

# Veterinary

M E D I C A L R E V I E W

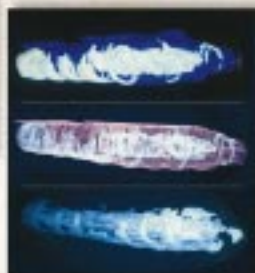


- Dr. Kornegay Named Dean
- Developing Quadramet
- Helping an Osprey Catch an Important Flight
- Taking a Bite Out of Pet Health Costs
- Diagnostic Detectives
- Old Books, Old Wisdom
- Dog's Best Friend

*New*

**Flashback!**

Revealing  
Mysteries  
of the  
Ancient  
Animal  
Mummies



**See Some Surprises!**

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# Veterinary

M E D I C A L R E V I E W

Spring/Summer 1999

Volume 16, Number 2

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### ON THE COVER



**BEST PRESERVATION**  
Of the three mummies investigated, the baby crocodile was in the best condition on the outside. Its crosshatched linen wrappings are still nearly perfect in spite of 2,000 years of age.



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*“I look forward to working with our alumni and friends.”*

## *Moving Forward Together*

*B*y now, many of you will have heard of my appointment as Dean of the MU College of Veterinary Medicine. This is a tremendous honor for me. I look forward to working with our alumni and friends to advance the College’s programs.

First, thanks so much for your support and advice over my tenure as interim dean. At the time I accepted the interim position in May, 1998, a number of key issues faced the College. These included a review of the DVM curriculum, our anniversary endowment campaign, recruitment of several endowed professorships, mission enhancement for University programs through the state legislature, and the American Veterinary Medical Association’s (AVMA) accreditation visit. Our students, staff, and faculty have really “stepped up to the plate” and worked tirelessly to address these areas. The good news is that progress has been made on all fronts! I’ll keep you updated on what should be some exciting developments in the months ahead.

Preparation for the AVMA accreditation visit required a substantial self-study document. We decided to take advantage of the resulting discussions and incorporated strategic planning at the unit level in this process. I’ve reviewed these materials and want to now develop a more comprehensive College plan. Your input will be needed. With this in mind, over the coming months, I’ll be getting out in the state to meet with many of you and other key constituency groups. It’s really pretty simple. You’ve been there for us time and time again when we’ve needed you. It’s important that we be there for you when you need us.

As I’ve stressed in the past, a natural synergism exists among our teaching, service, and research missions. I’m confident that, working together, we can capitalize on this synergism and really make a difference!

**Joe N. Kornegay, Dean**

# Dr. Joe Kornegay Named Dean



Dr. Joe N. Kornegay, Interim Dean of the University of Missouri-Columbia College of Veterinary Medicine, was named Dean of the College. Dr. Kornegay took over as Interim Dean in May 1998, succeeding Dr. H. Richard Adams, who resigned after 6 years as Dean to become dean of veterinary medicine at his alma mater, Texas A&M University.

"Dean Kornegay will be an important addition to the leadership team of this campus at a very important time in the history of the College of Veterinary Medicine and the educational mission of this university," Provost Brady Deaton said. "His

distinguished record as an exemplary teacher, national prominence as an academic clinician and scholar, and his commitment to the statewide role of the College make him an ideal choice for this position. Not only will Dean Kornegay continue to develop research and scholarship on the campus, but he will continue to evaluate and build programs that strengthen the statewide role of the College. His leadership will enrich the strong programs of the College and provide students with the training and conceptual understanding to be leaders in the practice of veterinary medicine. I am excited by this appointment and am looking forward to working closely with Dr. Kornegay."

"I appreciate the confidence shown in me by Provost Deaton and look forward to working with him to achieve our common goals for the College of Veterinary Medicine,"

Dr. Kornegay said. "Through the collective efforts of our students, staff and faculty, as well as alumni and other supporters in the state, the College has made tremendous progress in recent years. It is important to me that all groups served through our programs benefit from this momentum. With this in mind, I will work particularly hard to capitalize on the natural synergism that exists among the College's teaching, service, and research missions."

"I am pleased by this appointment, which places a very strong academician and administrator in such an important position for the College, the University and our state," Chancellor Richard Wallace said. "Importantly, Dr. Kornegay has excellent credentials as an educator

and clinician in addition to his record in scholarship. The breadth of his background will help ensure that Missouri's only College of Veterinary Medicine continues its prominent role of service to the people at an exciting time when we are strengthening the life sciences on our campus and planning for the opportunities offered by the state's mission enhancement program. Dr. Kornegay is the right person at the right time to provide leadership for this effort."

Dr. Kornegay joined MU in 1994 as professor and chair of veterinary medicine and surgery, director of the Veterinary Medical Teaching Hospital and investigator for the Dalton Cardiovascular Research Center. Previously, he was a professor of companion animal and special species medicine at North Carolina State University in Raleigh, where he spent 11 years, received numerous teaching awards and remains an adjunct professor. There, Dr. Kornegay gained a national reputation for his research on a canine model of Duchenne muscular dystrophy, which he continues at MU. He also spent several years working as a veterinarian in private practice. Dr. Kornegay earned a bachelor's degree in veterinary sciences and a doctorate in veterinary medicine from Texas A&M University, and a master's degree in veterinary anatomy and doctorate in veterinary pathology from the University of Georgia in Athens. He is board certified in the neurology specialty of the American College of Veterinary Internal Medicine.

"The College of Veterinary Medicine plays an extremely important role at MU and throughout the state," Dr. Kornegay said. "We are the only Missouri university that awards the DVM degree and also have critical responsibilities in clinical service and outreach. In addition, College faculty are committed to work with colleagues from other divisions to increase MU's research productivity."





## Bald Eagle Returns to Wild with Help from Vet Students

On a warm October day, a mature bald eagle named Itsan was released back into the wild south of Columbia, Mo. after six months of intensive rehabilitation.

Itsan arrived at MU's Veterinary Medical Teaching Hospital in April. He was underweight, sick, and had a dislocated shoulder. Students in the College's Raptor Rehabilitation Project first worked to cure an infection. Later, the group sought to increase the eagle's body weight.

After a month of cage rest, the eagle began a rehabilitation process that included limited flying. A large crowd of students, faculty, staff, and television reporters were on hand to observe the release near the Missouri River.

The MU Raptor Rehabilitation Project is an educational and service activity of the College of Veterinary Medicine with support from the Missouri Department of Conservation. The project is managed by veterinary medical students and community volunteers under the supervision of veterinary medical hospital faculty.

The group seeks to rehabilitate and release birds of prey back into the wild, learn more about Missouri's large birds, and educate the public about raptors and their importance to the environment.

Marla Gray, a fourth year veterinary medical student and president of the raptor project who supervised much of Itsan's rehabilitation, warned that untrained people should not approach an injured raptor. These birds, she said, are wild animals with powerful beaks and claws. Additionally, raptors are protected by state and federal law. People who find an injured bird should call the MU Veterinary Teaching Hospital at (573) 882-7821 for assistance.

The group is available to give presentations on birds-of-prey featuring some of its resident raptors—injured birds who cannot be returned to the wild because of their injuries. The Raptor Rehabilitation Project also coordinates a raptor adoption program in which individuals or companies can sponsor an injured bird's care. Funds also are used to improve the group's bird holding and training facilities. Each sponsor receives a certificate of



Marla Gray, a fourth year veterinary medical student and president of the College Raptor Rehabilitation Project, struggles to get a bald eagle from its cage to release back into the wild. She is assisted by Nicole Griffin also a fourth year student and vice president of the group. Two local television stations witnessed the release.

adoption and a photo of the adopted bird. Fees range from \$25 to adopt a screech owl, to \$100 to adopt a golden eagle, to \$150 to adopt a bald eagle.

**NEWS**

## New CVM Clinical Trials Offer Reduced Fees for Dogs

Dogs with certain types of cancer may be eligible for reduced-fee medical treatment by participating in one of a series of clinical studies at MU's Veterinary Medical Teaching Hospital.

One study will clinically test a new chemotherapy protocol designed to induce remission of canine transitional cell carcinoma of the bladder. A second trial will investigate a new chemotherapy treatment for prostatic cancers. A third study is designed to help develop a medical strategy to prevent the recurrence of certain soft tissue tumors after cancer surgery.

In the first study, the MU Veterinary Medical Teaching Hospital is the lead institution in a Veterinary Cooperative Oncology Group (VCOG) trial for the treatment of bladder cancer in dogs.

Dogs with a diagnosis of transitional cell carcinoma (TCC), a common bladder cancer, and whose disease is visible with ultrasound, are eligible for the study.

To be eligible, the dogs must not have received previous treatment with piroxicam and must not have any other complicating disease, Dr. Carolyn Henry, assistant professor of oncology said.

In the bladder and prostatic tumor clinical trials, dogs receive four doses of mitoxantrone chemotherapy, given on an outpatient basis every three weeks at the MU Veterinary Medical Teaching Hospital. In the bladder study, owners also administer an oral medication, piroxicam, at home. The tumors are measured before the first and third treatments, using ultrasound. Mitoxantrone is provided free of charge. "This is nearly \$900 in savings for a 60-pound dog," Dr. Henry said.

Clients are responsible for other costs associated with diagnosis and treatment. "We have enrolled 21 dogs in the bladder cancer study thus far and our target enrollment is 50 cases by May 1999," Dr. Henry said.

The third trial is designed to find a treatment that will prevent post surgical recurrence of a type of soft tissue tumor



(hemangiopericytoma) that occurs most often on the limbs. This trial is designed for use in cases where radiation therapy is not feasible. "Here, we are investigating the use of mitoxantrone chemotherapy post operatively," Dr. Henry said.

Dogs participating in the study will receive treatment on an outpatient basis every three weeks for four doses. Regular follow-up care at the teaching hospital is required after completion of treatment. The drug is provided free of charge, as are thoracic radiographs. To date, two dogs have been enrolled in the study that has a target enrollment of 40 cases in a one-year period.

A fee reduction also is available for the treatment of dogs with oral malignant melanoma. This is the most common oral cancer in dogs and also serves as a model for treatment of melanoma in people.

Dr. Henry can be reached at the Veterinary Medical Teaching Hospital, 573/882-7821.

## MU Researcher Named Chief USDA Scientist

Dr. Michael Roberts, adjunct professor and the previous chair of pathobiology in MU's College of Veterinary Medicine, has been named chief scientist at the U.S. Department of Agriculture's National Research Institute (NRI) in Washington, D.C.

Dr. Roberts divides his time between Columbia and Washington D.C., where he works as a policy leader for the National Research Initiative Competitive Program. The program funds research on key problems of national and regional importance in biological, environmental, physical, and social sciences relevant to agriculture, food, and the environment. The grant proposals are judged on a peer-reviewed, competitive, basis.

Dr. Roberts has received several awards and honors. He was elected to membership in the prestigious National Academy of Sciences in 1996. He also was the 1994 Amoroso Lecturer at the Society of the Study of Fertility, the 1992 U.S. Department of Agriculture Distinguished Scientist, and the 1990 Sydney A. Asdell Lecturer at Cornell University for the Study of Reproduction's Research Award.

## Scholarship Honors Dean Adams

A scholarship will be established honoring former MU College of Veterinary Medicine Dean H. Richard Adams. Donations are now being sought.

The scholarship will be awarded to a graduating veterinary medical student who demonstrates exceptional interest and understanding of how the human-animal bond will influence the future of veterinary medicine.

Donations to this fund should be sent to David Horner, director of development, College of Veterinary Medicine, W203 Veterinary Medical Building, University of Missouri, Columbia, Mo. 65211 (phone: (573) 884-5972). Checks should be payable to the University of Missouri and designated for the H. Richard Adams CVM Tribute Fund.

## New Editions of Books by Faculty and Alumni

New versions of two books edited by College faculty and alumni were recently introduced.

Dr. John Bonagura, the College's Gilbreath-McLorn Endowed Professor of Cardiology, recently completed editing *Kirk's Current Veterinary Therapy*, Volume 13, Small Animal Practice.

Dr. Robert Paddleford, DVM '70, recently saw the second edition of his book *Manual of Small Animal Anesthesia* published.

## Time is Best Medicine for Some Eye Injuries, MU Report Indicates

It's best to let nature take its course with some eye diseases, according to a recent MU College of Veterinary Medicine study.

The study found that healing of bruised and swollen corneas was actually delayed when treated with corticosteroid ointments or drops. In fact, in some cases, the treatment can lead to permanent damage to the eye.

The study was conducted by Dr. Cecil Moore, acting chair of Veterinary Medicine and Surgery and the MU Veterinary Medical Teaching Hospital.

Corneal bruises, usually caused by a blow to the eyelid or brow, impart a



Dr. Cecil Moore, left, examines the eyes of a small dog at the College's Veterinary Medical Teaching Hospital. Dr. Moore is one of the nation's leading veterinary ophthalmologists.

cloudy appearance to the intact surface of the eye. Corticosteroid preparations have already been linked to destructive fungal growth in cases where the surface of the eye has been disrupted, such as a corneal scratch. According to Dr. Moore, a veterinary medical ophthalmologist, use of these preparations on an intact cornea can also be detrimental.

Dr. Moore's study involved nine cases of horses with bruised corneas. He found that the six that initially received cortisone took, on average, two weeks longer to heal than the three that did not.

One way the medication inhibited the healing process was by preventing small blood vessels from migrating into the bruised cornea. The migration helps clean out the damaged tissue, Dr. Moore said.

Animal owners understandably want the eye to look normal as soon as possible, Dr. Moore said. Corticosteroids seem to initially achieve that goal. The eye, however, will flare up again as the tissues try to heal. The longer the healing process, the more potential for permanent damage to the eye and loss of sight, he continued.

For bruises of the cornea, Dr. Moore recommends using a systemic or topical nonsteroidal anti-inflammatory drugs, which help to control the irritation while allowing the surface of the eye to heal on its own.



## Honoring a Friend



Classmates of Dr. Steven Bumgarner, class of 1987, gather around a lectern dedicated in Dr. Bumgarner's honor. The lectern is located in the College of Veterinary Medicine's H. Richard Adams Conference Center. Dedication of the lectern occurred in May '98, one year after Dr. Bumgarner died of cancer. Attending the dedication ceremony were Dr. Craig Franklin, MU veterinary pathobiology assistant professor; Dr. Kitty Gepford-Barnett, Fulton, Mo.; Dr. Stacy Messner, Blue Springs, Mo.; and Dr. Lonnie Blum, Holden, Mo.

## Accolades



**Dr. Allen Hahn**, professor of veterinary medicine and surgery, received the Best of Symposium Award for Investigative Informatics by the Association for Veterinary Informatics and Idexx Informatics. The award was made at the groups' meeting last Summer. Dr. Hahn's presentation was judged as contributing most to the improvement of veterinary medical patient care through the application of informatics by the practitioner.

**Dr. Robert Livingston**, a MU post doctoral fellow, was certified as a Diplomate of the American College of Laboratory Animal Medicine. The specialty board, recognized by the American Veterinary Medical Association, consists of more than 600 active specialists in the field of laboratory animal medicine.



**Dr. Stan Casteel**, associate professor of veterinary pathology, was invited to participate as a panelist in Protecting Children from Lead Exposure: Assessing the Relationship Between Soil Lead to Blood Lead. The discussion was held in October in Washington, D.C., and was hosted by the National Environmental Policy Institute.

**Dr. Lynelle Johnson**, veterinary biomedical sciences graduate student, received the 1998 American Physiological Society's Outstanding Presentation by a Graduate Student Award for her presentation "Exercise Training Produces Enhanced Acetylcholine-Induced Vasorelaxation in Porcine Pulmonary Arteries." She made the presentation at the society's recent annual conference.

**Dr. James Thorne**, associate professor of



pathobiology, recently chaired the annual Epidemiology and Economics of Animal Health Management meeting in Lansing, Mich.

The MU College of Veterinary Medicine Alumni Organization recently received Honor Chapter status from the MU Alumni Association. Only 20 of MU's 70 alumni chapters received honor status this year. The recognition is based on the chapter's activities, projects, membership, and service. An Honor Chapter receives additional scholarship and operating funding.

# '99

## Calendar of Events

### March 15-19

Spring Vacation Week for VM 1 & 2

### March 20-28

MU Spring Break

### April 1

Research Day

Sponsored by Phi Zeta & the College

### April 10

College of Veterinary Medicine

Parents Day

H. Richard Adams

Multipurpose Conference Center

8 am - 2:30 pm

### April 10

Gentle Doctor Benefit

MU Hearn Center Field House

4-10 pm

### April 16-17

MU College of Veterinary

Medicine Open House

CVM campus

9am-3pm

### May 2-8

National Pet Week

### May 7

College of Veterinary Medicine

Commencement

Jesse Hall, UMC campus

### July 10-14

American Veterinary Medical Assn.

New Orleans, La.

### September 25

College Alumni Day

### NOTE

*Times and places here may change. Check with the sponsoring organization for the latest information.*



**Dr. Jimmy Lattimer, associate professor at the MU College of Veterinary Medicine, investigated the ability of a new drug to relieve the pain of cancer in dogs. Dr. Lattimer was a member of a university-wide team of investigators evaluating the radioactive drug, Quadramet, in dogs and humans.**

*The Quadramet story is a remarkable testament to the power of collaboration and an excellent example of the 'one medicine concept.' Working together, faculty from the various divisions contributing to the life sciences will continue to make discoveries that impact both human and animal health.*

—Dr. Joe Kornegay  
Dean, College of Veterinary Medicine

# University Team Effort Helps Cut Pain to the Bone

**T**he pain of metastatic prostate and breast cancer in humans that has spread to the bone can be debilitating. Thirteen years ago, a group of MU researchers began a study to develop a new drug to more effectively treat that pain. Today, the fruits of their labor are helping cancer patients in the form of Quadramet, a radiotherapeutic approved last spring by the U.S. Food and Drug Administration.

The effort not only yielded the new drug, but also helped create a University wide team approach to develop and test new drugs. These team players included faculty in the University's College of Arts and Science, College of Engineering, Ellis Fischel Cancer Center, Research Reactor Center, School of Medicine, University Hospital and Clinics, and College of Veterinary Medicine. Staff in the Truman Veterans Hospital also aided in the effort.

The effort showed that the "one medicine concept," a joint effort where diverse health-related organizations lend their particular expertise to a project, could yield tangible results.

"Without the teamwork this may never have gotten off the ground," said Dr. Wynn Volkert, lead investigator of the project and professor of radiology at the MU School of Medicine.

Metastatic cancer afflicts more than 200,000 people a year, according to the American Cancer Society and National Cancer Institute. The chronic, unremitting pain of the cancer is caused by rapidly growing skeletal tumors.

"The quality of life deteriorates rather quickly because the pain of this cancer makes life difficult," said Dr. Allen Ketting, associate director for research

and development at the University of Missouri Research Reactor Center.

## The Story of Quadramet

The story of Quadramet began in 1982 with a cooperative development agreement between the University's Health Sciences Center and Dow Chemical Co. to find applications for Dow's existing stock of chelating agents—drugs that attach themselves to specific parts of the body. Work was begun to see if these agents had any value in treating cancer. The best candidate had the unwieldy name of ethylenediaminetetramethylenephosphoric acid, EDTMP for short.

EDTMP was strongly attracted to the rapidly growing bone cells that comprise bone cancer tumors. This made EDTMP a likely carrier to deliver a radioactive element that would help kill the cancerous cells. To be effective, EDTMP would have to concentrate its effects without lingering too long in the body causing unwanted side effects.

After reviewing several candidates for the cancer-treating component, the radioactive isotope of samarium-152, a rare metal in the earth's crust, was chosen. Samarium-152 is not naturally radioactive, bringing the University's research reactor into the picture. After a week-long bath in the core of a nuclear reactor, samarium-152 is converted in radioactive samarium-153.





Samarium-153 looked promising as a cancer-fighting drug. With a half-life of 46 hours, it decays naturally in a couple of days leaving no lingering radiation. It also emits enough gamma radiation to be picked up by a gamma camera, allowing clinicians to make sure the drug localized in the targeted tumor and not healthy tissue.

Strontium-89, a current cancer-fighting isotope, has a half-life of 50 days, produces a number of side effects including nausea and hair loss as radiation destroys adjoining tissue. It also allows few opportunities for monitoring.

Samarium-153 also blended well with EDTMP. But would they work well in a living organism and help destroy tumor cells?

### 1983

In 1983, samarium-153/EDTMP passed its first tests on healthy laboratory rabbits and rats. What would it do against bone cancer? Dr. Jimmy Lattimer, associate professor at the MU College of Veterinary Medicine had a plan: beagles.

“As it happens, dogs are the only other species that commonly contract bone cancer,” Dr. Lattimer said. “They get it at about 10 times the rate of humans.”

Dr. Lattimer structured two tests. The first used 24 laboratory-bred beagles. The second test used 40 canine cancer patients at the Veterinary Medical Teaching Hospital. Under Dr. Lattimer’s direction, samarium-153/EDTMP was used against cancer for the first time in living subjects.

From 1984 to 1988, Dr. Lattimer and Dr. Louis Corwin Jr, professor of veterinary pathobiology, worked on the study. Pet owners from as far away as New York City and Philadelphia flew their sick dogs to MU to undergo the experimental treatment.

Initial results were promising. Samarium-153/EDTMP ignored healthy tissue and settled in large quantities in tumor sites. Excess medication passed harmlessly through urine within six to 12 hours.

The drug produced no typical side effects such as hair loss, although it did temporarily suppress the dog’s production of bone marrow and white blood

cell count, causing a reduction in platelet production. Dogs that entered the hospital unwilling to stand, walk, or eat because of pain reverted to a more normal attitude and lifestyle.

“We were able to exhibit a reduction in bone pain in more than 90 percent of the dogs we treated,” Dr. Lattimer said.

In 1987, based on the successful dog studies, the first phase of human testing began. The first human patient, who received the medication on an outpatient basis, responded as positively as Dr. Lattimer’s patients did. Next, 22 patients at MU’s Ellis Fischel Cancer Center, suffering from the pain of metastatic bone cancer, volunteered for the treatment. The results again mirrored Dr. Lattimer’s studies, with 17 of the 22 reporting a significant reduction in pain.

### 1990

In 1990, samarium-153/EDTMP testing shifted from MU to Dow’s hands. In phase two testing, clinics in Europe and North America confirmed MU’s phase one results. In phase three trials, the final step before FDA approval, 50 human medical clinics performed testing. Last March, samarium-153/EDTMP, marketed under the name Quadramet, was approved by the FDA for human use.

The effort to produce Quadramet has come full circle on the MU campus. The University’s hospitals use it in humans as a palliative therapy, the research reactor irradiates samarium-152 into samarium-153, and, at the College of Veterinary Medicine, Dr. Lattimer and his colleagues have another tool to fight the pain of cancer in dogs.



### Christmas Cheer

For the needy of mid-Missouri, Santa didn’t come by reindeer but by pickup trucks this past Christmas when the College Class of 2001 donated 670 pounds of food to the Central Missouri Food Bank. The Class of 2001 won a friendly competition with the Class of 2002 who also collected and donated food to the charity.



### Mark Your Calendar for College Events in April

The MU College of Veterinary Medicine will be center stage for three events in April 1999.

On April 10, the annual CVM Parents Day will occur. The event will begin in the College’s H. Richard Adams Conference Center and extend from 9-11:30 am.

The College’s annual Gentle Doctor Benefit is scheduled for 4-10 pm on April 10 and will take place in the MU Hearnes Center.

The College’s Open House is scheduled for Friday, April 16 (9 am-3 pm), and Saturday, April 17 (10 am-3 pm). Admission is free. There will be demonstrations of police dogs and German protection dogs, as well as mule rides, a petting zoo, tours, and a teddy bear clinic.



# Revealing the Mysteries of the

Sometime between 300 B.C. and 200 A.D., an Egyptian felt compelled to make a prayer offering to the crocodile god Sobek. With a prayer for strength or endurance, he reverently left a brown-and-tan baby crocodile mummy in the temple of this god.

Twenty centuries later, that same 18-inch-long mummified crocodile, on loan to the University of Missouri-Columbia's Museum of Art and Archaeology, came under the laser positioning crosshairs of the CT Scanner at MU's Veterinary Medical Teaching Hospital. After thousands of years of mystery and conjecture, the animal was to yield its secrets to one of the most sophisticated medical imaging devices devoted to veterinary medicine. Without disturbing its fragile linen wrappings, the scanner would peer into the animal and look for the remains of a skeleton, internal organs, or any clues about the Egyptian rituals that caused these animals to be worshiped and mummified. It was also hoped the scans would show any mummification

by Randy Mertens

incisions, disease pathology, and, if the stomach was present, the animal's last meal.

Joining the baby crocodile in the investigation was a 3,000-year-old hawk and 2,000-year-old kitten. Egyptologists had studied the outside of the animals for decades, even X-raying them in 1931. The CT scanner, a computer-enhanced X-ray machine that can yield three-dimensional soft tissue images that conventional radiography cannot, promised to show more.

### College Is Asked to Assist

Dr. Jane Biers, curator at the MU Museum of Art and Archaeology, and Dr. Patricia Podzorski, assistant director and an Egyptologist, requested the assistance of the MU College of Veterinary Medicine to learn more about the mummies on loan from the Field Museum in Chicago.

A 1931 X-ray yielded some fuzzy skeletal information on two of the animals, showing little beyond that animals did exist under the wrappings. In addition to looking for evidence of the mummification technique

used, Drs. Biers and Podzorski hoped to see if

any amulets (Egyptian good luck charms) were inside the wrappings. Knowing the gender, species, and age might help Egyptologists determine if these played roles in religious rituals.

Another question: Did the mummies die natural deaths, or were they killed to satisfy the market for animal offerings?

The 1931 X-ray did not reveal a cat under its linen wrapping. Egyptologists speculated that an unscrupulous ancient vendor, knowing the buyer wouldn't unwrap the mummy, sold a fake cat to an unsuspecting customer. Because of this, the cat mummy commanded only moderate historical interest.

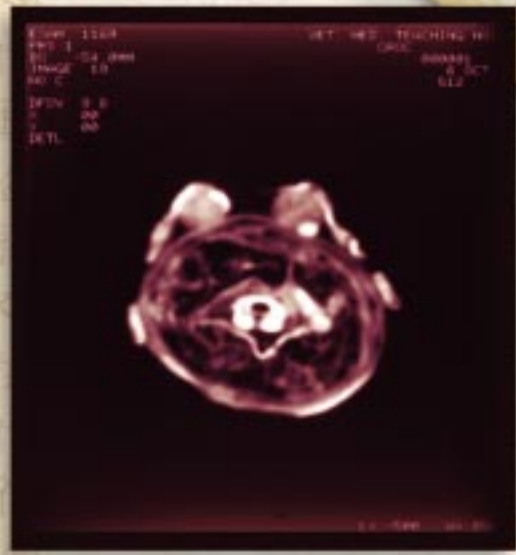
Dr. Biers said Egyptologists could only guess the mummies' ages as they were unearthed by grave robbers and sold as tourist trinkets.

Because the practice of mummifying animals took place during a 1,000-year time span, with several millions of animals sacrificed, there are thousands of catacombs filled with these relics, Dr. Podzorski said.

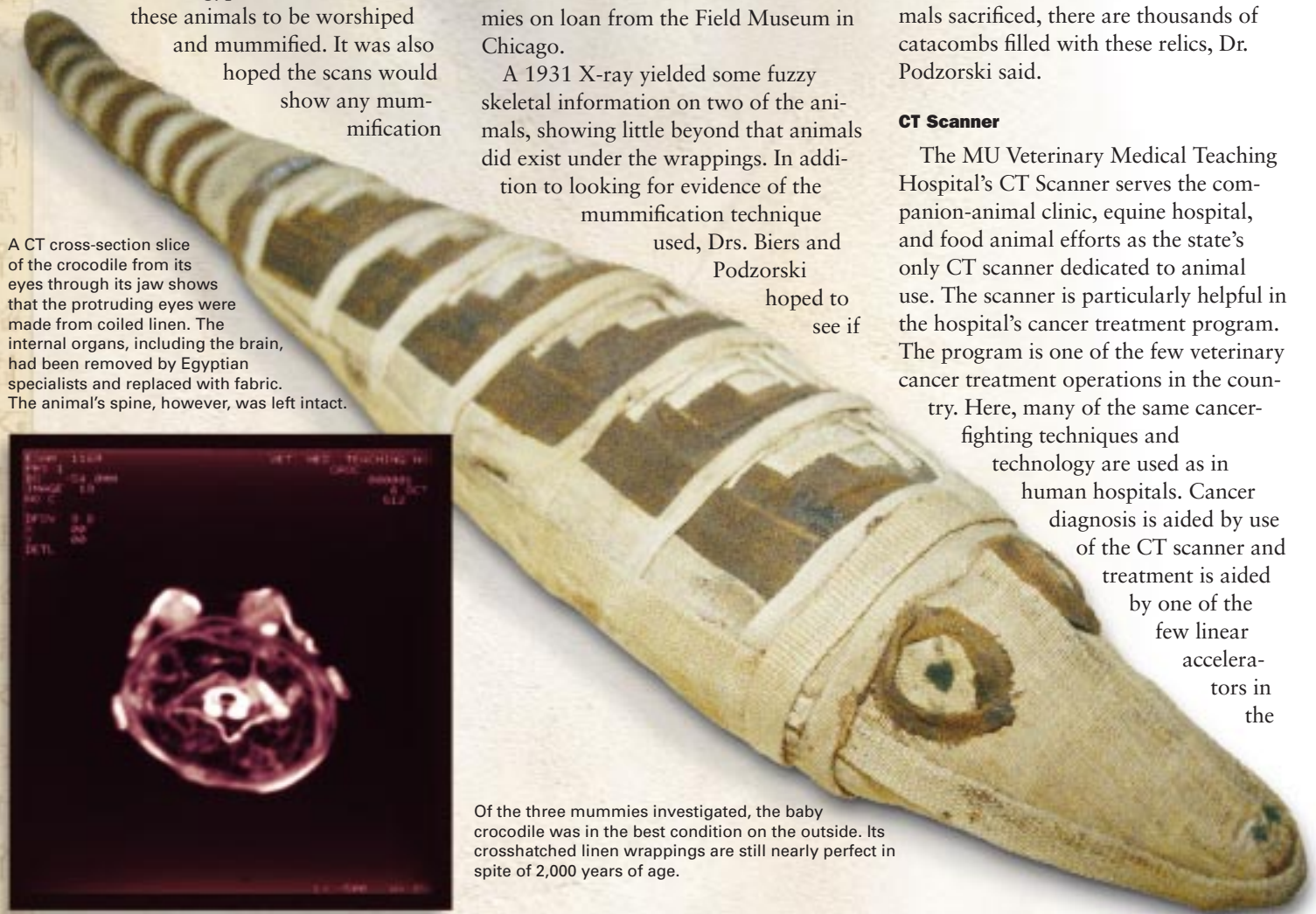
### CT Scanner

The MU Veterinary Medical Teaching Hospital's CT Scanner serves the companion-animal clinic, equine hospital, and food animal efforts as the state's only CT scanner dedicated to animal use. The scanner is particularly helpful in the hospital's cancer treatment program. The program is one of the few veterinary cancer treatment operations in the country. Here, many of the same cancer-fighting techniques and technology are used as in human hospitals. Cancer diagnosis is aided by use of the CT scanner and treatment is aided by one of the few linear accelerators in the

A CT cross-section slice of the crocodile from its eyes through its jaw shows that the protruding eyes were made from coiled linen. The internal organs, including the brain, had been removed by Egyptian specialists and replaced with fabric. The animal's spine, however, was left intact.



Of the three mummies investigated, the baby crocodile was in the best condition on the outside. Its crosshatched linen wrappings are still nearly perfect in spite of 2,000 years of age.





# Ancient Animal Mummies

world dedicated to animal use.

CT stands for Computed Tomography, previously known as Computed Axial Tomography (CAT). "Tomo" means *slice* in Greek.

In a conventional X-ray exam, X-rays pass through the body to a film that records anatomy mainly as shadows. Only the outside shape of organs is visible.

CT scanning uses X-ray information taken from around an object to construct a series of initial black and white cross-sectional images. These images are like slices of bread, revealing a detailed image inside the targeted bones and soft tissue. In a live animal, injectable, contrast-enhancing dyes may be given in conjunction with the scan.

The data is sent to a computer for processing in a step called reconstruction. This converts the images into a series of pixels that can be manipulated into a computer-generated three-dimensional image.

CT scans are generally used to determine the condition of soft organs such as the brain, liver, lung tissue, and kidneys. It also can be used on complex bony structures like the spine, pelvis, and hip. The CT is a valuable tool in searching for large space-occupying lesions such as tumors.

CT scanning is particularly useful clinically because it can be performed rapidly. Only a few minutes are required after scanning for the initial data to show up on computer monitors in the control room. CT scanning is becoming the method of choice for imaging trauma patients as the fast and simple exam that allows a quick overview of possibly life-threatening pathology and rapidly enables a surgical intervention.

During a CT exam, the patient lies in a large device that has a doughnut-like opening. Inside the doughnut is a sophisticated X-ray tube that spins around the patient to take pictures of the patient

from every angle. The beam of X-rays passes through the patient and is detected according to the density of the tissue encountered.

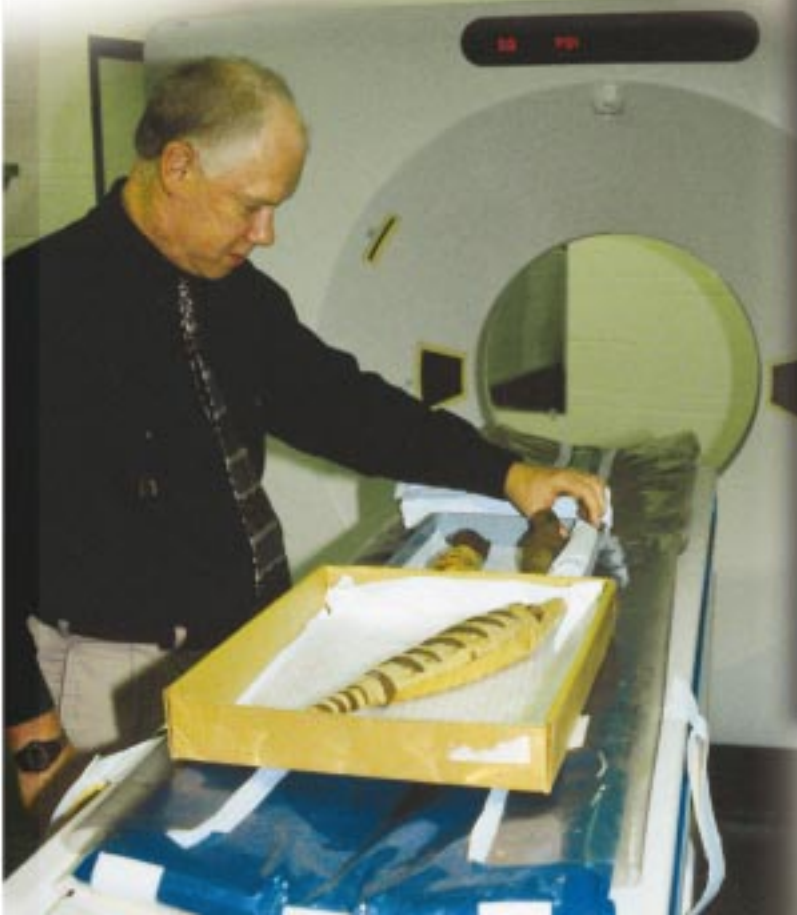
Each slice is then reconstructed into the initial two-dimensional image that appears on the control room monitor.

The good soft tissue and spatial resolution possible with CT imaging allows its use in orthopedics. It can be used in imaging of complex joints like the shoulder or hip as a functional unit. Fractures, especially those affecting the spine, are also common CT scanning targets.

The computerized post processing three-dimensional images can be rotated to view from several angles, further enhancing the value of CT imaging for surgeons. CT images also are used as the basis of radiotherapy planning purposes and for interventional work like CT guided biopsies.

Dr. Jimmy Lattimer, associate professor of veterinary medicine and surgery

Jeffrey Wilcox, registrar of the MU Museum of Art and Archeology, positions the three animal mummies into the MU Veterinary Medical Teaching Hospital's CT Scanner.



The baby crocodile was the most difficult of the three animals to render in the CT Scanner's computer. The crocodile was quite young when it died. Its skeleton had not yet transformed into bone from cartilage, something that does not show well in either x-rays or CT scans. Also, unlike the other animals, the crocodile had been mummified in the same way as humans. The internal organs of the animal had been removed and replaced with coiled linen.





A cat looks back from 2,000 years. One slice of the initial scan of the kitten mummy was directed to the front of the cat's skull to verify that a cat was indeed in the linen. The face of the long-dead cat emerged on the computer monitor in the CT scanning room, confirming that the remains of the animal were inside the wrappings.

(far left) Dr. Cristi Reeves Cook, College of Veterinary Medicine radiologist, and Heather King, senior veterinary technician, position the cat mummy on the CT Scanner. The scan revealed the skeleton and internal organs of a kitten, disproving the idea that the mummy was a fake.

## "Oh, it's real. Cool."

and director of radiology, coordinated the mummy scans. His first job was to choose scanning options and gather the raw imagery data for placement into a computer database. Part two would be to selectively reconstruct the data into a computerized, three-dimensional, virtual computer mummy for analysis.

### It's Real

As the high-resolution thin-slice scans of the cat mummy began, something unexpected emerged on the television screens of the darkened CT scanning control room. The skeleton of a kitten, not the sawdust expected, was under the cat mummy's wrapping.

"Oh, it's real. Cool," Dr. Podzorski said. The 1931 X-ray and subsequent Egyptology catalogs were wrong.

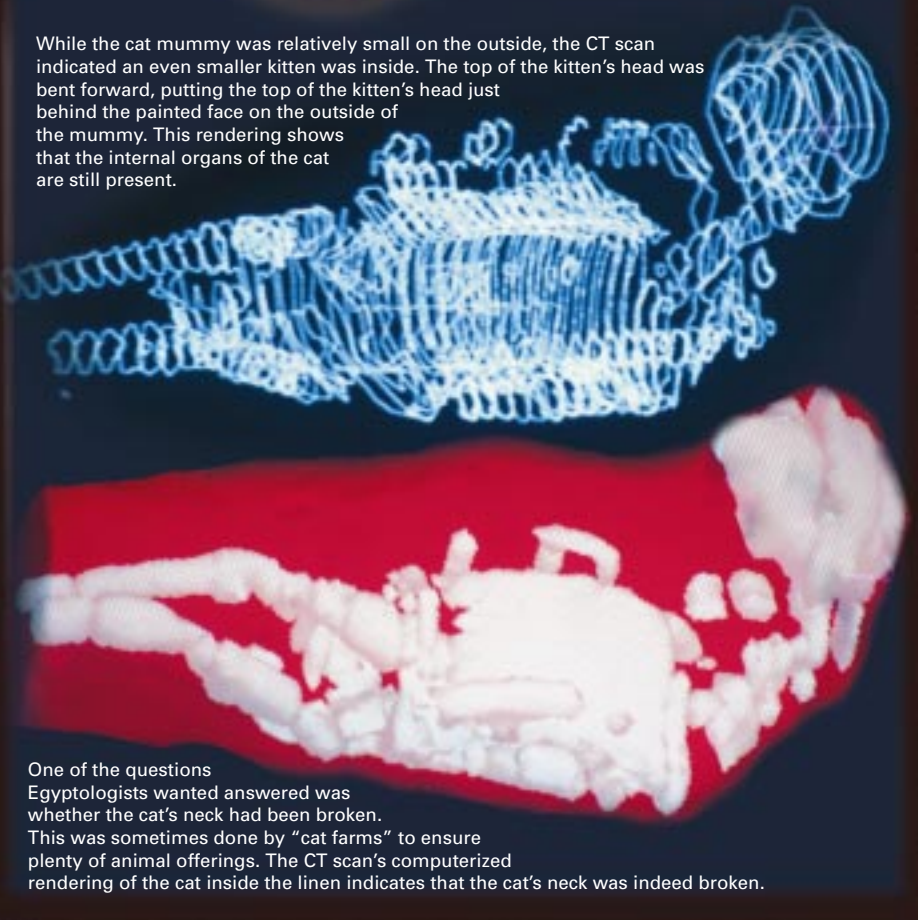
The initial black and white scans showed more. A skeleton, a brain, and other internal organs appeared. Even the cat's fur could be detected. That these items were still in place provides worthwhile clues about life in ancient Egypt.

As the CT scan moved along the front of the cat's skull, an ancient face looked back at the dozen people in the CT scanning room over a gulf of 2,000 years. When the scanner sliced through the cat's neck, broken vertebra appeared on the monitor. The cat was probably killed to satisfy the need for religious offerings. From the damage and the position of the broken bones, the guess was that the kitten was grabbed by the head, face down, and snapped like a whip.

Because of the severity of the spinal injuries, the position of the real face of the cat does not correspond with the face painted on the outside of the mum-

The 2,000-year-old kitten's wrappings are somewhat tattered. A cat's face was painted on the linen. The cat's ears are really linen fashioned to look like ears.

While the cat mummy was relatively small on the outside, the CT scan indicated an even smaller kitten was inside. The top of the kitten's head was bent forward, putting the top of the kitten's head just behind the painted face on the outside of the mummy. This rendering shows that the internal organs of the cat are still present.



One of the questions Egyptologists wanted answered was whether the cat's neck had been broken. This was sometimes done by "cat farms" to ensure plenty of animal offerings. The CT scan's computerized rendering of the cat inside the linen indicates that the cat's neck was indeed broken.



mification linen. The real cat's head is bowed forward, putting the top of its head just behind the painted face on the outside of the cat's linen covering.

The kitten was probably only two-months-old when it died, as its skeleton is mostly cartilage, not bone, Dr. Lattimer observed, which is probably why little was seen by the conventional X-ray.

As the scan, consisting of one-millimeter slices of the kitten, continued, more internal organs began to appear. Dr. Lattimer and the Egyptologists conferred, agreeing that the kitten was not mummified, but probably chemically dried. Dr. Podzorski, watching the computer image, said Egyptologists believe small animals began their mummification process in large terra-cotta jars full of drying salts and other chemicals. The kitten probably went through this process.

The initial scans revealed no evidence of sickness. Up until 40 years ago and before vaccinations became common, more than half of all kittens died of disease before they were three months old. In fact, the evidence from the scan indicated the kitten was healthy, creating speculation that the cat was raised in one of several Egyptian "cat farms." Here, cats were bred and pampered as revered symbols of the gods. Based on the evidence of the broken neck, however, this good life was short-lived as the commercial enterprises had to satisfy thousands of customers seeking religious offerings.

### The Hawk

The scan on the hawk indicated that it had not been mummified, either. Intact feathers, wings, feet, skeleton, heart, liver, lungs, brain, and other organs showed up on the initial scan. Most human mummies went through an elaborate process of drying with the body organs removed and stored in jars. Since the hawk was preserved with organs intact, some sort of chemical process must have been used.

The hawk appeared to be a fully grown bird—probably a peregrine falcon. Part of its last meal appeared on the monitors as the scan passed through the bird's digestive tract.

As the scan moved from the hawk's feet to head, the feathers appeared to be arranged in a pinwheel form—the technique of the person who preserved the animal or something of religious consequence, perhaps?

The scan of the crocodile revealed one

quick surprise. While the wrappings are 18 inches long, the animal inside is only nine inches long. Was the animal wrapped with extra linen to make it more salable?

Looking at the scan, Dr. Lattimer noted that little of the crocodile's skeleton had transformed from cartilage to bone, indicating a very young animal. This was bad news in terms of a detailed look at the interior of the animal as cartilage is one of the few things that yield little information to the CT Scanner.

The CT scan did reveal that the nine-inch-long baby crocodile was mummified in much the same way as Egyptians mummified people. No internal organs showed on the CT scan—the spaces were stuffed with linen to help the outside of the animal keep its external shape. Some of this linen was tightly and precisely wrapped while other linen was haphazardly crumpled. Also, the crocodile's back legs were missing. The animal apparently underwent an extensive and expensive mummification process. The remarkable appearance of the linen after thousands of years indicated a special craftsmanship. Were the legs removed for a religious reason or to enhance the smooth look of the finished product, thus, boosting its salability?

Another clue indicating special treatment: The skin of the crocodile was surprisingly well preserved.

As the scanning continued there was yet another surprise: Small hard spheres appeared in the body. While these could be rocks, dirt, or chemical pellets left over from the mummification process, the spheres are too consistent in size and shape to be dismissed lightly. Another CT scan on decorative beads sometimes inserted into human mummies would have to be conducted to see if the scanner recorded similar readings. If these are amulets, it might indicate the crocodile was even more than an above-average religious offering.

Did the hawk mummy still have its feathers? An initial CT scan indicated that the feathers were still present under the linen wrappings.

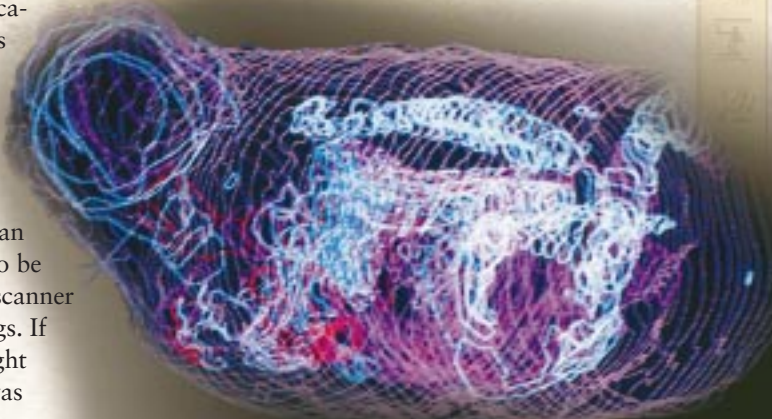
Of the three animal mummies, the hawk's linen was the most tattered. The talons and beak of the 3,000-year-old hawk peek from its linen.



### Computer Imagery Unlocks Secrets

After the initial scanning, Dr. Lattimer took the raw data to his reconstruction computer for a more complete, three-dimensional look into the animals. It took 24 hours of computer time for the first phase of this part of the investigation. Computer "wire" renderings, where the outlines of internal shapes were reduced to lines, showed the location of heart, lungs, and other organs. "Solid" form computer imagery showed what the animals look like under their linen wrappings.

These are to be the maps for a more detailed examination. Here, as questions are asked, detailed examination of specific parts of the animals can be undertaken. With more information of what's under the animals' wrappings, it is hoped even more secrets will be revealed from the ancient animal mummies.



A computer "wire" rendering shows the condition of the hawk's skeleton and digestive track.

# Taking a Bite Out of Pet Health Care Costs

A simple question led Dr. Jack Stephens to start a revolution in pet health care. "Pet owners were asking, 'Why don't we have insurance for our pets like we do for our children?'" said Dr. Stephens, DVM Class of '72 and California veterinarian who saw too many pets being put to sleep because of economics.

President of the Southern California Veterinary Medical Association at the time, Dr. Stephens first tried to persuade traditional insurance companies to cover pet health. That didn't pan out, so he started his own company, Veterinary Pet Insurance.

When VPI started selling policies in 1982 on a shoestring budget, it was the first pet-insurance company in the nation. Today, the Anaheim, Calif.-based company is still the largest, with 110,000 policies in force in 48 states.

Revenues are doubling every year, from premium volume of \$8.7 million in 1997 to \$18 million this year. The company expects revenue of between \$36 million and \$40 million in 1999.

"Jack has been the only person I know of who's been successful in actually implementing a comprehensive pet-insurance program," said David Horner Jr., director of development for MU's College of Veterinary Medicine. "It's going to impact the overall profession someday."

Pet health insurance is common in some European countries, but fewer than one percent of pet owners in the United States own policies. Meantime, vet costs are climbing faster than human health care—30 percent a year by one estimate.

A recent survey in the veterinary trade journal *DVM Magazine* suggests that American dog and cat owners begin to consider euthanasia when faced with vet

By Andrew Walters



Dr. Stephens, pictured with his miniature pinscher, Skeeter, has built Veterinary Pet Insurance into a nationwide company. He plans to return next year to speak at MU.

## Dr. Jack Stephens

Age: 52

Born: Hobart, Oklahoma

Hometown: Anaheim, California

Education: University of Missouri doctor of veterinary medicine, '72

Family: wife, Vicki, four children, seven dogs and a cat

Hobbies: Hiking, backpacking and bird hunting

Sidekick: Skeeter, a miniature pinscher that Dr. Stephens takes to work with him every day

bills in excess of \$576. Dr. Stephens believes a third-party payer can help keep that to a minimum.

Pet insurance "is really becoming attractive for pet owners who care about their pets," Dr. Stephens said. "Veterinarians can do anything they can do in human health care. And even though it's only one-fifteenth of the cost, it's still expensive."

VPI's basic policy costs \$89 a year and

covers up to \$2,000 per incident, with a maximum of \$7,500 per policy. The deluxe policy costs \$159 and covers up to \$4,000 per incident, with a maximum of \$12,000 per policy. Both plans carry a \$40 deductible.

A California policyholder submitted a \$10,000 claim for cancer treatment for a Great Dane that included chemotherapy, radiation and surgery at Colorado State Medical School. VPI paid \$8,000.

VPI also paid to install a pacemaker in a 15-week-old poodle in Santa Cruz that lived another 12 years.

"Pets give you so much love. They're great companions," Dr. Stephens said. "Why wouldn't you give back to them?"

Dr. Stephens' success in the dog-eat-dog world of insurance comes as somewhat of a surprise to former classmates at MU, who remember him as someone who took his work seriously but also wanted to make sure everyone else had a good time.

"No one expected him to be the big businessman of the crowd," said classmate Dr. John Williams, who graduated from the College of Veterinary Medicine with Dr. Stephens in 1972 and now is co-owner of Horton Animal Hospitals in Columbia, Mo. "I don't think anybody thought he had the disposition to do that."

It wasn't easy. In 1991, VPI fell short of California's capital requirements for insurance companies and was taken over by state regulators for three months.

In the midst of the company's financial turmoil, Dr. Stephens was going through a personal ordeal of his own. In 1989 he was diagnosed with throat cancer. Doctors recommended surgery and gave him a year to live.

Ironically, it was a veterinarian who suggested an alternative treatment that ended up saving his life. Dr. Stephens





MU graduate Dr. Jack Stephens has built a fledgling California company into the nation's largest pet health insurance company. Veterinary Pet Insurance has 110,000 policies in force in 48 states. "Pets give you so much love. They're great companions," Dr. Stephens says. "Why wouldn't you give back to them?"

was treated with radiation implants inserted into his throat and tongue, along with chemotherapy.

Eight years later, the cancer is gone, and he doesn't even go in for checkups. The procedure dried out his throat permanently—he has to drink plenty of water with food—but, as he points out, it's better than the alternative.

"They wanted to do radical surgery; remove my tongue and jawbone. I wouldn't have been able to eat or talk," he said. "Now I'm talking and leading a normal life. It was all from a doggie doctor. It just shows you how sophisticated a veterinary doctor can be."

The episode could have taken Dr. Stephens out of commission for months and ruined his fledgling company. Instead, he missed only two weeks of work.

"The company was still struggling at the time," he said. "They wanted me to take six months off, but I couldn't do it. The company couldn't survive if I did."

Dr. Stephens said he felt a personal responsibility to some 950 investors — 700 of them veterinarians — who had put up an average of \$2,000. "I didn't want them saying I lost their money. They'd never forgive me," he said. "I used to be the goat, and now I'm the hero. It's all due just to perseverance, I guess."

Dr. Stephens said he has no plans to

take his company public. Money won't be an issue for a number of years, he said, thanks to investments by two major shareholders—Scottsdale Insurance Co. and Veterinary Centers of America Inc., each of which has a 23 percent stake in VPI.

Santa Monica, Calif.-based VCA, which operates the nation's largest chain of animal hospitals and is the largest provider of diagnostic laboratory services in the country, invested \$4.5 million in VPI last year.

"We're really at the beginning of the technology boom inside of veterinary care," said Bob Antin, president and CEO of VCA. "As the diagnostic world expands and pet owners can treat their pets using techniques once only available for humans, the cost of it will somewhat justify having insurance."

Antin said he's known Dr. Stephens for 11 years and has been impressed by the "labor of love" approach he takes to pet insurance.

"Nobody has done it like Jack has — with heart and compassion and the personal inner drive for success," he said. "It's truly entrepreneurial."

A drawback Antin and others see in VPI's approach, however, is the company's strategy of marketing its product mostly through veterinarians using point-of-purchase displays at clinics across the country.

"Veterinarians are not insurance salesmen," said Dr. Williams. "We're too busy to sell it. When I'm done with a client, I've got another one waiting to come in. I can't spend another five minutes saying, 'Wait a minute. Here's something you need.'"

Dr. Stephens said the company is beefing up its budget for advertising and promotions from about \$1.8 million this year to more than \$4 million in 1999. It's still chicken feed, Dr. Stephens acknowledges. But then again, the company doesn't have much competition.

The only other national pet-health insurer, Canton, Ohio-based Petshealth Insurance Agency Inc., has about 4,000 policies in force and 1998 annualized premium volume of about \$500,000, said co-founder Russell Smith.

Petshealth policies are underwritten by American Home Assurance Co., a member of giant American International Group. Premiums begin at \$120 a year for dogs and \$83 a year for cats. Policies cover 80 percent of vet costs after a \$100 annual deductible.

Petshealth expects to grow rapidly next year, with a goal of 40,000 policies in force and premium volume of \$10 million by the end of its first fiscal year in June 1999. The publicly traded company is planning a \$5 million stock offering early next year.

Dr. Stephens said VPI has been successful in part because of his clinical background. "We understand pets and pet diseases," he says. And VPI tries to keep its policyholders happy by paying claims within five days.

"A lot of companies have gone into the market and gone out of the market. Jack is unique. He had a mission and stuck with the mission," said Horner of MU's vet college. "He's devoted years of his life and all of his financial resources to this."

Dr. Stephens has kept his ties to MU as an advisor and financial contributor to the Veterinary College. In 1993, he was named the school's alumnus of the year, and he plans to accept an invitation to speak to the graduating class next year.

"I feel an affiliation with the school. I worked for the school in pre-vet and all through vet college," he said. "Some of my professors are still there. If it wasn't for them, I wouldn't have had the opportunity in life I've enjoyed."





Dr. James Cook, clinical instructor in small animal surgery and orthopedics specialist, examines Ishmael's broken wing. Assisting Dr. Cook is Nicole Griffin, a fourth-year veterinary medical student and vice president of the MU Raptor Rehabilitation Project.

*Students and Surgeons  
at the College of  
Veterinary Medicine  
Help a Broken-Winged  
Osprey to Migrate  
with His Fellows*

(above right) Dr. James Cook uses the hospital's C-arm intraoperative fluoroscope to view Ishmael's broken wing. The C-arm allows surgeons to see a series of x-ray images on a TV-like screen.

**I**shmael has an important flight to catch—probably the most important of his life and one that can't be delayed. It was not the best time to suffer a broken wing.

*Text and photos by Randy Mertens*

Ishmael is a fledgling osprey brought to Missouri as part of a five-year project to repopulate the birds to the state. The plan was to bring the just-hatched bird to Missouri in July, have it “imprint” on the state in August through September, migrate south in October, and return to Missouri the next spring.

Ishmael arrived in Missouri with a broken wing. If he can't migrate with his fellows, he will, in essence, be forever lost.

That's why the Missouri Department of Conservation brought Ishmael to MU's Veterinary Medical Teaching Hospital. Here, Ishmael had four things going for him: an orthopedic surgeon with almost 100 avian surgeries to his credit, a sophisticated X-ray machine, anesthesiologists familiar with avian respiratory systems, and veterinary medical students with specialized knowledge in rehabilitating birds of prey.

With this help, Ishmael, named by veterinary medical students helping his recovery, has a good chance of making his flight.



# Helping a Catch an I

## Ospreys in Missouri

Ishmael is part of the fourth installment of a Department of Conservation program to restore these fish-eating hawks to Missouri. Ospreys used to breed in Missouri but disappeared in the late 1800s.

“Their habitat was destroyed by pioneers digging stream channels, polluting waterways, draining wetlands, and sawing down nesting areas,” said John Meyer, Missouri Department of Conservation (MDC) wildlife biologist and osprey reintroduction project leader. “They were also subjected to the unlimited killing that took place in the early 1900s before the rise of the conservation movement. The insecticide, DDT, finished off the rest of the osprey population.”

As a result, their Midwest breeding range shrank to Minnesota and Wisconsin. Before the reintroduction work, ospreys only flew through Missouri on their spring and fall migrations to the tropics between North and South America.

When mature, ospreys are 21 to 24 inches long, have five- to six-foot wingspans, and weigh about three pounds. They are dark





brown with white undersides and heads. Prominent dark stripes set off their yellow eyes. In flight, their light-colored wings show a pronounced crook with a dark spot at the wrist. Ospreys eat shad, catfish, yellow perch, carp, and suckers, which they catch by plunging into the water feet first to grab prey swimming near the surface.

The program's goal is to have ospreys live in Missouri in summer as they once did. Ospreys become attached to the location where they hatch and try to come back each spring. By raising chicks at state lakes, MDC hopes to "imprint" the young transplants on Missouri sites, so they will return and raise their young.

To help chicks become attached to these sites, they are raised in four-foot boxes on towers eight to 12 feet tall. These towers overlook the lakes and mimic conditions of natural nests. Boxes are covered with wire mesh, allowing the birds to see their surroundings. For osprey chicks to imprint on their nesting

and for the October departure with this fellow osprey.

Dr. James Cook, clinical instructor in veterinary surgery and orthopedics specialist, performed Ishmael's operation. Ishmael had two wing bone fractures—one through the growth plate that separates the long wing bone from the wing's "wrist" joint. This cartilage is the growing part of the bone. It was the first avian growth plate fracture that Dr. Cook had seen.

Treating growth plate fractures is tricky. The bone is small, and imprecise alignment can cause it to heal crooked. Dr. Cook inserted a temporary pin the length of the long bone, growth plate, and fragment to ensure correct alignment.

Avian surgery is also difficult because birds carry virtually no extra blood—any blood loss during surgery is critical. Also, bird respiratory systems are more complex and faster than humans, making anesthesia difficult to administer. Prolonged surgery can be fatal to most

problems on the TV screen. The imagery was videotaped for teaching purposes.

"The C-arm in this surgery made all the difference in the world," Dr. Cook said.

Overseeing Ishmael's post-operative healing and rehabilitation is the College's Raptor Rehabilitation Project. This group of about 25 third- and fourth-year veterinary medical students, clinicians, and volunteers administers the special care needed to rehabilitate injured birds of prey so that they can be returned to the wild.


The Raptor Rehabilitation Project maintains a ward for birds in the hospital requiring critical care and the nearby Raptor Compound where the birds undergo rehabilitation and restoration to flight status. The compound also is host to about 10 eagles, owls, hawks, and kestrels who are unable to be returned to the wild, said Nichole Griffin, vice president of the raptor project and overseeing Ishmael's recovery.

Normally, post surgical birds are moved to the compound where they are kept in one of ten mews—open-air buildings that allow birds to be outside but not escape. As the birds recover their strength, they visit the flight cage—a barn large enough for the birds to fly from perch to perch. This helps the birds regain muscle strength and flying skills. Later, when the birds are strong enough, they are connected to a creance, several hundred yards of strong string that allows the birds to fly without escaping. When the birds are ready, the Raptor Project releases them, Ms. Griffin said.

### The Future

The MDC's osprey reintroduction program will continue until the year 2000 with a total of 32 to 48 birds being released from 10 different sites.

Birds released in previous years have made their migrations and have returned to Missouri. They have been observed living near their original nesting sites, flying and catching fish.

"We have already positively identified osprey released in 1995 at Mark Twain, and we think we have identified all four birds from Thomas Hill," Meyer said. "If the next few years are also successful, Missouri will soon have a growing population of ospreys fishing in the state's waters." With luck, Ishmael will be back, too. 

# Osprey

## Important Flight

site, they need 360-degree visibility, Meyer said. They remember the area and come back to nest.

Until the ospreys can feed themselves, conservationists catch enough fish to feed each bird about one pound per day—usually three 10-inch live grass carp.

When the birds are strong enough to fly, their boxes are opened and the birds begin life on their own. Spray-painted patches on the birds' wings and numbered leg bands help biologists follow the ospreys' progress.

Ishmael's part of the plan went bad early. As a four-week-old fledgling, he suffered a broken wing on the flight from his Wisconsin birthplace to Missouri. For Ishmael to survive, his wing would have to be healed in time for him to imprint on a lake

birds. Luckily, anesthesiologists experienced in avian metabolism and physiology were on hand for Ishmael.

Dr. Cook's operation on Ishmael took only 20 minutes with help of a C-arm machine. Named for its shape, the C-arm is an intraoperative fluoroscope, an X-ray machine that provides surgeons with movie-like images during surgery. By having exact and immediate visual information, the surgeon can make smaller and more precise incisions. There is less blood loss and the operation is faster.

The C-arm is usually used in human hospitals. MU's Veterinary Medical Teaching Hospital is one of the few veterinary medical colleges to use this technology for animal surgery.

The X-ray movies allowed Dr. Cook to move Ishmael's wing through its full motion and watch for obstructions or

One day after surgery, the osprey, named Ishmael by veterinary medical students, is alert and recuperating in the raptor rehabilitation ward of the MU College of Veterinary Medicine's Teaching Hospital.

Worried large animal veterinarians and cattle producers from across Missouri noticed sick cattle with symptoms ranging from stiffness and lack of appetite to fever, swollen tongues, and oral and nasal ulcers. The problem seemed to follow no known pattern. Blood tests and other observations taken from the field were sent to the Veterinary Medical Diagnostic Laboratory for tests.



## The Veterinary Medical Diagnostic Laboratory

## MU's Animal Disease Detectives

It was during the warm days of late September that the phones began to ring at the MU College of Veterinary Medicine Veterinary Medical Diagnostic Laboratory.

Worried cattle producers and large-animal veterinarians from across Missouri had sick cattle with symptoms ranging from stiffness and lack of appetite to fever, swollen tongues, and oral and nasal ulcers. The problem seemed to follow no known pattern.

The pathologists and staff at the Diagnostic Laboratory handled the concerns the way they always do, with a watchful, well-trained eye, and a full range of diagnostic services. As its name implies, the Diagnostic Laboratory conducts scientific analyses to determine the causes of the most vexing animal and agricultural disease problems. It features the laboratory equipment and techniques to conduct simple chemical tests to state-of-the-art DNA analysis. The laboratory seeks out the toxins, viruses, contaminants, infections, and biological hazards that threaten the state's agriculture industry.

### The Lab Comes to State Aid

The laboratory helps Missouri in numerous and varied ways. An outbreak of aggressiveness in rabbits was traced to lead in their blood caused by eating paint chips. Diagnostic Laboratory staff acted like detectives to determine a sudden increase in deaths in feedlot cattle. Cause: Discarded automobile mufflers were leaking chemicals into the drinking stream. A dog food company suspected contamination in hundreds of bags of feed. The Diagnostic Laboratory determined there was no contamination, and the company was saved from a massive recall.

Still other cases involved young goats that died suddenly. Post-mortem tests revealed clues that led to the discovery of a poisonous vine that the animals had eaten. In addition to identifying various bacteria and viruses that silently afflict animals, the laboratory also is called in to help in cases such as satanic sacrifice of cattle and dogs.

The laboratory also helped identify the causes of a wheat fungus and helped farmers deal with the problem.



“We are the only full-service laboratory in the state of Missouri,” said Dr. Harvey Gosser, director of the Diagnostic Laboratory. “We can examine whole animals, tissues, blood and specimens, and perform a wide range of diagnostic tests. It is helpful to have all of this evidence in one facility in situations like this so that we can act quickly determine the causes of problems.”

The laboratory has more than 50 faculty and staff who handle more than 75,000 specimens and perform more than 300,000 diagnostic tests annually. The number of cases has been growing. Last year the number of tests increased 15 percent. Early in the laboratory’s history, it mainly dealt with food and equine problems. In the past decade, there has been increasing requests for diagnostic services relating to companion-animal health.

In addition to offering diagnostic assistance and consultation with veterinary medical practitioners and animal owners, the laboratory also has a place in educating the next generation of veterinarians. Each MU DVM student and pathology resident learn about laboratory procedures and animal disease investigation in the Diagnostic Laboratory.

#### An Anniversary Virus

The Diagnostic Laboratory had just celebrated its 30th anniversary when the flood of September phone calls from cattle producers began coming in.

The symptoms led laboratory personnel to suspect a virus that historically affected mainly deer populations, epizootic hemorrhagic disease (EHD), among other possible causes. The possibility of EHD alarmed the veterinarians because cattle with the disease, which is caused by an insect bite, normally do not show any symptoms. On the other hand, infected deer experience serious symptoms and often die as a result of the virus.

Using laboratory analysis of cattle specimens, Diagnostic Laboratory personnel confirmed the presence of EHD in 29 of 44 submitted cases. Twenty-two of those samples were Missouri cattle; the others were deer, elk, and sheep.

“What we saw was a cluster of cases with similar clinical signs that are testing

positive for EHD,” said Dr. Eileen Ostlund, assistant professor and veterinary virologist. “Cattle in Missouri have had EHD in past years. What’s unusual here is that the presence of the disease has been accompanied by relatively severe manifestations.”

After Dr. Ostlund and her colleagues received several requests to test for the unusual disease, they began to keep a chart to compare the cases, their history, location, symptoms, and test results. After initial blood tests showed antibodies to the EHD virus, they began to seek more conclusive evidence that EHD could be causing the cattle’s sickness. Because isolation of the virus that causes EHD is extremely difficult and time-consuming, they implemented an alternate type of sophisticated testing to identify genetic material of the virus present in the samples, called polymerase chain reaction (PCR) testing, for concerned owners and veterinarians. PCR detects

*An historical review indicated the last significant outbreak of hemorrhagic disease in Missouri deer occurred in 1988*

DNA patterns in infectious organisms leading to a rapid diagnosis from small test samples.

As information from laboratory, clinical, historic, and on-site testing began to come together, the details of the problem began to emerge.

A historical review indicated the last significant outbreak of hemorrhagic disease in Missouri deer occurred in 1988, and mortality estimates in the wild deer population ranged from six percent to 16 percent. No cases in cattle were described at that time. EHD isn’t typically fatal in cattle unless the animal suffers from concurrent disease. Humans are unaffected by the disease, and are not harmed by eating meat with the virus present.



As the data were examined, the cause was determined. The disease was caused and transmitted by biting midges, *Culicoides variipennis*, also known as gnats, punkies, and no-see-ums. The disease is seen most commonly in Missouri in the summer and fall when the midges are active.

**Diagnosis:** EHD is self-limiting; it will run its course like the common cold virus in humans.

“Take a little extra care, avoid stress, and make sure water is easily accessible,” said Dr. John Kreeger, associate professor and veterinary pathologist. “While the virus can’t be ‘treated,’ it is probably a good idea to give antibiotics to affected animals to reduce the chance of secondary bacterial infections, but it does nothing to inhibit the course of the viral infection. Analgesics can be used to relieve discomfort.”

With the diagnosis, the immediate job was done. As always, the Diagnostic Laboratory continues to monitor the cases as a whole to learn more about the virus. And, as it has for its 30-year history, they’re ready for a new challenge when the phones ring again. VETER

# OLD BOOKS,

THE COLLEGE'S COLLECTION OF OLD VETERINARY

faculty member Dr. Arthur Case died, and the family suggested donations to the College library as a memorial. With help from the Dean's office, this memorial evolved into an endowment fund to subscribe to current scientific journals and buy the latest veterinary medical books. It also allowed for a modest sum to be used for the acquisition of rare veterinary medical books.

The acquisition of rare books began in earnest when Boyd met Norman Comben, considered the foremost authority on rare veterinary medical books. The

74-year-old Comben, who has an office in his Berkhamsted house north of London, offered advice for the first purchase for the College library, a 1683 book titled *Anatomy of the Horse*.

It was through Comben that Boyd discovered and purchased the first known book on veterinary medicine, *Mulomedicina*. This book, written in Latin, was penned by the Roman author Vegetius Renuus who lived from 450 to 500 A.D.

The college's version of this book is a 1574 reprint of the original text. The book was reprinted 1,000 years after its author's death both as a historical reference and a current textbook. The concepts and techniques detailed in 500 A.D. had changed little by the 16th century.

"This book dovetails perfectly in two areas that we are collecting comprehensively—mule and significant veterinary medical books," Boyd said. "This book deals with horses and mules because they were so important economically. No one bothered with dogs and cats. The first book about dogs didn't appear until the late 1800s."

Though more than four centuries old, the book's 200 paper pages are in excellent condition. The raised black ink has almost a paint quality to it, indicating it was printed on a Gutenberg-style letterpress. Sometime in this century, the original bookbinding was replaced.

**I**n a room behind the circulation desk of the MU College of Veterinary Medicine's Library are about 700 books that help tell the history of veterinary medicine. This is one of only a handful of collections of rare veterinary medical books. Before the age of computers, genetic engineering, and cellular biology, these books represented the sum of humankind's wisdom in treating animals.

The books in the collection range from the text of the first known veterinary medical book, circa 500 A.D., to books printed in the early 1900s. The books detail everything from homemade cures using grease to kill lice to surgical techniques that that would be recognized by today's veterinarian.

## C. Trenton Boyd

The person compiling the collection is C. Trenton Boyd, College librarian since 1970.

He became interested in rare books through his interest in history. While he saw a need to capture historical information about the veterinary medical profession, he had no budget to make that happen.

In the late 1980s, long-time College

The 1683 book, "Anatomy of the Horse", by Andrew Snape, is beautifully illustrated. This illustration was considered so desirable that thieves would tear out the page and frame it like a painting.

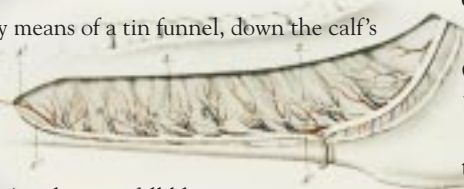
## CURE FOR BLOATED CATTLE

After cutting off the end of the tail, boil a strong dose of thoroughwort and tanzey. Pour it down the throat as soon as it is cool enough, then turn the animal into the yard and drive it for a few minutes. This will soon start wind. Repeat treatment in the nose, if necessary.

## CURE FOR SCOURS IN CALVES

Break two eggs into a basin. Beat them up. Pour them, by means of a tin funnel, down the calf's throat. Repeat twice or thrice. An almost infallible cure.

—*Yankee Farmer's Manual and Practical Farrier*  
Boston, 1846





# OLD WISDOM

BOOKS TELLS MUCH ABOUT THE PROFESSION'S BEGINNINGS

## Historical Plagiarism

*Anatomy of the Horse*, by Andrew Snape, “ferrier to the king,” is another book in the collection. This 1683 book features an elaborate woodcut “plate” of Snape.

Like the woodcut of Snape, the 49 woodcuts of the horse’s anatomy are incredibly elaborate, and detailed. But, there’s a problem. The illustrations were stolen from another source. The book is one of the earliest examples of plagiarism, Boyd said.

“Of the 49 plates in the book, 22 were taken in their entirety from *Anatomia del Cavallo* (Anatomy of the Horse) written by Ruini, an earlier Italian author,” Boyd said. “Four are taken partly from Ruini or suggested by his figures.”

When Snape copied the illustrations, possibly by tracing the originals, he accidentally reversed the drawings in his book, putting organs like the heart on the wrong side of the horse. *Anatomia del Cavallo* was published in Venice in 1598.

While *Anatomy of the Horse* is complete, one of the book’s pages is a recent reproduction. The drawing in the front of

the book of a horse in a field was so beautiful that a thief, 100 or so years ago, removed the original page to frame it.

The first “encyclopaedic” work where the word “veterinary” appeared in a title was the *Dictionary of Veterinary Art*,

written in 1805. This work, at least two inches thick with no page numbers, was published in London. It proudly proclaimed that it was illustrated with copper plates.

Somewhat arranged like the encyclopedia of today, its text detailed the author’s conversations with farmers, blacksmiths, and veterinarians about issues and practices of the day. Cooling off an exhausted horse, for example, was best done by running the horse into a cold pond, one commentator proudly told the author.



“Le Cheval” by Edouard Cuyer has loose pages that show the different gaits of horses portrayed in the same way a dance class portrays footsteps on paper. The articulated legs of a cardboard horse can be positioned on these steps to show what a horse looks like at a walk, trot, or gallop.

An even more practical book is almost no book at all, but a combination book and wall hanging.

*Chevaux & Mulets* (Horses and Mules) was published in France around 1900. The book features 10 tablets designed to fold out and hang on a wall on eyelets. Each tablet

details, by plastic-like reproduction, horse’s teeth at various stages of wear. The purpose was to create a standardized method of judging an animal’s age. The first tablet shows a reproduction of “milk teeth,” the teeth of a neonatal horse. The last tablet shows the teeth of an aged horse whose teeth are almost gone from wear.

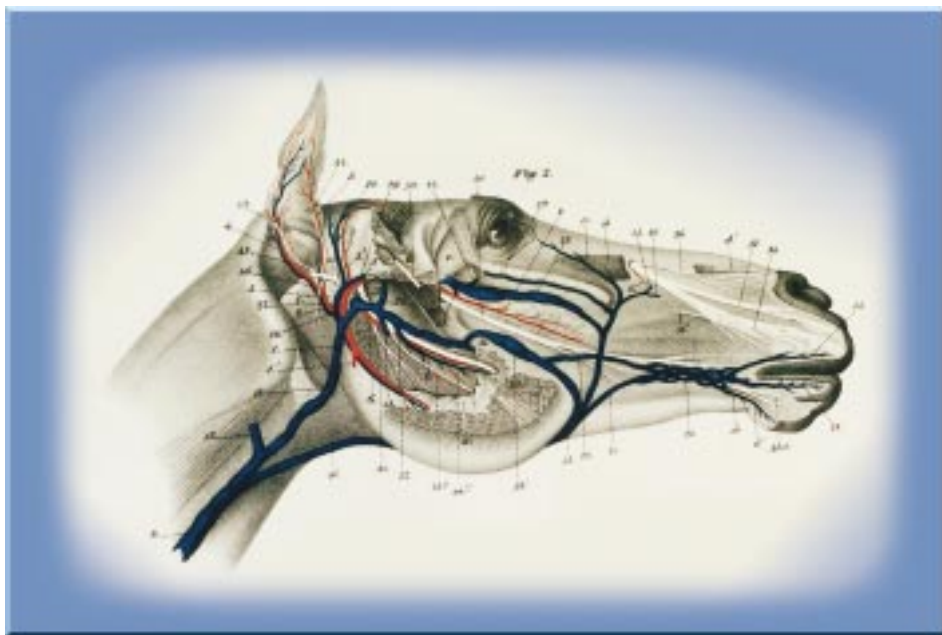
The sub-title of the book reads: “*Caracteres de L “age”* and shows a picture of a horse. Translation: Characteristics of Age of the Horses.

Another French book on the horse, *Le Cheval* (the Horse) by Edouard Cuyer, also has a fold-out section showing teeth wear and anatomy. The 1886 book is unique, however, in that a pocket on the inside back cover contains loose pages that show the different gaits of horses portrayed in the same way an Arthur Murray dance class portrays footsteps on paper. The articulated legs of a cardboard horse can be positioned on these steps to show what a horse looks like at a walk, trot, or gallop.

This book is one of the first printed with color overlays—a technological challenge in the late 1880s that meant several perfectly-aligned passes through a hand-fed press. The College’s version of this book may be the only complete example of its kind.

Probably the most striking use of illustrations in the College collection is the

The 1861 “Atlas der Anatomie des Pferdes” by August Leisering features incredibly detailed hand-drawn black and white line illustrations of the anatomy of the horse overprinted with red, blue, and yellow ink.





C. Trenton Boyd, College of Veterinary Medicine librarian.

"Although we're ecstatic to add any rare book to the MU Veterinary Medical Library collection, we want our collection to be unique from others in the world. We've decided to specialize in pamphlets and booklets published in the late 19th and early 20th centuries by veterinary patent medicine companies with an emphasis on those from Missouri. No other library in the world has attempted to collect these materials. They document an important period of American veterinary history. They need to be collected and preserved while they are still obtainable. Most of these materials were printed on highly acidic paper and are literally being destroyed by the acid within the paper. It is critical to amass as complete a collection as soon as possible so we can treat the paper and stop the deterioration. If this project isn't started now, in another 15 to 20 years an important period of veterinary history will be lost forever. The library is always interested in hearing from anyone who would like to donate items of this nature."

—C. Trenton Boyd

*Atlas der Anatomie des Pferdes* by August Leisering. This 1861 German work features incredibly detailed hand-drawn black-and-white line illustrations of the anatomy of the horse overprinted with red, blue, and yellow ink. The overprinted ink (muscles, nerves, and blood vessels) is translucent and the black ink underneath shows through somewhat, creating an almost three-dimensional effect.

#### A Book of Value

The most expensive book in the collection, valued at about \$6,000, is also the largest. Weighing about 25 pounds, it is almost two by one feet in size. Written by Phillippe-Etienne Lafosse, the book is four inches thick.

Money has always been a significant consideration with this book. As there were no publishing houses to sponsor and market books, Lafosse paid a printer 70,000 French livres (predecessor to the franc) in 1770 to produce the work.

The book, *Cours D'hippiatrique, ou Traite Complet De La Medecine des Chevaux* (Treatise on the Veterinary Art

with Complete Studies on the Medicine of Horses) features 65 incredibly detailed line drawings of the anatomy of horses.

"It is truly amazing to see the detail of the drawings of the horse's anatomy," Boyd said. "Imagine how many had to be destroyed to gather this level of detail on muscles, arteries, and nerves. There was no means of preservation at that time. Can you imagine how it would have stank as they dissected and studied all those animals?"

The College's copy is considered by collectors to be one of the best examples of this book in the world.

The College's *Cours D'hippiatrique, ou Traite Complet De La Medecine des Chevaux* is a rare find as it is a complete work. The last chapter deals with horse shoeing. Blacksmiths would tear this section out of the book to use as a reference over their forges. The book features two full pages on different horseshoes. Another page details blacksmithing tools.

"The significance of these books, in my mind, is that they trace the development of veterinary medicine as a profession," Boyd said. "Sometimes it's interesting to see what they knew, or didn't know, 100 to 200 years ago. We think we know a lot today until you see some of the amazingly detailed illustrations they did back then. Also, we don't know much more about conditions such as moon blindness, for example, than they did."

Boyd hopes to create a rare book room and display the more interesting books in a display case. He hopes to expand the collection into books and sales pamphlets on Missouri veterinary patent medicines as a way of capturing the development of pharmaceuticals.

The book collection is available for viewing, by request, at the College library.

...Mr. John Lawrence... alone gives rheumatism a place; and from which we extract the following particulars. He defines rheumatism as "a chronic local cold." "It's feat," says he, "is among the integuments of the muscles and... consists of inspissated mucus left upon the fascia, occasioning pain on every move...."

From the  
*Dictionary of the Veterinary Art*  
London, 1805

Want to help the MU College of Veterinary Medicine Medical Library? A cash donation will assist the library in helping educate the next generation of veterinarians by making sure the latest journals and books are available. To make a gift, contact the Office of the Dean, W-203, College of Veterinary Medicine, University of Missouri-Columbia, Columbia, Mo. 65211. Phone: (573) 884-6774.



# Caring

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### Mission: Create a Genetic Canine Map

Dr. Gary Johnson is one of a number of scientists around the world pooling their research to create a genetic map of the dog. The effort is designed to help advance cures for more than 300 inherited canine diseases, including cancer, the biggest killer of older dogs.

The plan was agreed to earlier this year when more than 400 scientists and dog breeders convened at the Molecular Genetics and Canine Health Conference in St. Louis. The events were sponsored by the American Kennel Club's Canine Health Foundation.

The map will allow researchers to pinpoint the DNA location for genetic characteristics, including genetic diseases. A DNA test directed to the known location of a disease will determine whether the dog carries that trait.

The genetic map will help dog breeders identify dogs that are disease carriers so they can avoid breeding them, Dr. Johnson said. One DNA test that should lead to the eradication of von Willebrand's disease in a few generations already is available.

Canine genetics research is important in combating human diseases, as well.

Because human and canine genomes are 85 percent similar, there are significant advantages to conducting genetic research with dogs rather than humans. The canine genetic map will be an invaluable resource for scientists researching inherited human diseases because the map will represent more than 140 genetically unique breeds with extensive pedigrees that may cover 10 generations.

Almost every working day in his third floor lab of the newly renovated Connaway Hall, Dr. Gary Johnson, associate professor of veterinary pathobiology, studies hazy lines etched on sheets of photographic film. The lines don't look like much, but to Dr. Johnson's eyes, they are the clues to the causes of genetic canine diseases.

Dr. Johnson's hazy lines are DNA markers. DNA markers show some of the most basic information about life—the genetic structure of the DNA molecule. These molecules are the cell's "software" that controls hair color, phys-

produces an incredible amount—virtually infinite—of coded information on the gene. The information-carrying DNA molecules, double helices with two strands that look like a twisted ladder, are identical in each cell of a living being. Researchers can analyze a part of a gene or chromosome from a cell from any part of the body.

On this twisted ladder, individual genes sit like beads of a necklace. The genes and chromosomes come in pairs—one gene coming from the individual's father, and the other gene from the mother. Most genes carry inherited DNA

# Dog's Best Friend

*Cutting-Edge DNA Testing Aids Research Into Diseases Afflicting Dogs*

ical characteristics, and, most important for Dr. Johnson, a predilection to certain diseases.

When the results of Dr. Johnson's research studies are completed, the scientific community will have a greater understanding of almost a dozen genetic dog diseases from epilepsy and kidney disease to cataracts.

With this information, individual dogs can be tested for genetic diseases before the disease manifests itself. Breeders can use these tests to better select which dogs to breed, which will help eliminate certain genetic diseases in only a few generations. In the future, this genetic information may lead to better treatments, or even cures, for these diseases.

To his colleagues, Dr. Johnson is a genetic detective and a leading DNA researcher. To a variety of canines, he is a dog's best friend.

### DNA

Mention DNA and most people think of evidence in murder trials or cloning dinosaurs from mosquito stingers as in the movie, *Jurassic Park*.

DNA (deoxyribonucleic acid) carries the individual genetic blueprint for living things. DNA is comprised of only four basic units (called nucleotides), but the arrangement of these nucleotides

instructions on how to assemble particular proteins. Combinations of proteins are responsible for an individual function or trait such as hair color or muscle strength.

Sometimes, a gene malfunctions and the "instructions" are lost or scrambled. When Dr. Johnson studies the hazy lines, he is looking for evidence of a malfunctioning gene.

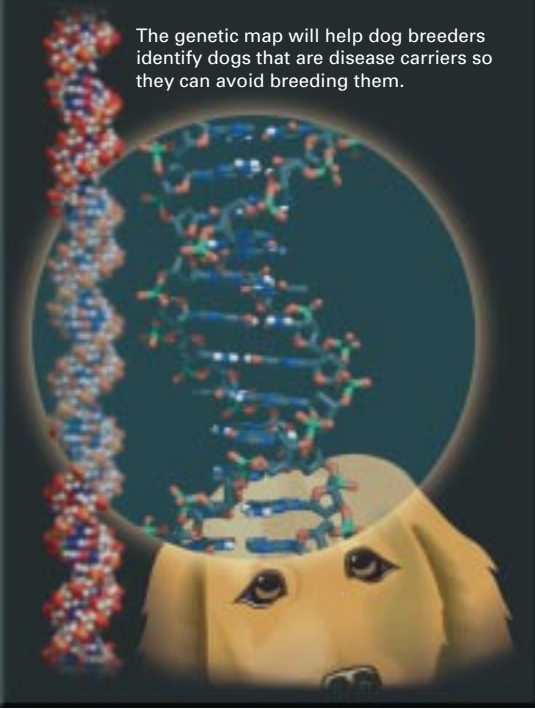
Two things make identification of specific disease-causing genes difficult. First, there are hundreds of millions of places to look on the DNA strand. Second, not all dogs that have a malfunctioning gene exhibit disease symptoms. It is a mystery worthy of Sherlock Holmes.

Many genetic canine diseases are *recessive* diseases. Here, overt clinical symptoms occur when both members of the gene pair, the father's and mother's, are defective. More difficult are the *carriers* who have one normal and one defective member of the gene pair. Carriers appear healthy, but produce offspring that, if bred to another carrier or affected dog, will exhibit the genetic disease.

Sometimes, one defective member of the gene pair is sufficient to produce the symptoms of a genetic disease. In these instances, the disease is considered the *dominant* trait. These are the plot twists of a DNA researcher.



The genetic map will help dog breeders identify dogs that are disease carriers so they can avoid breeding them.



It doesn't help the investigation that only a fraction of the genes that control diseases have been identified. If the investigator doesn't see anything, it may be because it is not there, or the investigator hasn't looked in the right place. There is hope, however. Dr. Johnson is part of a worldwide DNA research effort to create a "map" of the entire canine gene structure, called a genome. When this project is complete, it will be possible to consult a "map" to readily determine if a dog carries a disease-causing gene for poorly understood diseases such as epilepsy and ataxia.

Parallel to the canine studies, other researchers are using the human genome map to identify malfunctioning genes implicated in such conditions as cystic fibrosis, polycystic kidney disease, inherited nonpolyposis colon cancer, retinitis pigmentosa, as well as hundreds of others. Many human discoveries have implications to the animal world and vice-versa. Dr. Johnson's work with epilepsy in dogs may provide clues that will help people suffering from this malady.

Dr. Johnson predicts that in the next 20 years, researchers will pinpoint not only the genes responsible for such diseases as hip dysplasia and epilepsy, but also the genes responsible for physical and behavioral traits. Nonetheless, identifying the genetic determinants of traits

and diseases is not easy. The canine genome contains approximately seventy thousand different genes and about three billion possible sites for mutation.

#### Genetic Markers

Until the canine genome map is complete, Dr. Johnson uses an alternative strategy to find DNA markers for genetic canine diseases, the candidate gene approach.

This is the real detective work of gene research. Here, Dr. Johnson uses clues from other diseases or research studies to look for a possible disease-causing gene. With this approach, suspect genes are selected and tested for mutation. Sometimes the results are promising, sometimes the result is another dead-end. Once the authentic disease gene has been identified, a DNA marker assay for carriers can be developed.

DNA analysis generally starts with a blood sample. While DNA information can be extracted from the cells of any living tissue, current technology works best with blood.

Dr. Johnson's DNA marker assay test is designed to cheaply and efficiently reveal the presence of either a normal or mutant gene (or both) in a DNA sample from a dog. In addition to the scientific data collected for other researchers looking for disease cures, the information is invaluable to dog breeders who can selectively breed a disease out of a line of dogs.

Dr. Johnson's appointment is in the College's Department of Veterinary Pathobiology. He came to MU in 1980. Before that he earned a DVM at the University of Minnesota and a Ph.D. at Kansas State University. He performed post doctoral research at Johns Hopkins University and the New York State Department of Health. In the 1980s, Dr. Johnson's research was focused on the analysis of proteins associated with diseases that cause abnormal bleeding. About ten years ago, the emphasis of bleeding disease research switched from protein biochemistry to DNA analysis. "DNA studies were so much fun, I decided to expand my horizons and apply them to as many different inherited diseases as possible," he said.

#### The Bottom Line

Almost a dozen inherited diseases are now under study in Dr. Johnson's laboratory. Most are funded by the American Kennel Club's Canine Health Foundation.

So far, Dr. Johnson's markers have led to the eradication of hemophilia in Portuguese water dogs and cerebellar ataxia (inherited clumsiness) in Pointers. The ataxia study was done in collaboration with Dr. Dennis O'Brien, a veterinary neurologist in the MU Department of Veterinary Medicine and Surgery.

Drs. Johnson and O'Brien are also studying ataxia in several other breeds including Chinese crested dogs, Jack Russell terriers, Kerry blue terriers, and Old English sheepdogs. In addition, Drs. Johnson and O'Brien are collaborating in a study of canine epilepsy. Although they are interested in epilepsy in all breeds, they are now focusing on epilepsy in standard schnauzers and English Springer Spaniels. Dr. Johnson is excited about recent findings that suggest they are close to a breakthrough in the schnauzer epilepsy study.

Dr. Johnson also is collaborating with MU veterinary ophthalmologist Dr. Cecil Moore to study inherited diseases of the canine ocular lens.

Among the other genetic diseases under investigation are Shar Pei fever (inflammation and renal amyloidosis) in Chinese Shar Peis, Fanconi syndrome (renal resorption deficiency) in basenjis, and ceroid lipofuscinosis (a neurodegeneration) in Tibetan terriers. In addition, Dr. Johnson's laboratory is involved in studies of inherited diseases of farm animals.

Dr. Johnson is most proud of work he and his colleague, Dr. Hisashi Shibuya, did to find a DNA marker for protoporphyria (a metabolic disease causing photosensitivity) in Limousin beef cattle. Through selective breeding, this disease was eradicated.

Like many of his projects, the ataxia case has human implications—the disease resembles a degenerative human nerve disease that causes a slow cell death similar to Alzheimer's disease. Dr. Johnson's research may yield clues to help prevent or cure this human condition, possibly making Dr. Johnson more than just a dog's best friend.



Dr. Caroline Truss, Class of '84, owns the Barrett Station Veterinary Medical clinic near St. Louis.

## Alumnae Presents the Greatest Christmas Gift

Caroline Truss, DVM, Class of '84, gave the most important Christmas gift that one of her clients ever received, a life-saving kidney.

In a December 30 operation, Dr. Truss donated one of her kidneys to a client and friend dying of lupus-induced kidney failure. The operation "went like clockwork" according to the surgeons involved, and both donor and recipient are doing well.

Dr. Truss owns the Barrett Station Veterinary Clinic in St. Louis. In the weeks after the operation, both her office and home were flooded with flowers and get well cards.

Dr. Truss and the recipient's paths had crossed only three times before the operation. They met in second grade when both were in the same Girl Scout troop. Later they became reacquainted as candy striper hospital volunteers, ironically in the same St. Louis hospital where the kidney transplant occurred. It was at that time that the recipient was diagnosed with lupus.

About four years ago, Dr. Truss and the recipient crossed paths again. This time the recipient was looking for a veterinarian for her pet when she came across Dr. Truss's practice.

At that time, the recipient had been on dialysis for more than five years. The prognosis was grim as more than 300 kidney donors were tested and found medically unsuitable. Dr. Truss agreed to be tested. The test revealed that Dr. Truss "was a miracle match." The doctors said the match was better than between most siblings.

With this, the decision to donate the kidney to her client was easy, Dr. Truss said. "This was being directed by a higher authority," she said.

Both donor and recipient experienced expected complications immediately after the operation. The recipient suffered unexpected problems with the anti-rejection drugs and Dr. Truss experienced more than usual post-operative pain. Within a week of the operation, both problems subsided. Both are expected to need about three to six weeks to recuperate.

Dr. Truss said she was able to spend so much time away from her small practice because of the help from her two colleagues, Dr. Laura Blazek and Dr. Kimberly Sanford, DVM, Class of '93, her office manager Diane Mansfield, and her staff.

## Hahn Sets the Pace at the Missouri Seniors Game

As Allen Hahn, DVM, Class of '58, stepped up to the swimming pool platform, waiting for the start of the 100-meter freestyle swim, he only hoped to place well in the race. Given his history of dominating the swimming events at last summer's Missouri State Seniors Games, the crowd at Columbia's Hickman High School had higher expectations.

Dr. Hahn did not disappoint those who cheered him on. Far and away the standout of the group, this year he took gold medals in the 100 breaststroke, 50 fly, 50 breast, 100 freestyle, and 50 freestyle. He won each race by more than three seconds over second place.

In fact, members of the Columbia Swim Club, an organization founded by Dr. Hahn in the 1970s dominated the games. The club boasts about 50 members and has been coached by MU swim coach Brian Offer and former Tigers coach Joe Goldfarb.

"I've been doing competitive swimming for 25 years, but I am still surprised at how well I do here," Dr. Hahn said. Since the Seniors Games started, Dr. Hahn has won nine gold medals in swimming competition. He started his swimming career after seeing all the fun that his children were having in competition.

Today, he trains 2,000 to 3,000 meters four days a week. Next year, he will move into the 65 to 69 age group.

Dr. Hahn is professor of veterinary medicine and surgery at the MU College of Veterinary Medicine.

## Monett Vet Travels to Russia in Cultural Exchange Program

Carol Dahlstrom, DVM, Class of '88, never thought much about Russia, much less about traveling there. Yet the Monett, Mo., mixed-practice veterinarian recently traveled to the country as part of a veterinary medical cultural exchange program.

The exchange started when 15 Russian administrators, faculty, and students from the Uralsky Institute of Veterinary Medicine visited Crowder College in Neosho, Mo., for three weeks in April.



The visit was made possible with assistance from the Russian communities in Newton and Jasper counties in southwestern Missouri. The Russians went to Crowder because of the school's reputation in agriculture and its connection to the veterinary medical community.

The Russians visited Dr. Dahlstrom's Animal Clinic of Monett. "They asked about everything," Dr. Dahlstrom said. "Many questions concentrated on salaries, veterinary medical techniques, and laboratory equipment." The visitors also witnessed a surgical procedure.

Communicating was difficult, she said. Only three of the visitors spoke English, and the translator, an English teacher, knew few medical terms.

Two Russian students asked if they could return and intern in Monett.

Russian students can start veterinary medical school at age 16 at what is roughly the equivalent of a vocational high school, Dr. Dahlstrom said. Students who do well can graduate to an upper level of study which can result in a veterinary medical degree.

Students must choose a specialty early in their career, Dr. Dahlstrom noted. Students enter the "surgeon track" while still in high school. Other students choose a government track, which can lead to a job as a government meat inspector. One student in this kind of training fainted at the first sight of veterinary surgery.

Dr. Dahlstrom prepared for the visit to Russia by taking 10 weeks of Russian language training. Like the Russians who visited Missouri, she stayed in the homes of local families. During her stay, she visited a steel mill, an archaeological dig from the year 2000 B.C., and the veterinary medical school in Troitsk, 1,000 miles southwest of Moscow.

The visit to Russia made Dr. Dahlstrom appreciate conditions in America. Because of the breakdown of Russian collective farms, much of the farm equipment has broken down or runs on parts pieced together. Veterinarians who previously worked with the state-run practices have left to form their own companies, but lack even rudimentary equipment and medicines. Many

government veterinarians have not received their paychecks for more than seven months.

### 50's

**Jack Horton**, DVM '57, retired from his Columbia, Mo. veterinary practice just shy of 39 years on the job. Well-known and liked in the mid-Missouri area, Dr. Horton opened his first animal hospital in 1960. Since then he has opened two more. He grew up on a farm near Columbia, graduated from the College in 1957, and served two years in the Air Force as a captain. Dr. Horton said he "is going back to his roots" to work on the farm he owns near Columbia.

### 70's

**Donna Angarano**, DVM '79, was named president of the American College of Veterinary Dermatology. She took office April 16 at the group's annual meeting in San Antonio, Texas. Dr. Angarano is associate dean for academic affairs at the University of Texas College of Veterinary Medicine.

### 80's

**Susan Graves**, DVM '82, recently announced that she has taken a new job. After 12 years of mixed animal medicine practice in northeast Missouri, she is now the Supervising Veterinary Medical Officer with the U.S. Department of Agriculture in Ewing, Mo.

**Mark Anderson**, DVM '87, and his wife, Patricia Smith, DVM '91, announced the birth of a son, Hayden Avery Anderson, born Dec. 10, 1997. The family lives in Columbia, Ill.

### 90's

**Lisa Simmons-Fleischmann**, DVM '92, announced the birth of a daughter, Elizabeth Rose Fleischmann, born Nov. 12, 1997. The family lives in Grain Valley, Mo.

**Janet Hill**, DVM '92, recently purchased a veterinary medical hospital in Springfield, Ill.

**Michael Jones**, DVM '92, recently married Konda Baskin in a ceremony in Knoxville, Tenn. He is employed at the

University of Tennessee's College of Veterinary Medicine as an assistant professor in avian and zoological medicine.

**Dennis Bene**, DVM '93, recently accepted a new position at the Spring Creek Veterinary Medical Clinic in Minden, Nev.

**Janet Linton**, DVM '95, recently accepted a new position at the Belleville Animal Clinic in Belleville, Ill.

**Joseph Sansone Jr.**, DVM '95, was awarded his master of business administration degree from Lindenwood University in Colorado. He lives in Montrose, Colo.

## In Memoriam

**Donald Edwin Rodabaugh**, MU College of Veterinary Medicine professor who retired in 1976, died Sept. 3 at his home in Springfield, Mo., at the age of 85. He was born February 7, 1913 in Ray County, Mo. He earned his doctorate in veterinary medicine at Kansas State University. He is survived by his wife, Gertrude, and two children.

**Elmer Haselhorst**, DVM '80, died Aug. 6 at his home in Taos, Mo., at the age of 43. He worked for the Highland Veterinary Medical Clinic in Milan, Mo., from 1980 to 1997. He is survived by his wife, Janet, and two children.

## '98 Alumni Winner

The winner of the MU College of Veterinary Medicine Alumnus of the Year Award was Dr. William Boever, DVM, Class of '70, assistant director of the Saint Louis Zoological Park. He was chosen by a vote of his fellow alumni. In addition to his work at the zoo, Dr. Boever is an adjunct assistant professor and research associate for the College's Department of Pathology. He is the director and major advisor for veterinary medical residency in zoo animal medicine that provides training in the clinical specialty of zoo animal medicine.



Do you have a story that you would like to share with your fellow MU College of Veterinary Medicine graduates? For consideration, drop a note describing your story to: Editor, College of Veterinary Medicine, W-207 Veterinary Medical Building, University of Missouri-Columbia, Columbia, Mo. 65211. Please include your daytime phone number and any good-quality color photograph that helps tell the story. All materials will be returned.



*"I said I would teach for no more than two years... but, you know, I enjoyed working with the students. They challenge you..."*

## Dr. Kenneth Niemeyer

Dr. Ken Niemeyer's history in veterinary medicine and the MU College of Veterinary Medicine's history are just five years different.

Five years after the first class was accepted, a young Kenny Niemeyer stepped into the College's hallways as a student. He's still here, still quietly helping the College years after his formal retirement as associate dean.

There is little about the College that Dr. Niemeyer hasn't touched. Generations of students have learned from him as a teacher. He was an early director of the small-animal hospital. He helped institute the clinical block system that teaches current veterinary medical students. He helped start the College's publications and coordinated its earliest fund-raising efforts. Seeking donors for the private portion of the financing for Clydesdale Hall and getting the Gentle Doctor Benefit started were Dr. Niemeyer's projects. He was considered for the position of interim Dean before retirement and helped make the College's 50th anniversary campaign a success.

Dr. Niemeyer is enjoying his life in retirement, traveling and playing with his grandkids. Three times he was called

back to help the College with important projects. Dr. Niemeyer's history with the College hasn't ended yet.

Dr. Niemeyer was born Sept. 15, 1928 in St. Louis, but the family soon moved to his grandfather's Missouri River bottom farm near Treloar, east of Hermann. On this 100-acre farm, Dr. Niemeyer learned about milking cows, raising chickens, growing wheat, corn, and oats, and "surviving the Depression."

Dr. Niemeyer was 10 years old when the Rural Electrification Association brought electricity to the farm. "I remember it well," he said. "Before electricity, we had no refrigeration. We drank our milk straight from the cow, so to speak. I remember the first time mom brought milk out of the new refrigerator. It was cold and I didn't want to drink it."

School was a one-room affair—12 total students with four in Dr. Niemeyer's class.

"I thought I was through at the end of the eighth grade," Dr. Niemeyer said. "My dad, an avid reader, said I was going to high school—no ifs, ands, or buts about it."

After graduation at 17, Dr. Niemeyer joined the Navy. From 1946 until 1949 he served at various stations including the fleet carrier U.S.S. Tarawa as an electrician. Under the G.I. Bill, he enrolled at the University of Missouri.

"It was a real culture shock coming back," he said. I was coming out of the Brooklyn Navy Yard back to little Columbia, Missouri—it was a little different.

"I made the decision in the Navy to pursue a pre-vet curriculum. I remembered how veterinarians would come out to our farm and treat our animals, and that's what I wanted to do."

Dr. Niemeyer entered the MU College of Veterinary Medicine in 1951, one of 30 students, paying \$150 per semester in tuition. In his second year he married his wife, Margaret, who he met in Washington, Mo. Nearing graduation, Margaret asked her husband what career he planned and suggested he consider teaching. "Teaching? That's the last thing I will ever do," Dr. Niemeyer said. "Turns out, that was the last thing that I ever did."

Veterinary education in the early '50s was in transition from an "art" to a "science," Dr. Niemeyer said. "As an art, you used all five of your senses to make a diagnosis. Many times, a stethoscope was all the equipment that you had. Veterinary Medicine was evolving into a science based on test results and chemistry. It requires a different mind-set.

"For example, when one of our cows on the farm developed milk fever, the treatment was to stop the flow of milk by blowing air up the udder. When she developed milk fever the next year, we had the



When not traveling or assisting the College in a project, Dr. Niemeyer handles bedtime story duties with his two grandchildren. (above) Dr. Niemeyer and his wife, Margaret.



new calcium gluconate treatment. This time, the cow got up immediately. It was impressive.”

Dr. Niemeyer didn't pay particular notice to the veterinary medical college administration, but they had noticed young Niemeyer. A few months after graduation, Dr. Niemeyer was working for a St. Louis dog and cat hospital. Dr. Ed Ebert, chair of MU's veterinary medicine and surgery department called. Would Dr. Niemeyer consider teaching full-time at the College?

No.

Dr. Ebert called a second time. Same answer.

After the third call, Dr. Niemeyer relented and came back to the College to take a look. The owner of the dog and cat hospital had heard about the offers and released Dr. Niemeyer from their handshake agreement.

“I said I would teach for no more than two years—then I would leave to develop my own practice,” Dr. Niemeyer said. “But, you know, I enjoyed working with the students. They challenge you. I was only a few years older than my students, and I felt I was learning more than they were. Also, I had a lot of technical support at the College—radiology, pathobiology—that I would never have in private practice....”

Early in his academic career, Dr. Niemeyer was tapped for administrative duties.

“Dr. (Joe) McGinity was teaching and directing the large-animal hospital,” he said. “I took over the duties of the small-animal hospital director. It was about that time when I first become involved in curriculum development.

“We wanted to organize and make our curriculum more efficient. We came up with an innovative system called the block system. Missouri was the first school to try this,” he said.

In 1976, Dr. Niemeyer was named assistant dean for student and alumni affairs—a position that included admissions and alumni relations.

“We really had no alumni relations program,” he said. “We graduated them and let them go.” Dr. Niemeyer helped to develop the College's first alumni publication, what is now *Veterinary Medical Review*, and organized the College's first

## *The College's History and Dr. Niemeyer Are Intertwined*



Dr. Niemeyer flies co-pilot with Dean Robert Kahrs in 1985.

alumni reunion. To fund student and faculty projects, he began a College development fund drive. “This had never been done before,” he said. “I had no background in it and there was no University development office to guide me through.

“My first attempt at fund-raising was a \$100 a plate dinner at our annual conference to furnish our Friends and Alumni Conference Lounge. We raised \$6,000.”

When Dean Robert Kahrs promoted Dr. Niemeyer to Associate Dean for Academic Affairs, a new project entered Dr. Niemeyer's life: The financing of Clydesdale Hall.

The Missouri legislature provided more than \$16 million for construction of the new Veterinary Medical Teaching Hospital with the stipulation that the College had to raise \$4 million in private matching funds. With that goal, the College went on a fund-raising drive. One part of that effort was the establishment of the Gentle Doctor Benefit.

When funding was secured, Dr. Kahrs asked Dr. Niemeyer to oversee the construction of the building. The facility was dedicated on April 3, 1992, the Niemeyers' 40th wedding anniversary.

When Dr. Kahrs retired, the University Provost considered Dr. Niemeyer as interim dean. “I withdrew my name from consideration and recommended others

on the faculty,” Dr. Niemeyer said. “I was getting too close to retirement.”

Dr. Niemeyer retired in 1992. “It was very difficult to walk away from the College,” he said. “I probably had the best job in the world.”

In 1994 he was coaxed back to help raise funds and oversee the College's 50th anniversary efforts. This included inviting all members of the first graduating class, 1950, back to the College.

Today, the Niemeyers travel the American West, from Alaska to Colorado. He has developed a particular interest in the Indian culture of New Mexico. “We put a lot of miles on our car,” he said.

Dr. Niemeyer relishes his role as grandfather, and still has the time and energy to handle a game of pickup basketball with his grandkids.

His wife volunteers for the Women's Symphony League of the Missouri Symphony Society. “We always seem to be busy,” he said.

Dr. Niemeyer retired once again from his part-time College duties last year. Only a few months later, he was tapped for another College development project.

Full retirement from the College, Dr. Niemeyer said, may still be a few years in the future.

# The Diner

*Food for the Hungry Student and More*

by Cindy Cellar

With all the talk regarding the Broadway Diner, I felt compelled to write and tell the true history of the diner.

It didn't just become popular in the last few years.

The Minute Inn (original name) was popular from the very beginning in the 1950s, as well as in the '60s and '70s.

I know about the diner at the corner of Broadway and Providence as I grew up there.

**My father was Rex Freemyer.** He acquired the Minute Inn from Hubert Blakemore in the late '50s. As was popular at the time, diners were moveable buildings—many converted streetcars. Diners were typically small and would seat only a dozen people at a time. Stools were the only place to sit, encouraging people to eat and leave quickly, making way for the next customer. Blakemore was tired of moving the diner.

Originally, the Minute Inn was a 10-stool diner at Providence and Walnut. We moved the building to Providence and Broadway in the late '50s and soon realized it was too small. My dad bought a larger building, the current Broadway Diner, in 1960 from Valentine Buildings in Wichita, Kan. My mother, Marie Freemyer, ran the diner in the daytime and my father worked the graveyard shift, along with being a rural route mail carrier for the U.S. Postal Service.

The days at the diner are very vivid, and I didn't realize it at the time, but those were great days.

The Minute Inn was home to all walks

of life, however my memories are of the late nights with the student clientele as that is the time I shared with my father. Beginning around 11 pm and until 4 am, the students were the majority of the late-night business. They had to have Rex's "chili and eggs" before retiring home after a late night at the bars.

We had fraternity dinners there. Celebrities that played at Brewer Fieldhouse, and eventually at Hearn Center, came and ate there. I never will forget the night when a student made the Minute Inn a drive-through when he drove his car up the front steps through the doors and windows. My father got a huge smile out of it and gave the student breakfast on the house. My father was calm when it came to the students, enjoyed them tremendously, and loved each one of them.

There was no doubt the students respected him. There were times when a few would get out of hand late at night and he would simply raise his voice to restore order.

Football Saturdays at the "Inn" were incredible. Waiting lines would wind

down to Uncle Clem's Liquor (now Streetside Records). We went through enormous amounts of chili (that my dad made every morning), dozens of eggs, and pounds of hashbrowns. We cooked all of our potatoes and then would let them chill before hashing them. Of course, they had to be peeled first—what a pain—but it was all worth it as you just don't find that kind of cooking anymore. Many holidays, my father would bring students home for Thanksgiving and Christmas to eat with us as they couldn't go home or had no place to go for the holidays.

Whenever a journalism student needed a story for class, they came to my dad as the "Minute Inn and Rex" was always a good article.

My father retired in the late '70s. He sold the diner to Gordon and Fran Meridith in 1980 and it became Fran's Diner. Even after selling the restaurant, students still called wanting my dad to come down to the "Inn" and cook for them, or come to Harpo's for a beer. They never forgot him. He was a mainstay in their lives when they were going to school. Again, I didn't realize it then, but those were great days.

I now work at the University of Missouri-Columbia. My dad was always proud that I gave back to the University what they gave to us. Faculty and students alike patronized the Minute Inn, along with most of Columbia. **VMR**

## Night cook While others sleep, he works

By Ruth Christensen  
Special Staff Writer

It is late at night, nearly dark, but the diner is still busy. Through the glass windows of the Minute Inn at E. Broadway, the street is dark and quiet. Inside, the diner is a warm, busy place. Rex Freemyer, the owner, is in the kitchen, wearing a white apron over his dark shirt. He is looking at a menu board that lists the night's specials. The kitchen is filled with the sounds of cooking and the smell of chili and eggs. Rex is a man in his late 60s, with glasses and a friendly smile. He has been working at the diner for many years. The diner is a small, cozy place with a few tables and stools. It is a popular spot for students and faculty alike. Rex is known for his "chili and eggs" which is a favorite among the late-night crowd. The diner is a part of the community and Rex is proud to be a part of it.

But when Rex Freemyer, the owner, is in the kitchen, wearing a white apron over his dark shirt, he is looking at a menu board that lists the night's specials. The kitchen is filled with the sounds of cooking and the smell of chili and eggs. Rex is a man in his late 60s, with glasses and a friendly smile. He has been working at the diner for many years. The diner is a small, cozy place with a few tables and stools. It is a popular spot for students and faculty alike. Rex is known for his "chili and eggs" which is a favorite among the late-night crowd. The diner is a part of the community and Rex is proud to be a part of it.



Reprinted from the Columbia Daily Tribune newspaper. Rex Freemyer died in 1997.



**Editor's Note:** During the past month there has been much discussion in the Columbia media regarding a proposed Walgreen's drugstore at the corner of Providence Road and Broadway. Opposition to the development centers around the removal of the Broadway Diner now at that location. Cindy Cellar, administrative associate in the College's Cooperative Extension Office, remembered growing up around the diner and shared her experiences in a letter to the Columbia Daily Tribune newspaper. Because generations of veterinary medical students frequented the diner—often late at night or early in the morning during finals weeks—we reprint the letter here in our first Flashback column. Rex Freemyer died in 1997.





# Gentle Doctor Benefit

## Auction & Dinner

...is an annual fundraising event conceptualized by Friends of Veterinary Medicine, Inc. and a group of parents of veterinary students to support the MU College of Veterinary Medicine. Approximately 400 items will be auctioned and proceeds will establish the "Gentle Doctor Benefit Parents Committee Scholarship Trust"—a fund to provide scholarships for veterinary students.

### Win a Vacation!

#### Grand Prize

##### Tiger Country Vacation

Choose a destination to see your favorite TIGER team play. \$3000 will be provided to offset expenses.

#### Second Prize

##### Boca Raton, Florida

October 2-16, 1999 with \$750 spending money, condominium lodging and round trip airfare for two.

#### Third Prize

##### Lake of the Ozarks

June 4-11, 1999 with \$500 spending money and condominium lodging.

#### Raffle Tickets are available

\$10 each or  
3 for \$25



Saturday  
**April 10**  
Hearnes Center

### How Can I Help?

**By attending and purchasing items at the auction.** Admittance is by invitation only. For details, contact the benefit office.

**By donating items of interest valued at \$25 or more.** These items can include veterinary supplies and equipment, artwork, crafts, jewelry, gift certificates, sporting event tickets, specialty kitchen items, appliances, furniture, quilts, camping gear, boating or recreational equipment, or other like items.

**By becoming an Individual Sponsor.** Contribute \$25 or more and each donor's name will be acknowledged in the Benefit program.

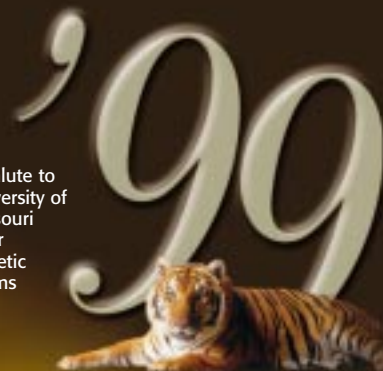
**By becoming a Corporate Sponsor.** Corporate sponsors contribute \$1,000 each and are acknowledged in the Benefit Program and related mailings to more than 5,000 veterinary medical students, alumni, faculty, and friends of the College. Space for a full page advertisement in the Benefit Program is provided as well as a table for eight guests.

#### Reservations to attend

\$25 advance  
\$30 door  
\$15 veterinary medical students

#### For additional information, contact:

Gentle Doctor Benefit  
PO Box 582  
Columbia, Missouri 65205  
573/882-3254  
(FAX 573/884-5044)



A Salute to  
University of  
Missouri  
Tiger  
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Teams



*In the next issue of the Veterinary Medical Review...*

# Mules on a Mission

**V**eterinary  
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