feel as though I know the animal is suffering, but emotionally this is very difficult to do." It is here that the role of the veterinarian becomes very important. He or she has to understand the emotional pain the owner is suffering at this time. Ms. Dunn touched briefly at how to deal with the depth of suffering, "We counsel people to resume their activities as quickly as possible and to stay busy." The sentence I hear over and over again is: "I feel as though I am putting a member of my family to sleep. I feel as though I know the animal is suffering, but emotionally this is very difficult to do." It is here that the role of the veterinarian becomes very important. He or she has to understand the emotional pain the owner is suffering at this time.

Ultrasound Imaging of Abdominal Disorders

Ultrasound, a relatively new technology in veterinary medicine, is a valuable diagnostic tool for the examination of soft tissues and organs in the abdomen. Dr. Mark Saunders, assistant professor of radiology, gave an overview.

"Abdominal ultrasound is an additional diagnostic modality available to the veterinarian, said Dr. Saunders. "It is often used to clarify an abnormality seen on a radiograph. In addition, we can use ultrasound to biopsy or aspirate masses as we can guide the needle to an exact location." It is a form of non-invasive imaging. Sound waves above the frequency limits of human hearing, ranging from 2 to 10 Megahertz, are emitted from a transducer placed on the skin. These varying amounts and strength of sound waves are reflected back to the transducer from different tissue and an image is generated and displayed on a monitor. The ultrasound waves emitted from the transducer into the tissue gradually lose their strength with depth of penetration. The amount of sound absorption is directly proportional to the frequency of the sound. High frequency sound, because of higher tissue absorption, cannot penetrate as deeply into tissue. For this reason, high frequency ultrasound is used to examine superficial structures, and lower frequencies must be used for scanning subsurface tissue. Ultrasound cannot penetrate bone or air.

VHUP's ultrasound equipment is quite sophisticated and provides detailed images. The ultrasound equipment has a transducer emitting varying frequencies; the image can be frozen. It can be measured and calculations can be performed by the built-in computer and everything can be recorded on tape or film. From this information, cross-sectional representations of anatomy taken in various planes. By imaging the internal architecture of organs, ultrasound differs from radiographs which depict only the silhouette of an organ. For an ultrasound exam the animal generally does not have to be sedated. "Animals are placed on their side on the table," explained Dr. Saunders. "The abdomen has been clipped to allow better contact with the transducer. The transducer is placed on the skin, a gel is rubbed on the skin. Most animals relax and some go to sleep during the exam."

A complete ultrasound exam of the abdomen takes about 30 minutes, but don't just zero in on one organ but examine the entire abdomen. Often abnormalities are found that no one suspected.

Each organ presents a specific ultrasound appearance and the radiologist is able to diagnose disorders in the organ by changes in the amount of sound reflected, depending on the disease. For example, a healthy liver has a certain echogenicity(reflectivity), if the liver has a lot of fatty tissue, the echogenicity changes. "In a majority of cases, the ultrasonographic abnormalities seen in an organ are not specific for a certain disease," said Dr. Saunders. "But when these abnormalities are also considered with the history, physical examination findings, radiographic abnormalities and laboratory results we can be more specific about the disease process. If one is biopsy of the organ or mass is needed for a definitive diagnosis, we can then examine the organ."

Structural abnormalities of the following abdominal organs can be evaluated by ultrasound: liver and gall bladder, spleen, pancreas, stomach, intestines, kidneys, bladder, prostate gland, uterus, testes, adrenal glands and major blood vessels. These structural abnormalities may be caused by infection, tumors, cysts or obstructive processes. Ultrasound is also used to examine the heart. VHUP's cardiology department has a sophisticated Doppler echocardiography unit which provides color images and allows for a detailed, non-invasive examination of the organ.
Treatment of Canine Osteosarcoma

Each year about 10,000 dogs in the United States, mostly of the large and giant breeds, are diagnosed with osteosarcoma (OSA), a painful bone tumor. This disease also occurs in humans, though not in such high numbers. Osteosarcoma in dogs affects primarily the long bones of the leg, but can affect bones of the spine, skull, or ribs. "Over the last 10 years there have been major advances in treatment of this disease in both species," said Dr. M. Joy Weinstein, assistant professor of surgery at Penn's School of Veterinary Medicine, "but better treatment protocols are still needed. Therapy for osteosarcoma of long bones includes amputation with or without chemotherapy, or limb-sparing surgery and chemotherapy. Limb-sparing surgery involves removal of the primary tumor while preserving the limb through use of a bone graft or a prosthesis. Two chemotherapy drugs that appear to be most effective in this disease are Adriamycin and cisplatin. Unfortunately, at this point in time, we cannot cure the disease, but we can give the dog a good quality of life for a number of months or years."

Dr. Weinstein, who returned to Penn after surgical specialty training at Tufts University School of Veterinary Medicine, is conducting a study assessing perioperative and postoperative treatment of OSA by administering Adriamycin and cisplatin concurrently. "These drugs usually are used alone or alternated to reduce the growth of metastases. By administering them together we hope to achieve an additive effect."

Osteosarcoma in dogs frequently manifests itself as a limp; the dog is in pain and often refuses to use the leg. Radiographs reveal a bone tumor at the end of the long bone of the leg, either front or rear. "When the bone comes to the veterinarian, the tumor has already spread through microscopic lesions to other parts of the body, primarily the lung," said Dr. Weinstein. "If we amputate the leg and give no other treatment, the median survival time is about 18 weeks, though some dogs (10 percent) live more than a year. If the animal is treated with chemotherapy, either cisplatin or Adriamycin, the median survival time increases to about 40-45 weeks, with nearly 50% of the dogs living more than a year."

Amputation of the affected limb is Dr. Weinstein's preferred surgical treatment. "It relieves the pain, the dog can get around quite well on three legs," she explained. "Most dogs walk one day after surgery and need exercise restrictions for only about two weeks." An alternative to amputation is limb-sparing surgery. She recommends this treatment for dogs that would not get around well on three legs or those cases where an owner cannot accept amputation as an option for the dog. Here the tumor and the affected section of bone are removed, and a bone graft is used to replace the missing bone. The graft can be donor bone which has been frozen and stored, but infections are common with this method. Dr. Mark Cofoe and Dr. David Dieteler have used autogenous cancellous bone as the graft. Small amounts of the soft bone from the marrow cavity of the dog's own shoulder (proximal humerus), pelvis (ilium) or knee (proximal tibia) are used to replace the diseased bone. Plates and screws hold the bones in their proper orientation. It is complicated surgery and the time period until the bone graft has healed may be several months. Limb-sparing surgery is most successful for tumors of the distal radius (foreleg) because the carpal joint (wrist) can be fused without problems.

Previously described chemotherapy treatment protocols for OSA incorporate cisplatin and/or Adriamycin, usually given at three week intervals. The drugs are administered intravenously. They are both potent drugs that act on cell division. Adriamycin prevents DNA from replicating, thus slowing the growth of metastasized tumors. Cisplatin also affects the DNA, binding to it, crosslinking the strands. Both drugs affect other rapidly growing cells in the body, such as bone marrow cells and intestinal cells. Side effects are often minimal, but can include decreased appetite, gastrointestinal upset, bone marrow suppression, kidney problems, or heart problems.

Dr. Weinstein proposes to use the two drugs concurrently, administering therapeutic doses of cisplatin and slightly lower doses of Adriamycin to further slow down metastatic tumor growth. Preliminary studies have shown encouraging results, four dogs treated are doing well six to ten months after treatment. She proposes to use the drugs perioperatively, beginning two weeks after surgery, in one group of patients for a total of three cycles, three weeks apart. In another group of patients, the first dose of drugs will be administered perioperatively, within 24 hours after surgery, followed by two additional treatments three weeks apart. "Studies in humans and rodents have shown that there is rapid growth of metastatic lesions in these species following surgical excision of primary tumor," she said. "Studies in laboratory animal tumor models show that administration of perioperative chemotherapy prevents rapid growth phase to metastatic lesions following removal of the primary tumor." Dr. Weinstein explained that perioperative chemotherapy is not routinely administered to humans with the disease due to fear of postoperative surgical wound complications, such as infections and delayed wound healing. "Our previous results administering pre-, perioperative and postoperative Adriamycin to dogs with osteosarcoma do not support high wound complication rates. We hope to document improved survival rates for patients treated with perioperative chemotherapy; this would advance canine osteosarcoma treatment and might also encourage similar studies in human patients with the disease."

Osteosarcoma in people is a disease of teenagers and young adults. In dogs it affects primarily middle-aged animals, though it does occur in dogs under two years of age and in elderly dogs. Canine osteosarcoma may serve as a model for human osteosarcoma and Dr. Weinstein is collaborating with researchers at the Medical School on several projects. "We are looking at MRI images of the amputated canine limb to establish how the tumor grows in the image correspond to the tumor margins established by histological examination," she explained. "It is very difficult for the surgeon, when doing limb-sparing surgery on people or dogs, to know exactly where the tumor ends," she said. "We hope to determine just how accurate the MRI scan is in defining the tumor margins." The studies also encompass a look at the role of growth factors and their receptors in canine osteosarcoma. The role of P-glycoprotein in the resistance of canine osteosarcoma to chemotherapy will be investigated. The researchers hope to expand the project so that they can evaluate different clinical protocols in dogs with osteosarcoma and assess prognostic indicators and chemosensitivity assays to predict differences in the response to treatment.

Dr. Weinstein is currently searching for funding for the chemotherapy study from private sources or foundations to support the costs of the drugs. Without such support, chemotherapy drugs cost about $2,000 per patient. If support cannot be found, these costs to the clients will decrease considerably. Dr. Weinstein is also looking for candidates for the treatment and she hopes that veterinarians with canine osteosarcoma will refer them to the Veterinary Hospital of the University of Pennsylvania.

Dr. Weinstein graduated from the University of Pennsylvania School of Veterinary Medicine in 1983; she completed a surgery residency at Tufts University School of Veterinary Medicine and Angell Memorial Animal Hospital; and became an instructor in surgery at Tufts. She completed a research fellowship at Massachusetts General Hospital where she worked in the laboratory of Dr. Henry Mankin, a pioneering researcher in bone cancer in people.

Merck Supports Laboratory Animal Medicine Training

Merck Sharp & Dohme Research Laboratories Division of Merck & Co., Inc. has provided a postdoctoral fellowship grant in Laboratory Animal Medicine at the University of Pennsylvania. Dr. Laurence Handt, a 1987 veterinary graduate of Michigan State University, has been selected as the first recipient of the grant and is now in the first year of the program. The laboratory animal medicine program has been in existence since 1987 at the University of Pennsylvania. It is a three-year program combining a residency in laboratory animal medicine with a master's degree in a related scientific discipline. Individuals enrolled in this program also complete a one-month rotation in the Department of Laboratory Animal Resources at Merck's West Point, PA facility. This program is designed to develop competence in biomedical research and laboratory animal medicine, and prepare candidates for the American College of Laboratory Animal Medicine board certification. This joint effort of Merck and the University of Pennsylvania is an example of the growing trend in the business sector providing financial assistance to foster advanced training in scientific disciplines.

Shown here (left to right) are Dr. Harry Rozmiarek, director of the University of Pennsylvania Office of Veterinary Laboratory Animal Resources and director of the Laboratory Animal Medicine Training Program, Dr. Jeffrey Lim, associate director and clinical coordinator, Dr. Laurence Handt, Dr. Gwendolyn McCormick, a postdoctoral fellow, and veterinarian with Merck's Department of Laboratory Animal Resources at West Point, PA and Dr. Hilton Klein, director of Laboratory Animal Resources, MSDRL Division of Merck.
Animals can now be used for the efficacy of some potential drugs using the tissue of one animal rather than hundreds of animals. Refinement refers to efforts to reduce pain and distress experienced by laboratory animals. New guidelines from the USDA and NIH are calling for closer scrutiny by researchers in this area, and are encouraging them to investigate additional avenues to measure and reduce pain for animals.

According to Dr. John Galligan, director of the Center for Alternatives to Animal Testing at The John Hopkins University, the three R's represent the "common definition of alternatives." He said alternative methods in specific cases are scientifically useful, provide a cleaner and more precise result than animal models, and are more economical.

The success of alternatives can be measured by the surgeon's use, Dr. Goldberg said. "Ten years ago there were few tissue culture areas in research facilities. Now, every facility that builds a building adds a tissue culture area."

Alternatives most commonly considered are cell, tissue and organ cultures, computer modeling and the use of minimal invasive procedures that produce less stress, Dr. Goldberg noted. While more toxicological research is being conducted in vitro, the potential of using a "traditional" method in toxicological protocols and hazard assessment is only beginning to be used and evaluated, he said.

Dr. Goldberg attributed the increase of alternatives to public pressure from the animal rights movement and to the scientist's own responsibilities for encouraging the scientific understanding and development of alternatives, he said. "But if the science hadn't been there, it never would have come about."
Dr. Ray Sweeney, V'82, assistant professor of medicine, received the 1991 Lindback Award for Distinguished Teaching at the University's most prestigious teaching award.

Dr. Robert Kenney, professor of animal reproduction, is the eighth recipient of the David E. Bartlett Award. This award, sponsored jointly by the Society for Theriogenology and the American College of Theriogenologists, honors a distinguished theriogenologist who has made important contributions to the field. The award was presented at the annual conference of the organizations, held in August in San Diego. Dr. Kenney delivered the David E. Bartlett Honorary Address, entitled "Thirty-seven Years Working with Cattle, Horses and Other Creatures. What do the Next Thirty-seven Hold?"

Dr. Gary Raiczik, V'84, was named Veterinarian of the Year by The Jersey Shore Veterinary Medical Society for his outstanding contributions to veterinary medicine. Dr. Raiczik served as president of the organization for the past three years and he is a partner in the Ocean County Veterinary Hospital, Lakewood, NJ.

The second edition of Domestic Animal Behavior, a book by Dr. Katherine Albro, V'63, has been published by the Iowa State University Press. Dr. Albro is director of the animal behavior clinic and professor of psychology at the New York State College of Veterinary Medicine. Cornell University.

Dr. Urs Giger, associate professor of medicine and medical genetics, and Dr. Colin E. Harvey, professor of surgery, were the speakers at the 13th Annual Robert H. Winn Foundation Dinner and Symposium on Feline Health, held in June in Philadelphia. Dr. Giger's study, Genetics of Feline Blood Groups in the United States, a project funded by the foundation, had its funding renewed. The foundation also funded a new study, Survey of Patella Luxation and Hip Dysplasia in Cats, conducted by Dr. Giger, Dr. Pamela Green, resident in radiology, and Dr. Gail Smith, V'74, assistant professor of orthopedic surgery. Dr. Harvey also received funding for a study, Location and Concentration of Immuno-reactive Cells in the Oropharynx of the Cat, the co-investigator is Dr. Richard Dubielzig, University of Wisconsin. A second project by Dr. Harvey and Dr. Stuari Carter, University of Liverpool, Chronic Gingivitis Stomatitis in Cats - Involvement if Mucosal Immune Response, was also funded by the foundation.

Dr. Giger received the John A. Connaughton-Merrielen Dunston Award from the Cai Fanicians' Association of America for outstanding service to cats and the cat fancy at their annual meeting in New York. Barry Stepine, associate dean for administration and director of WVUP, is serving as acting vice president for external relations at the University. He divides his time between the School and the University.

Dr. Harold M. Smith, V'43, has been appointed by the executive board of the American Veterinary Medical Association to the AVMA Animal Welfare Committee, representing private practice equine clinical practice. Dr. Smith is an honor roll member of the AVMA and the AAEP.

Dr. Jill Beech, associate professor of medicine, received funding from the American Quarter Horse Association for her work on hyperkalemia periodic paralysis.

Dr. Robert Eckroade, associate professor of poultry pathology, testified at hearings of the New York Department of Agriculture on behalf of the Pennsylvania Poultry Federation. Dr. Eckroade reviewed the unresolved scientific issues regarding Salmonella enteritidis and the logistical problem of testing large numbers of poultry houses.

Dr. Donald Abt, V'61, presented a lecture, Aquaculture in the U.S. -Where is it Going?, at the New York Farmers dinner in New York.

Dr. Robert S. Hoge, V'55, was awarded the 1991 Charles E. Emsl Practitioner of the Year Award by the American Animal Hospital Association. It is the highest award given by the association. Dr. Hoge was honored for his many contributions to the veterinary profession.

Dr. Stuart Wiles, V'60, was featured in People Magazine in May. Dr. Wiles is commissioner of laboratory animals for Cambridge, MA.

Dr. Ralph E. Werner, V'68, received Distinguished Service Awards from the New Jersey Veterinary Medical Association and the Atlantic City Police K-9 unit.

Dr. Harry A. Reynolds, V'56, retired from the University of Illinois College of Veterinary Medicine faculty after 25 years of service.

Dr. David H. Nunamaker, V'68, Jacobs Jenny Professor of Orthopedic Surgery, has been appointed to the Scientific Committee of the Grayson Foundation.

Dr. Dean Richardson, assistant professor of surgery, received a grant from the Grayson Foundation for a study, The Biochemistry and Morphology of Equine Articular Carilage in Degenerative Joint Disease and their Relationship to Subchondral Bone Stiffness. The foundation also awarded a grant to Dr. Eric Tulleners, associate professor of surgery, for his study, Partial Laryngectomy in a Horse using an Extra Laryngeal Approach.

Dr. Kenneth Bovee, Corrine R. and Henry Bower Professor of Medicine, Dr. Joan Hendrick's, V'79, associate professor of medicine, Dr. Meryl Littman, V'75, associate professor of medicine, Dr. Richard Squires, lecturer in medicine, and Dr. Sheldon Steinberg, V'59, professor of neurology, presented papers at the meeting of the British Small Animal Association in Birmingham, England in April.

Dr. John Simms, V'74, has been appointed for a three-year term to the Small Business/Agiculture Advisory Council of the Federal Reserve Bank of Philadelphia. The 12-member council meets regularly with the bank's executives and has as a major goal facilitation of two-way communications between small businesses and the farming industry and the Federal Reserve Bank.

Iowa State University Press published Pigeon Health and Disease by Dr. David C. Tudor, V'S1.

Dr. Leslie Dierauer, V'74, has accepted an official staff position with the House Committee on Merchant Marine and Fisheries.

Dr. Adrian Morrison, professor of anatomy, has been appointed to the newly formed editorial board of the journal, Sleep, and to the International Advisory Board of the Journal of Sleep Research which is published by the European Research Society. He is currently on leave of absence while he serves as director, Office of Animal Research Issues, Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) at NIH.

The School's Center for Animal Health and Productivity was well represented at the 1991 Annual Meeting of the American Dairy Science Association in Logan, UT, in August. Dr. James Ferguson, assistant professor of nutrition, delivered an invited paper in the Borden, Inc. Symposium on Protein. Twelve abstracts were presented by Dr. Linda Baker, a graduate student, Dr. William Chalupa, professor of nutrition, Dr. Ferguson, Dr. David Galligan, associate professor of animal health economics, and Dr. Paul Pitcher, a graduate student. Drs. Baker, Chalupa, Ferguson and Galligan also participated in the annual meeting of the American Association of Bovine Practitioners in Orlando, FL, in September. The group gave three different two-day seminars for practitioners.

Dr. Kirk N. Gelatt, V'65, received the 1991 Caines Cycles Fido Award through the AVMA "for work in clinical research or basic sciences that has contributed significantly to the advancement of small animal medicine and surgery." Dr. Gelatt is considered a premier researcher and educator in the field of glaucoma.

Dr. Darrell Biery, professor of radiology, and Dr. Marc Sanders, professor of radiology, presented scientific papers at the Ninth Meeting of the International Veterinary Radiology Association (IVRA), held in Yelthoven, The Netherlands, in August. Dr. Biery was re-elected IVRA director for North America and appointed chairman of the organizing committee for the next international meeting. The Tenth IVRA meeting will be co-hosted by the University of Pennsylvania and the American College of Veterinary Radiology in Philadelphia in the summer of 1994.

Dr. Samuel Chacko, professor of pathology, spent three weeks in Leningrad in July at the USSR Academy of Science Institute of Cytology where he did a collaborative study with Russian muscle biologists. He then went on to present a paper at the International Biochemistry Congress.

Dr. Virginia Reef, assistant professor of medicine, received one of the 1991 Samuel F. Scheid Memorial Awards. The awards were established in 1984 by a grant from SmithKline Beecham to encourage participation in international scientific affairs and to support travel by AVMA-member veterinarians to the World Veterinary Congress.

The School was well represented at the meeting of the American College of Veterinary Internal Medicine in New Orleans in May. Papers were presented by Dr. James Buchanan, professor of cardiology, Dr. Giger, Dr. Monika Grori-Wenk, Dr. David H. Knight, professor of cardiology, Dr. Meryl Littman, Dr. Virginia Reitz, Dr. Michael Rosenzweig, Dr. Richard Squires, Dr. Corinne Sweeney, associate professor of medicine, Dr. Wendy Vaula, V'80, assistant professor of medicine/nematology, and Robert Washabau, V'72, assistant professor.

Dr. Dolores Holle, V'81, was appointed attending veterinarian and director of canine health management for The Seeing Eye, Inc., Morristown, NJ.

Dr. Karen Overall, V'83, lecturer in behavior, made a presentation to veterinarians and veterinary technicians at the annual meeting of the Morris Animal Foundation in Denver in June.
Teaching Awards

The ballroom at the Hotel du Pont in Wilmington was filled to capacity for the Annual Student Government Dinner Dance on April 14. Centerpiece of the evening was the presentation of the 1991 Student Government Awards for Teaching Excellence to members of the faculty and staff.

Designed to enable each of the four classes of the School to honor an individual who exemplifies the highest degree of proficiency in teaching, the award is given to "anyone involved in the educational process who has made a major contribution to our veterinary education through dedicated, creative, and informative teaching."

Dr. Mark Haskins, associate professor of pathology, was the recipient of the Class of 1994 Teaching Award. The Class of 1993 presented its award to Dr. Thomas Van Winkle, assistant professor of pathology. Dr. Charles Reid, professor of radiology, received the Class of 1992 Teaching Award. The Class of 1991 presented its award to Dr. Lesley King, lecturer in medicine. The 1991 Student Government Teaching Awards were also presented to Donna Oakley, head nurse, VHUP; Dr. Beth Ann Brockman, an intern at VHUP; and to Marjan Govers, a resident at VHUP.

Dr. Deborah M. Gillette, assistant professor of pathology, was the recipient of the Norden Faculty Teaching Award. Dr. John H. Wolfe, assistant professor of pathology and medical genetics, received the Beecham Research Award. The Dr. Jules Silver Bedside Manner Award was presented to Dr. Brockman. Dr. Celeste Washington, junior surgery intern, received the William B. Boucher Award for Outstanding Teaching at New Bolton Center by a House Officer. The Jams Small Animal Clinician Award was presented to Dr. Beth Callan, resident in medicine. The Resident's Award for Outstanding Teaching by a Faculty Member was presented to Dr. Robert Washabau, assistant professor of medicine.

The evening was supported by the following benefactors: Hills Pet Products, The Upjohn Company, Veterinary Medical Student Government, SCAMVA, Peter Imaging, Inc., and ANAQUEST.

Veterinarians and Wildlife Experts Train Arab Wildlife Rescue Workers

The massive oil spills in the Persian Gulf early this year endangered many birds, marine mammals and fish. A United Nations-sponsored six-member team, three veterinarians, two wildlife specialists and a bird specialist, was brought to Bahrain in May to help train wildlife workers to meet the great influx of animals injured by the oil. The team was assembled by the National Wildlife Research Center and Research, Inc. of Wilmington, DE, a group with a strong reputation for successfully rehabilitating oiled birds.

It included Dr. Greg Bossart, V'78, the veterinarian at the Onslow Seaquarium, Dr. Josh Dein, V'80, U.S. Fish and Wildlife Service Wildlife Health Laboratory (Madison, WI), Dr. Virginia Pierce, V'87, director of the Laboratory of Pathology, Philadelphia Zoo, Lynne Frink, president, TSSBR, Mary Jane Dalton, clinic supervisor at TSSBR, and John Finch, assistant curator of birds at the Philadelphia Zoo. They were chosen on the basis of their experience, knowledge and ability to deploy quickly to help with a crisis.

The team included Dr. Robert Washabau, assistant professor of medicine and medical genetics, and received the Beecham Research Award. The Dr. Jules Silver Bedside Manner Award was presented to Donna Oakley, head nurse, VHUP; Dr. Beth Ann Brockman, an intern at VHUP; and to Marjan Govers, a resident at VHUP.

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The workshop covered a wide variety of topics, including environmental and oceanographic factors, field methods for sampling birds and oiled marine mammals, and field methods for sampling birds and oiled marine mammals. The team also included Dr. Robert Washabau, assistant professor of medicine and medical genetics, and received the Beecham Research Award. The Dr. Jules Silver Bedside Manner Award was presented to Donna Oakley, head nurse, VHUP; Dr. Beth Ann Brockman, an intern at VHUP; and to Marjan Govers, a resident at VHUP.

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Echinococcus
The parasites commonly found in fecal examinations of dogs and cats are Roundworms (Ascaris), Whipworms (Trichuris), Tapeworms (Dipylidium caninum and Taenia species). Echinococcus multilocularis has been reported in north-central United States and south-central Canada. Foxes and coyotes are the common definitive hosts (the true parasites). A domestic cat is a possible intermediate host. Humans are thought to be infected by eating infected animals. There is no effective treatment for echinococcosis in humans, but chemotherapy may be considered.

Pet Population Control
The overpopulation of unwanted dogs and cats is a serious and complex problem. Considerable guesswork is used to estimate the number of dogs and cats euthanized each year by animal shelters, but it is not in the millions. The American Veterinary Medical Association (AVMA) recognizes that animal population control is a major concern. The first priority is strict enforcement of animal control laws. (This includes fines imposed on dogs allowed to roam and licensing laws that favor neutered pets.) Substantially higher license fee are recommended for animals that are not neutered. AVMA recommends licensing of all cats and control measures for them comparable with those for dogs. It also has an intensive public education/information program designed to make pet owners more responsible and concerned. A plan to control cats is highly recommended and it should be a requirement that animals adopted from any animal shelter be rendered sterile.

Some statements from the text - "Cats send a variety of messages through unmistakable body language... The household cat's ability to manipulate humans has been perfected over the centuries. In most cases, when a cat wants to be picked up and petted, it is going to be picked up and petted!... A cat's facial expression will vary considerably based on changes in mental status - the most obvious changes can be seen in ear position and dilation of pupils... Rubbing against a person is a cat's way of showing affection for a human. It also allows it the opportunity to scent mark that person..."
Legislators' Day 1991

A group of Pennsylvania legislators visited New Bolton Center in May for tours of the facility and presentations by faculty members.

Canine Symposium

The Twenty-second annual symposium, Your Veterinarian and Your Dogs, will be held on Saturday, January 25, 1992 at the Veterinary Hospital of the University of Pennsylvania in Philadelphia. The day-long event will consist of four presentations:

- Vaccinations: The Good and the Bad - Dr. Peter Jezyk
- Diagnostic Screening and Prevention of Heartworm - Dr. David Knight
- Diagnosis of Allergic Diseases and Clinical Manifestations of Thyroid Disease - Dr. Robert Schwartzman
- Common Parasites of Canines and Their Control - Dr. Thomas Nolan.

The cost of the program, including lunch and parking, is $45. Reservations are required and can be made by contacting Dr. M. Josephine Deubler, VHUP, 3850 Spruce Street, Philadelphia, PA 19104 (215) 898-8862.

Veterinary and Comparative Pathology Symposium

Dr. Michael Goldschmidt, associate professor of pathology, organized the 15th Annual Symposium on Veterinary and Comparative Pathology, held in June at the Marine Biology Laboratory in Woods, MA. The program was cosponsored by the School's Department of Pathobiology and the Continuing Education Division of the C.L. Davis D.V.M. Foundation. In addition to Dr. Goldschmidt, the following faculty members made presentations:

- Dr. Gustavo Aguirre, professor of ophthalmology;
- Dr. Robert Bullis, research associate in microbiology;
- Dr. Mark Haskins, associate professor of pathology;
- Dr. Mattie Hendrick, assistant professor of pathology;
- Dr. Alan Kelly, professor of pathology;
- Dr. Tom Van Winkle, assistant professor of pathology; and
- Dr. John Wolfe, assistant professor of pathology and medical genetics.

Colloquium on Domestic Animal Cytogenetics and Gene Mapping

The Seventh North American Colloquium on Domestic Animal Cytogenetics and Gene Mapping was held at the School in July. Organized by Dr. Richard A. McFreey, professor of animal reproduction, the colloquium was attended by an international group of cytogenetists. Dr. Ralph L. Brinster, Richard King Mellon Professor of Reproductive Physiology, and Dr. Donald F. Patterson, Charlotte Newton Shepard Professor of Medicine, each led a plenary session.

Course on Transport of Fresh Cooled Equine Semen

A one day seminar on Transport of Fresh Cooled Stallion Semen will be offered to veterinarians and farm managers on November 22, 1991 at the Georgia and Philip Hofmann Research Center for Animal Reproduction at New Bolton Center, the large animal facility of the University of Pennsylvania School of Veterinary Medicine. The course, taught by members of the Section of Reproduction, will encompass the veterinary, technical, and business aspects of developing a successful program for transporting fresh cooled equine semen. Both stallion and mare management will be covered in the morning lectures and afternoon laboratory sessions.

International Workshop

The First International Workshop on Erection and Ejaculation in Horses and Men was held in September at New Bolton Center. Organized by Dr. Sue McDonnell, research assistant professor of reproduction, and funded by the Dorothy Russell Havemeyer Foundation, this is the first of an expected series of workshops on erection and ejaculation for review of current knowledge, consideration of future comparative research, and planning of continued interaction. The participating physicians and veterinarians came not only from the United States but also from Germany and Poland.

Dr. William Medway Honored

At the 1991 Annual Meeting of the International Association for Aquatic Animal Medicine (IAAAM) held at Marineland, Florida from May 12 through 16, Dr. William Medway was designated an Honorary Life Member for his many contributions on behalf of the association and the field of aquatic animal medicine. Dr. Medway, Professor Emeritus of Clinical Laboratory Medicine, is only the fourth member of the association to be so honored. He is both a founding member and a past president of the IAAAM.

The announcement was made during the conference banquet and took the form of a "roast" by former students representing the entire span of his career on the faculty of the Veterinary School. His "oldest" student, Donald A. Abt V'61, initiated the "roast" and then turned the microphone over to the other conference participants gathered to pay tribute to Dr. Medway. They were John C. "Ray" Sweeney V'71, J. Lawrence Dunn V'73, Leslie A. Dierauf V'74, Richard H. Lamberton V'79, Paul F. Calle V'83, Robert W. Ulbrich V'86, Gregory A. Lewbart V'88, Howard N. Krum V'92 and Roy P.E. Yanong V'92. A whale sculpture suitably engraved is being prepared for Dr. Medway. Naturally, he offered an appropriate rebuttal to his former students when they had finished their versions of his teaching and research career.

Dr. Medway presently serves as one of nine members of the Marine Mammal Commission's Committee of Scientific Advisors, a committee of scientists statutorily required to be knowledgeable in marine ecology and marine mammal affairs, who advise the Marine Mammal Commission on pertinent marine mammal issues.

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Mr. and Mrs. Jack Billhardt and Martha Rogers, V'92, one of the three Mrs. Jack L. Billhardt Dean's Scholars.

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Alumni Awards of Merit were presented by Dr. Michael Ratner, V'59, and Dr. Jack Bregman, V'66, to six alumni.

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Alumni Day 1991 was a family affair with a clown for the youngsters, carriage and hayrides, and a side saddle riding demonstration by Mrs. Jack Bregman and Mrs. John Rotelli, Jr. More than 200 people attended the event at New Bolton Center.

In the morning the official business of the Veterinary Medical Alumni Society was conducted and the Alumni Awards of Merit were presented. Dr. Michael Ratner, V'59, passed the gavel of office of president to Dr. Jack Bregman, V'66, and introduced the officers and members of the board. They are:

Dr. Jack Bregman, V'66, President
Dr. Daniel D. Bleicher, V'53, President-Elect and Vice Chair, Liaison Committee
Dr. Michael P. Ratner, V'59, Past President and Chair, Awards and Nominating Committees

Members-at-Large
Dr. Malcolm Borthwick, Jr., V'69
Dr. Pierre A. Conti, V'60
Dr. Richard Derstine, V'57
Dr. Diane R. Eigner, V'80, Benjamin Franklin Society Chair and Phonathon Co-Chair
Dr. John R.S. Fisher, V'61
Dr. George L. Hartenstein IV, V'68, Liaison - NBC
Dr. Seth A. Koch, V'65, Annual Giving Co-Chair and Phonathon Co-Chair
Dr. Edgar R. Marookian, V'54
Dr. Sidney L. Mellman, V'49
Dr. Pat A. Picone, V'78, Annual Giving Co-Chair and Phonathon Co-Chair
Dr. Donald R. Shields, V'63
Dr. Joseph D. Slick, V'53, Chair, Pennsylvania Veterinary Medical Historical Society
Dr. Steven W. Syken, V'86
Dr. Robert J. Tashjian, V'56
Dr. Alexandra Wetherill, V'80

Other Board Members
Dr. M. Josephine Deubler, V'38, Historian
Dr. Darryl Berry, Faculty Representative
Dr. Charles Benson, Faculty Representative
Dr. Kathy M. Mockler, V'90, Pacesetter Representative
Dr. Michael Moyer, V'90, Pacesetter Representative

Student Representatives
Meredith Brown, V'93
Roy Yanong, V'92
Steve Cudia, V'94

Ex-Officio Members
Edwin J. Andrews, V'67, Dean
Nancy Martino, Director of Alumni Affairs
Dr. Bruce E. Ilgen, P.V.M.A. President
Dr. Martha O'Rourke, New Jersey V.M.A. President
Dr. William Wade, Delaware V.M.A. President

Dr. Max Herman, V'59, and Dr. Jack Bregman, V'66, president of VMAS, present a plaque of appreciation to Dr. Michael Ratner, V'59, past president of VMAS.
The Commencement Exercises for the 106th graduating class took place May 21, 1991 at the Zellerbach Theatre. The commencement address was given by Professor Lord Soulsby.

Dean Edwin J. Andrews, assisted by Assistant Dean Jeffrey A. Wortman, V’69, Associate Dean Charles D. Newton, and Mr. Charles S. Wolf, chairman, Veterinary School Board of Overseers, presented the diplomas to the 103 members of the Class of 1991. Class President Janice M. DeRiso presented commens and Dr. Jack Bregman, V’66, president of the Veterinary Medical Alumni Society, presented the class flag to Dr. DeRiso. Dean Andrews, assisted by Dr. Raymond W. Sweeney, V’82, presented awards and prizes to graduates and recognized those graduating with honors.

The administration of the Veterinarian’s Oath by Dr. Bruce Ilsen, president of the Pennsylvania Veterinary Medical Association, concluded the ceremony. Everyone then gathered for a reception for the graduates and their families.

### Award Recipients

**Leonard Pearson Prize**
- Susan Valerie Westmoreland
- J.B. Lippincott Prize
- Susan Bayard Schoen
- 1930 Class Prize in Surgery
- Lisa Marie Miller

**Auxiliary to the American Veterinary Medical Association Prize**
- Janice Madeline DeRiso

**Auxiliary to the Pennsylvania Veterinary Medical Association Prize**
- Kirk Theodore Smith

**1946 Class Medal for Achievement in Pathology**
- Ruth Sullivan

**James Hazlett Jones Prize in Biochemistry**
- Lee Anne Myers Palter

**American Animal Hospital Association Award**
- Derek Scott Duval

**Merk Awards**
- Andrea Jean Facetti
- Large Animal Award
- Joanne Wampler Raudenbush

**George M. Palmer Prize**
- Laura Nichols

**Evelyn H. Prior Prize for Cardiology**
- Jean Marie Beikowski

**E.L. Studd in Avian Medicine**
- Carol Lynn Yesley

**Large Animal Surgery Prize**
- Samantha Gail Abbott

**Large Animal Medicine Prize**
- James Seddons Holt

**Morris L. Ziskind Prize in Swine Medicine**
- Robert John Lewis, Jr.

**Phi Zeta Award**
- Ruth Sullivan

**Hill’s Award for Nutrition**
- Julia Ann Norton

**Purdue Mills Award in Swine Medicine**
- Robert John Lewis, Jr.

**Upjohn Awards**
- Small Animal Award
- Lisa Marie Miller
- Large Animal Award
- James Seddons Holt

**Auxiliary to the Student Chapter of the American Veterinary Medical Association Prize**
- Mark Jerome Pyckett

### Class of 1991

- Samantha Gail Abbott
- Sarah Shafter Alcorn
- Jennifer Ann Andres
- Rita Angelo
- Paul Raymond Avery
- Lion Ellen Rabbit
- Barrie Michele Barr
- Lori Lei Baron
- Jean Marie Beikowski
- Mark Leonard Boccella
- Christopher John Bonar
- Rebecca Boshaw
- Mary Magdalena Bowser
- Katherine Standish Bradley
- Elaine Judith Brots-Tobin
- Elizabeth Ann Campbell
- Greg William Campbell
- Christopher Keith Cebra
- Kenneth Edwin Cullen
- Natalie Nero Daniels
- Georige Kathryn Danyly
- Janice Madeline DeRiso
- Nancy Kate Diehl
- Derek Scott Duval
- Michael Evan Dye
- Gregory Edwin Edelman
- Gregory John Ertz
- Sandra Jane Fargher
- Andrea Jean Facetti
- Helen Mary Ganser
- Elizabeth Marie Geagan
- Andrew Neale Germain
- Amy L. Grauman
- James Seddons Holt
- Scott David Johnson
- James Grace Jones
- Michelle Marie Karpovich
- Cynthia Anne Kezzi
- Marilynn Shino Kloosy
- Joyce Ruth Koch
- Margaret Neill Lackey
- Debra Ann Lawe
- Dena Christine Lebo
- Maria Litchfield Lewis
- Robert John Lewis, Jr.
- Stephen Keith Long
- Thomas John Lyons
- Heather Kate Mack
- Lisa Ann Maccini
- Paul M. Marcus
- Maureen Ann McElhenny
- James Kay McGregor
- Michael Lawrence Milholland
- Lisa Marie Miller
- Sally Fuller Morenaet
- Jaime Freedy Modiano
- Diane Lynn Monroe
- Judith Ellen Sklar Naborny
- Shelby Jean Nedy
- Laura Nichols
- Julia Ann Norton
- Lois Elizabeth Palin
- Lee Anne Palmer
- Jennifer Lyle Plais
- Mark Jerome Pyke
- James Stephen Quarancz
- Joanne Wagler Raudenbush
- Robynlee Reichard
- William Petersen Rives
- Frederick Martin Rock
- Mark Louis Roma
- Susan Bayard Schoen
- Cathy Marie Schwezegruber
- Joelene Shaw
- Kenneth Thomas Shirella
- Lindsay Scott Schreiber
- Matthew Wade Singler
- Sean David Smarick
- Kirk Theodore Smith
- Brenda Louise Spikler
- Susan Marie Spiridon
- Helel Byers Stout
- Ruth Sullivan
- Lisa Peri Swialk
- Claire D. Thompson
- John Page Trigge
- Barbara Lynn Vail
- Mary Bertladesh Van Kooi
- Douglass Lynn Victorian
- Nancy Jane Vovich
- Raquel Maria Walton
- Jane Marie Walton
- Kimberly Ann Werner
- Susan Valerie Westmoreland
- Mary Elizabeth Wilkes
- Rex Brian Womong
- Dona Lee Woodworth
- Judy Kevin Wyno
- Carol Lynn Yeisley
- Leslie Ellen Ziemer
- Stan Michael Zuczek

**Summer/Fall 1991**
Continuing Education Courses for Practitioners

October 23, 1991
Small Animal Medical Problem Solving, Part I
Dr. Joan Hendricks, Associate Professor of Medicine
Dr. Lesley G. King, Assistant Professor of Medicine
Dr. Alen R. Klap, Resident in Medicine
Dr. Meryl P. Litman, Associate Professor of Medicine
Dr. Richard A. Squires, Assistant Professor of Medicine
Dr. Robert J. Washabau, Assistant Professor of Medicine

This program will illustrate the use of the problem-solving method in small animal clinical practice. A case discussion format will be utilized in solving every-day practice problems, including:

1. Tackling the Problem of Proteinuria
2. The Coughing Dog
3. Managing the Vomiting Dog
4. Hemolytic Anemia
5. Urinary Incontinence in the Dog
6. The Ascitic Dog: What to do

The case discussion will emphasize diagnosis and therapy of these common practice problems.

Sunday, November 10, 1991
Clinical Hematology in Small Animals*

Presented by Veterinary Transfusion Medicine Academic Awardees, organized by Dr. Urs Giger.
Dr. W. Jean Dodds - Coagulopathies
Dr. Kenneth Meyers - von Willebrand Disease
Dr. Joseph Smith - Iron deficiency anemia
Dr. Urs Giger - Erythropoietin and its clinical use
Dr. Susan Cotter - Autoimmune hemolytic anemia
Dr. Robert W. Bull - Paternity testing in small animals
Dr. Susan Cotter - Emergency hematology

This one-day program provides a unique opportunity to learn from nationally recognized veterinary clinical hematologists. Each speaker will present a state-of-the-art review and the latest information about clinical signs, laboratory tests, and management of common hematologic disorders in small animals. Ms. Donna Oakley will demonstrate VHUP's blood transfusion program and the first veterinary bloodmobile.

This course is partially supported by Baxter General Health Care, Biopure Corporation, and Cin-Med Association.

*In Penn Vet the date for this course was listed at November 20, please note correct date of November 10.

To register for CE courses, please contact Ashra Markowitz, Office of Continuing Education, School of Veterinary Medicine, University of Pennsylvania, 3800 Spruce Street, Philadelphia, PA

Bellwether 31

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

Address correction requested