

# Veterinary Medical Review

College of Veterinary Medicine and UMC Extension Division



53rd Annual Conference for Missouri Veterinarians



## University of Missouri-Columbia

(Upper right) At the microphone University President James Olson announces that the Distinguished Service Award will go this year to Dr. George Shelton (far right), former Associate Dean of the College. At Dr. Olson's right is Chancellor Herbert Schooling and standing behind Dr. Olson is Dean Kenneth D. Weide.

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The Distinguished Service Award was presented at the October 9 banquet of the Annual Conference which was held in Columbia.

The night before the Annual Conference began, reunions were held for (counterclockwise) the College's Classes of 1952, 1962 and 1972.

Each Annual Conference presents an ideal opportunity for veterinarians to "get together," renew old acquaintances and make new ones, as well as attend scientific presentations, make contacts with the College's faculty and visit the College (see pages 2 and 3).

# 53rd Annual Conference for Veterinarians

## Annual Conference a Success

A diversified program drew a near record 245 veterinarians to the 53rd Annual Conference for Veterinarians, sponsored by the College of Veterinary Medicine and the UMC Extension Division, University of Missouri-Columbia. The Conference was held in Columbia, October 9 and 10.

One of the featured speakers was Dr. Francis Fox, Chairman of the American

Veterinary Medical Association's Executive Board. He gave two presentations on "Bovine Physical Diagnosis."

Dr. Donald Gustafson of Purdue University was part of a special panel discussion on pseudorabies.

Dr. William C. McMullan of Texas A & M spoke on "Equine Dermatology."

Balancing the program with small animal medicine and surgery, Dr. Gretchen Schmidt of Michigan State University presented "Problem Oriented Ophthalmology" and Dr. William Schall, also from Michigan State University, presented "Problem Oriented Internal Medicine."

Many of the College's faculty members presented "Mini-topics."

Advanced planning, attention to details, a well-balanced program, and outstanding speakers combined to produce a successful Annual Conference.

## Dr. Weide Addresses Alumni

Before the Citation of Merit was presented, Dean Kenneth D. Weide addressed those veterinarians at the Alumni Luncheon on the current status of the College.

Dr. Weide began by complimenting the alumni on their participation in alumni programs. The College tops every other division in the University in that 38% of its graduates are active members of the Alumni Association.

Dr. Weide indicated nearly all of the new construction dollars have been used. Money has been received for some remodeling in Connaway Hall. Some remodeling is currently being undertaken in the old necropsy area in the Teaching Hospital.

The emphasis of Dr. Weide's address was given to the financial status of the College. In the past five years the College's State Budget has increased by one-third, but that does not keep up with inflation. Faculty salaries continue to be low compared to faculty salaries of other veterinary colleges. Dr. Weide said that he believes the College's needs are well-known and accepted at the Columbia-campus level, and with the University's President and Curators.

Dr. Weide went on to say that fiscal year 1976-77 was the best period the College has had concerning gifts and donations—\$111,000.



## Citation of Merit to Dr. Bilyea

*Dr. George Bilyea (right), a practitioner in Overland Park, Kansas was presented the University of Missouri Alumni Association Citation of Merit Award and the Lee Rolf Memorial Award with Statuette at the Alumni Luncheon, October 9, which was part of the 53rd Annual Conference for Missouri Veterinarians.*

*Dr. Bilyea, who received his D.V.M. degree from the University of Missouri in 1956, was given the award by Dr. Dennis Weaver (MO '70), President of the College of Veterinary Medicine Alumni Association.*

*Dr. Bilyea was recognized for such contributions as a division representative to the University's General Alumni Board, Chairman of the Missouri Veterinary Medical Association's Advisory Committee to the Dean of the College of Veterinary Medicine, and his very active support of the Veterinary College's programs. Dr. Bilyea is a Life Member of the University of Missouri Alumni Association.*

*The Alumni Citation of Merit Award and the Lee Rolf Memorial Award with Statuette are given annually to a member of the University of Missouri College of Veterinary Medicine Alumni Association.*



## Distinguished Service Award Goes to Dr. Shelton

Dr. George C. Shelton was presented the College's Distinguished Service Award at the October 9 banquet of the Annual Conference. The award was presented by University President James Olson, with Chancellor Herbert Schooling and Dean Kenneth D. Weide looking on.



Dr. Shelton was recognized for his outstanding service to the College from 1948 to 1973 as a faculty member of the Department of Veterinary Microbiology and as Assistant (later Associate) Dean for Student Affairs.

While at the College, Dr. Shelton was given the National Science Foundation Award in 1962, the Norden Faculty Teaching Award in 1963, and the University's Outstanding Faculty Award in 1972.

Dr. Shelton, currently Dean of the College of Veterinary Medicine, Texas A & M, received his D.V.M. from that college in 1948 and went on to earn an M.S. degree from Auburn University and a Ph.D. degree from the University of Minnesota.

A portrait of Dr. Shelton will be hung in the Veterinary Medical Library. A smaller version of the portrait was given to Dr. Shelton's wife.

## Behind the Scenes for the Conference

### Preparations Begin a Year in Advance

This year's Annual Conference for Veterinarians has adjourned and all of the participants have gone home. However, planning has already begun for next year's Conference.

Within a month after the Conference is over, the College's Continuing Education Committee meets to analyze the past Conference and to begin preparations for the next Conference. The Committee is comprised of representatives from throughout the College.

Forty to fifty percent of veterinarians attending the Conference complete and return their evaluation forms. The forms indicate those areas that need improving as well as provide ideas for new topics and speakers.

Extensive discussions among the Committee members follow reading of evaluation forms. As suggestions are traded back and forth, specific topics and names of speakers emerge. For speakers, the Committee members consider those people in each field who are doing outstanding work. Special thought is given to finding one or two speakers who would be good 'drawing cards' for the whole program.

Committee members develop the tentative program and make initial contacts with proposed speakers. The Committee chairman follows these contacts with contractual arrangements. The program for the next Annual Conference is generally well established by January.

Arrangements for such vital details as hotel space, meals, room assignments, etc., is handled by Ms. Carol McAllister, Program Coordinator for Veterinary Medical Continuing Education.

All arrangements are planned with a calendar; as Dr. John Rhoades, this year's program chairman for the Committee, states, "preparations are a step-by-step chronological procedure." This procedure makes Conference preparations not as overwhelming as they may first appear.

Occasionally a few changes must be made in the preparations from one Conference to the next. As the Conference deadline draws closer, all details are checked and re-checked.

While the Conference is going on, members of the Continuing Education Office are on hand to answer innumerable questions, register walk-in participants, and add final touches.

### Research Day

Beecham Laboratories, Phi Zeta Honorary Fraternity, and the College are sponsoring a new research program for students. Any student now enrolled in the College is eligible to complete an original research project and prepare a final written paper to be given on Research Day, April 6, 1978.

Researchers are eligible for grants from the sponsors. All research proposals are

## Funding for Microscope Purchase

Dean Kenneth D. Weide received word that \$20,000 from the University of Missouri Unrestricted Development Fund has been approved for the purchase of additional microscopes for student use. The College will match that sum with an additional \$20,000 from unrestricted College dollars.

Depending on competitive bids, the \$40,000 total will purchase approximately 40 microscopes. These microscopes would be used in the histology and histopathology laboratories.

The College hopes to receive additional funding next year to purchase 40 more microscopes to complete the project so that students will not have to purchase their own microscopes for classroom use.

Last year at this time, 45 binocular microscopes were purchased and are now being used by second-year students in the microbiology laboratory.

## New Program for Freshman Spouses

The College has started a new program this year specifically for spouses of freshmen. Just as the freshmen are introduced to the College during orientation, this program acquaints their spouses with the curriculum and physical plant of the College, and gives an overview of what is involved in the study of Veterinary Medicine.

The first program was held the evening of September 22. Dr. and Mrs. Kenneth D. Weide, Dr. and Mrs. Kenneth H. Niemeyer, and Mrs. Treva Kintner participated in the program.

being handled by the Research Day Committee of Phi Zeta.

Presentations made on Research Day will be in the Teaching Hospital Auditorium. Prizes will be awarded for the best papers.

Drs. V. V. St. Omer and M. J. Bojrab are responsible for coordinating the program.

# Neuromuscular Blockade

## Neuromuscular Blockade Definite Place in Anesthesia

The development of veterinary anesthesia has accelerated tremendously in the last twenty years, but despite the recent introduction of several new drugs, the ideal anesthetic agent has yet to be discovered. The characteristics of the ideal agent would include a short latency period and a rapid recovery from anesthesia, good muscle relaxation and analgesia with minimal cardiovascular or respiratory effects, low toxicity and alternative routes for excretion.

The barbiturates produce cardiovascular and respiratory depression at surgical anesthesia and rely on metabolism for elimination. The volatile anesthetic agents are excreted chiefly via the lungs so that depth of anesthesia is easily altered and recovery generally rapid. However, they do produce dose dependent depression of the cardiovascular and respiratory systems, and halothane in particular provides poor muscle relaxation at light planes of anesthesia. The dissociative agents are marked by respiratory depression, little muscle relaxation and a tendency for prolonged recovery.

Some of these undesirable effects can be altered by the concurrent administration of other drugs. For example, analgesic agents can be used to reduce the amount of inhalation agent needed, or xylazine<sup>a</sup>, diazepam<sup>b</sup> or acepromazine can be used to improve muscle relaxation with dissociative agents. Neuromuscular blocking drugs similarly fall into this category.

Paralysis may be induced for two reasons: 1) to produce perfect muscle relaxation for atraumatic endotracheal intubation or aid control of ventilation; to improve surgical exposure of the thorax or abdomen or to facilitate reduction of fractures or dislocations, and 2) to eliminate the possibility of spontaneous movements which may occur during light general anesthesia. Light general anesthesia is generally advisable for cesarian section, in the elderly patient or the patient with organ disease.

Neuromuscular blocking agents (muscle relaxants) cause paralysis of skeletal muscle. These agents can be divided into two groups based on mechanism of action.

I. Depolarizing agents initially cause depolarization of the muscle membrane and render it insensitive to the action of acetylcholine. Succinylcholine chloride<sup>c</sup> is the only one used clinically.

II. Non-depolarizing agents occupy muscle receptors without causing depolarizing and prevent acetylcholine access to the recep-

tors. Agents currently used in veterinary anesthesia are d-tubocurarine chloride,<sup>d</sup> gallamine triethiodide,<sup>e</sup> pancuronium bromide,<sup>f</sup> alcuronium chloride<sup>g</sup> and fazadinium bromide.<sup>h</sup> D-tubocurarine is rarely used now in dogs and cats because of its hypotensive effect. The action of the non-depolarizing agents can be terminated by the administration of an anticholinesterase drug such as neostigmine<sup>i</sup> or pyridostigmine<sup>j</sup> but the amount required depends on the duration of paralysis. Difficulty with reversal may be experienced if attempted within ten minutes of administration of the muscle relaxant because drug levels are still high. However, twenty minutes after administration a substantial amount of the relaxant has been metabolized or excreted and low doses of neostigmine are effective. Atropine must be administered first to prevent their parasympathomimetic effects (bradycardia being the most important).

Several factors must be taken into consideration when choosing the muscle relaxant to use. Low plasma pseudocholinesterase levels are found in individuals with liver disease or within several weeks of worming with an organophosphate compound which will result in prolonged paralysis from succinylcholine. Gallamine is excreted entirely unchanged in the urine and should not be used in renal failure. It does not always completely eliminate respiratory movements and thus is not the muscle relaxant of choice for thoracotomy. Gallamine also readily crosses the placenta and should not be used for cesarian hysterotomy. Pancuronium is partly metabolized in the liver and partly excreted unchanged in bile and urine and therefore its duration of action is not unduly prolonged by hepatic or renal disease.

The following cases are included to indicate the situations where the use of a muscle relaxant is beneficial.

*Case I* - A three year old female Shepherd-cross weighing 20 kg was presented for anesthesia with a ruptured diaphragm and the stomach, spleen, duodenum and proximal jejunum displaced in the thorax. The dog was in good physical condition with mild respiratory distress.

Atropine (0.8 mg) was injected intramuscularly together with 20 mg meperidine<sup>k</sup> and 0.75 mg acepromazine twenty minutes prior to induction of anesthesia. Oxygen was supplied by facemask for four minutes and then anesthesia in-

duced with an intravenous bolus of 120 mg thiopental sodium.<sup>l</sup> The trachea was intubated and anesthesia maintained with 0.9% halothane<sup>m</sup> and 33% nitrous oxide. The high percentage of oxygen proved necessary to maintain adequate arterial oxygenation during surgery. Paralysis was induced with 1.2 mg pancuronium intravenously and mechanical ventilation instituted. One hour later a further 0.6 mg pancuronium was necessary to abolish diaphragmatic movement. Analysis of an arterial blood sample revealed a metabolic acidosis which was corrected with sodium bicarbonate.

Two hours after induction, the anesthetic agents were discontinued, air aspirated from the pleural cavity and the pancuronium reversed with 0.3 mg atropine and 0.7 mg neostigmine given intravenously. Meperidine 30 mg intramuscularly controlled the post-operative pain and recovery from surgical repair of the diaphragmatic hernia was uneventful. In this case the administration of a muscle relaxant aided control of ventilation and by paralyzing the abdominal muscles and diaphragm provided excellent operative conditions.

*Case II* - A 5.75 kg five year old spayed female Boston Terrier was presented for lens extraction from the left eye. Although no respiratory obstruction was noted at that time the anesthesia was managed on the assumption that, as with most brachycephalic dogs, there would be problems in the recovery period.

No breathing difficulty was seen following sedation with 10 mg meperidine, 0.5 mg acepromazine and 0.15 mg atropine. Anesthesia was induced with 30 mg methohexital sodium<sup>n</sup> intravenously and maintained with 0.9% halothane and 60% nitrous oxide in oxygen. The patient was paralyzed with 0.35 mg pancuronium and ventilation controlled manually. Approximately forty minutes later the surgery was completed uneventfully and the pancuronium reversed with 0.25 mg atropine and 0.375 mg neostigmine. At this time the halothane and nitrous oxide were discontinued and the patient allowed to breathe oxygen for a further five minutes. She was then extubated and assumed sternal position immediately. A mild degree of

# in Small Animal Anesthesia

## Blocking Agents Have a Veterinary Anesthesia

partial inspiratory obstruction was present for about ten minutes.

A muscle relaxant was chosen in this case to enable light general anesthesia to be maintained which would result in a rapid recovery with minimal post-operative sedation thus reducing the likelihood of airway obstruction, while preventing any movement by the patient which could have disastrous effects on the surgery. Pancuronium has no effect on intraocular pressure.

*Case III* - A ten year old male Labrador Retriever weighing 32 kg required general anesthesia for amputation of the hindleg following extensive invasion of the stifle by an undifferentiated sarcoma. Laboratory examination revealed a low albumin and a mildly elevated alkaline phosphatase. The dog also had evidence of heartworm disease. No metastatic deposits were seen on thoracic radiographic examination.

Premedication consisted of 1.4 mg atropine intramuscularly followed twenty minutes later by Innovar-Vet<sup>(R)</sup> 1.6 ml intravenously. Five minutes later anesthesia was induced with halothane and 50% nitrous oxide by mask and the trachea intubated. The vaporizer setting for halothane was 1% for the first two hours and then reduced to 0.6% for the next hour. To maintain adequate analgesia a total of 0.1 mg fentanyl<sup>o</sup> was given in divided doses. An initial dose of 2 mg pancuronium was followed by supplemental doses of 1 mg to maintain paralysis and was reversed at termination of surgery with 0.6 mg atropine and 1.5 mg neostigmine. Meperidine was given post-operatively for pain relief. By the addition of a muscle relaxant, the administration of depressant drugs can be kept to a minimum. Note that age reduces the requirement for anesthetic agents considerably. This technique described has proven successful in aged and debilitated dogs.

*Case IV* - A female Beagle of unknown age weighing 12 kg required a cesarian hysterotomy. The animal was bright and alert but of placid disposition and so anesthesia was induced with halothane and 50% nitrous oxide by facemask following prior atropinization only. Following intubation,

3 mg. succinylcholine was injected intravenously and the halothane reduced to 0.8%.

Six very active puppies were delivered. As the succinylcholine was metabolized the halothane concentration had to be increased to allow completion of surgery. Meperidine 35 mg. was administered intramuscularly at the termination of anesthesia.

Halothane provides little muscle relaxation at light planes of anesthesia and the addition of succinylcholine results in a marked improvement in surgical conditions. Succinylcholine does not cross the placenta in sufficient amounts to depress the fetuses.

Although the cases cited here involved dogs, the same principles apply to the use of muscle relaxants in cats.

Two points relevant to the use of muscle relaxants must be emphasized. Firstly, artificial ventilation must be instituted since the respiratory muscles are paralyzed. Secondly, analgesia must be provided because motor response to pain is abolished.

The signs of pain in a paralyzed animal are pronounced pupillary dilatation, salivation, lacrimation and tachycardia, and if these are observed then the administration of anesthetic agents should be increased. Analgesia may be supplied in a variety of ways utilizing narcotic analgesics, inhalation agents and barbiturates. However, it appears that a reduced amount of anes-

thetic agent is required to produce surgical anesthesia in the paralyzed animal. It is postulated that this is partly due to a reduced afferent input to the Central Nervous System as a result of paralysis.

In conclusion, neuromuscular blocking agents have a definite place in veterinary anesthesia. The greater degree of supervision and skill required for their administration precludes their use for a high proportion of anesthetics in a busy practice. However, drawing a parallel between veterinary anesthesia as it is today with anesthesia as it was in the infant stages, in the words of Liautard in 1872 when discussing the injection of chloral hydrate intravenously, "has been shown to be the best of all modes of obtaining anesthesia. . . .but unfortunately it is a method of introducing it into the system which will scarcely ever become sufficiently practicable to be available outside of the laboratory".<sup>1</sup>

Cynthia Trim, R.C.V.S., D.V.A.

- |                        |                        |
|------------------------|------------------------|
| a. Rompun              | i. Styglin, Prostigmin |
| b. Valium              | j. Regonal             |
| c. Sucostrin, Anectine | k. Demerol             |
| d. Tubarine            | l. Pentothal           |
| e. Flaxedil            | m. Fluothane           |
| f. Pavulon             | n. Brevital            |
| g. Alloferin           | o. Sublimaze           |
| h. Fazadon             |                        |

### References:

1. Soma, L. R. *Textbook of Veterinary Anesthesia*. Williams and Wilkins Company, 1971.

## Skunks Make Dangerous Pets - A Continuing Saga

The veterinary medical literature has for over a decade contained editorial advice against the veterinarian encouraging or participating in the ownership of skunks as pets by descenting or vaccinating against rabies. We have had some close calls in Missouri on this subject, and considerable expense, time and anxiety has been expended. Fortunately, nothing more was lost.

Recently, the Oklahoma Department of Health Laboratory diagnosed rabies in three separate pet skunks in unrelated situations, two on the same day. The first case was a typical story of a skunk kitten, estimated to be two months old, which was captured in broad daylight. The kitten was taken to a place of business where several

employees were placed in contact, and then to a home where several children had contact, one being bitten. The kitten promptly died and was confirmed as having rabies.

The second skunk was captured as a kitten, descented and given a modified live virus vaccine. Two years later the skunk became ill, bit one man and exposed two children to a lesser degree. The skunk was then confirmed to have rabies.

The third skunk was purchased at an open market in Texas, and had been vaccinated and descented. The owner thought the skunk was completely safe. But after coming into the owner's household, that skunk developed rabies.

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# Nutrition of the Dog

The dog needs approximately 43 different nutrients and these can be divided into five classes: water, protein, sources of energy, vitamins, and minerals. These nutrients must be present in specific amounts and ratios for optimum utilization.

Water might be called the forgotten nutrient; water is often neglected. Clean, fresh water available daily for the dog is important. All of the metabolic functions of the animal are carried out in the animal's body in the presence of water. The water requirement in a dog ranges from 20 cc per pound of body weight to 40 cc per pound of body weight depending on the environmental conditions.

Proteins from both meat and vegetable origin are beneficial and useful to the dog, but protein quality is important. Protein quality refers to an adequate balance of amino acids in the food. If the dog is given an excellent quality protein, the protein requirement could be met with a dry diet containing 16% protein or less.

Energy is derived by the dog's body from carbohydrates and fats. An adult dog should be fed enough of these energy sources to meet body maintenance requirements and meet the work demand. A growing puppy should be fed about two times the maintenance requirement of these energy sources. A pregnant animal should receive about 10% more of the energy sources than is needed by her basic maintenance requirements during the first two trimesters of pregnancy, and about 50% more of these sources for the last trimester. The lactating dog should be given three to four times her basic maintenance requirements for energy.

Fat contains essential fatty acids which the dog needs. A dog can be successfully maintained on a dry diet containing 5 to 8% fat.

Even though a dog requires only small amounts of vitamins, they are nevertheless essential. Most vitamins are supplied from the feedstuffs used in the diet. When formulating any dog's diet, vitamins A and D should be considered as well as many of the B Complex vitamins. Vitamin D is particularly important when dogs are raised in kennels without sunlight for long periods of time. If an animal is being fed an all vegetable diet, vitamin B<sub>12</sub> should be added to the diet since this vitamin is found only in animal tissue. When B

vitamins are deficient, the dog loses appetite and weight. These are just a few examples which illustrate that vitamins are essential to the healthy dog.

Minerals should be supplied in the dog's diet in the proper amounts and ratios. The amounts of calcium and phosphorus are of special concern. The dog's diet should have approximately 1% calcium and 0.9% phosphorus, with careful consideration given to the ratio of calcium to phosphorus. The adult dog needs a ratio of 1.2:1 calcium to phosphorus, while the growing puppy and lactating dog require 1.5:1 calcium to phosphorus ratio. Other macro minerals such as magnesium, sodium, potassium, chloride and sulphur are needed in larger amounts in the diet than such necessary trace elements as iron, copper, iodine, manganese and zinc which must be present in the diet at very low levels. But special consideration must be given to iron for a puppy receiving only a milk diet.

A dog today depends largely on a commercially available diet which is fortified with minerals and vitamins. When a commercial diet is fed and the manufacturer's recommendations are followed, problems should be minimized. Nutritional problems begin when a diet is changed and appropriate nutrients are not altered to balance. Commercial diets generally should not be supplemented with additional foodstuffs unless the proper change is made in the mineral and vitamin balance. Neither should diets be supplemented with excess minerals or vitamins if they are not needed.

The average dog now lives better because of: improved health care, effective biologics to control diseases, better education of the owner, genetic selectivity, and last but not least, better nutrition.

J. D. Rhoades, D.V.M., Ph.D.  
with acknowledgement to  
D. P. Hutcheson, Ph.D.



*Dr. Cecil Elder (seated) toured the College's new buildings recently. Dr. Elder received his D.V.M. degree from Kansas State University in 1916. In 1931, he joined the faculty of UMC's Department of Veterinary Science. With the establishment of a four-year professional program in 1946, Dr. Elder was placed in charge of the pathology area. He retired in 1963.*

*To Dr. Elder's right is his wife and to his left are Dean Kenneth D. Weide and Dr. Willard H. Eyestone, Chairman of the Department of Veterinary Pathology.*

# Veterinary Medical Diagnostic Laboratory Fully Accredited

The College's Veterinary Medical Diagnostic Laboratory has been given full accreditation for three more years from the Accrediting Board of the American Association of Veterinary Laboratory Diagnosticians. The Laboratory is one of 16 fully accredited, full service laboratories out of nearly 100 veterinary medical diagnostic laboratories in the U.S. as listed by the federal government.

Last June, three members of the Accreditation Committee visited the Veterinary Medical Diagnostic Laboratory. The Laboratory was last examined in 1974 when it was then given full accreditation for the first time.

The committee compared UMC's laboratory with previously established, standardized specifications of what a full service veterinary medical diagnostic laboratory should be and passed this Laboratory with high marks.

The committee was particularly impressed with the new facilities housing the Laboratory. These facilities were completed this past winter. The top priority given by this Laboratory for short turnaround time for tests also impressed the Committee.

At present the Veterinary Medical Diagnostic Laboratory is funded almost entirely by the College of Veterinary Medicine. This funding source has been

justified by the heavy involvement of the laboratory in the education of veterinary students. Dr. L. G. Morehouse, director of the Laboratory, has said that the presence of this laboratory on the Veterinary College's campus has given veterinary students an invaluable opportunity for seeing firsthand a wide variety of disease conditions.

Dr. Morehouse added: "This teaching opportunity, combined with the service the laboratory offers, makes UMC's Veterinary Medical Diagnostic Laboratory a unique educational resource for the University as well as a mechanism for providing diagnostic laboratory services to the veterinary profession, and to the livestock and poultry industry of Missouri."

## Pet Skunks, cont.

In the first two incidents, 15 persons received antirabies prophylaxis at an estimated direct dollar cost of \$7500. The third skunk exposed 27 persons to the disease. The hidden costs of work time lost, travel, etc., made the overall cost larger. The risk of a human rabies infection is real and the anxiety produced is tremendous.

These episodes, again, emphasize the fact that the skunk is a potential source of rabies, regardless of its age and geographic location. The "pet" skunk developing rabies usually exposes many persons because people are generally curious about these unusual pets, even when they get sick. Vaccination of skunks against rabies is a totally untested procedure. We do not know whether *any* vaccine produces immunity, whether the natural onset and clinical course of rabies may be masked or modified by vaccination, or whether a live virus vaccine can in fact produce typical or atypical rabies in the skunk. The owner is provided with a false sense of security when a veterinarian encourages domestication by providing vaccination, descenting or other pet care. Further, the normal behavior of the wild skunk provides direct clues as to its health in an accidental bite incident. The semi-domesticated skunk does not behave normally and this indication is lost.

The skunk is a wild animal even though it is easy and enjoyable to domesticate. The skunk should be allowed to remain and be enjoyed in the wild. The veterinarian should play no role in encouraging people to have skunks as pets.

D. C. Blendon, D.V.M.

## CE Program Coming

Client Service and Practice Growth—Feb. 25, 1978; fee \$35 (sponsored jointly with the Student Chapter of the AVMA). Instructor: Mr. Robert P. Levoy, Director, Professional Practice Consultants, Great Neck, N.Y. Mr. Levoy has conducted more than 2500 management seminars, and is the author of two books and more than 300 articles on practice management. This seminar will be held at Columbia's Ramada Inn. Registration deadline: Jan. 25, 1978.

For more information, contact the Continuing Education and Extension Office, 234 Veterinary Medicine Bldg., University of Missouri-Columbia, 65201.

## Specialty Title

Dr. Joseph M. Carrillo, a specialist in nephrology and Assistant Professor at the College, has recently been notified that he is now a Diplomate of the American College of Veterinary Internal Medicine.

Dr. Carrillo has been on the College's faculty for three years. He graduated in 1972 from the University of Illinois with his D.V.M. degree. He then served his internship and residency at the Animal Medical Center in New York City.



## New Instructor

Dr. Leon J. Cruise has been appointed Instructor for the College. He began work on September 1 in the Department of Veterinary Anatomy-Physiology.

While at UMC, Dr. Cruise will be working toward a Ph.D. degree in veterinary anatomy. This degree will compliment his D.V.M. degree which he received in 1964 from Tuskegee Institute. Dr. Cruise remarked about his interest: "I have wanted to be a veterinary anatomist for some time, and now I have the opportunity."

To take this opportunity meant that Dr. Cruise had to leave his 12 year-old practice in Ashland, Massachusetts. This was a practice which he had established himself and which he had built up into a two-veterinarian, five-technician enterprise.



## Dr. Coffman is President-Elect

Dr. J. R. Coffman is now President-Elect of the American College of Veterinary Internal Medicine. He is a Charter Diplomate with that College.

Dr. Coffman, who received his D.V.M. and M.S. degrees from Kansas State University, is one of four faculty members at UMC's Equine Center.

Dr. John M. MacDonald, recently appointed Assistant Professor for the College and a specialist in dermatology, recently passed the Qualifying Examination which

qualifies him to take the Certifying Examination for the American College of Veterinary Internal Medicine.

# Update on Marek's Disease Research

The National Cancer Institute has renewed support of studies on the role of "Cell-mediated Immunity in Marek's Disease." The project, funded for a total of \$131,730 of direct costs, is now in its third year and is directed by Dr. Hans K. Adldinger, Associate Professor of Veterinary Microbiology.

Marek's disease is a lymphomatous and neuropathic disease of chickens that often results in fatal malignant lymphomatosis. This neoplasm is caused by a highly contagious avian herpesvirus. In the United States, the disease was costing the

poultry industry nearly \$200 million loss annually back in the late 1960's.

Today Marek's disease is no longer an economic problem. Researchers at Cornell University, Dr. Adldinger among them, discovered in 1970 the manner in which the disease was transmitted. Soon thereafter, a highly successful vaccine was developed by USDA scientists which brought the disease under control.

Marek's disease is an important tumor model in animals for the study of human neoplasms thought to be caused by other herpesviruses. Infectious mononucleosis, a self-limiting lymphoproliferative disease of man, is known to be caused by a herpesvirus, and Burkitt's Lymphoma, Nasopharyngeal Carcinoma and Cervical Carcinoma are strongly suspected to be induced by herpesviruses.

As a model in animals, Marek's disease permits comparative studies of questions relating to the many factors that influence the outcome of infections with oncogenic herpesviruses. These factors may be categorized into: those associated with the infecting virus, those associated with the condition of the host organism, and those associated with the environment of the host.

One outstanding factor of the host organism is the ability of the immune system to respond quickly and effectively to infection caused by oncogenic herpesviruses.

The immune response of chickens involving humoral antibodies has been studied for several years with regard to Marek's disease. With the exception of maternal antibodies, the humoral immune response appears to have a less significant influence on the pathogenesis of Marek's disease than cell-mediated immunity. This was indicated by circumstantial evidence

obtained in studies involving early removal of the thymus (which governs cell-mediated immune responses).

Direct evidence of the protective effect of a strong cell-mediated immune response in chickens has been hard to come by, mainly because suitable *in vitro* tests for the assay of such immune responses have not been available.

Dr. Adldinger has been working on the development of an *in vitro* assay for cell-mediated immunity for more than a year. The goal has been to detect immune lymphocytes, specifically those that can destroy tumor cells, in the blood of infected chickens, and to quantify the cytotoxic activity of those lymphocytes. Dr. Adldinger was joined in his efforts by Dr. A. W. Confer, a Ph.D. candidate under Dr. Adldinger's sponsorship in the Department of Veterinary Microbiology since Fall, 1976.

The two researchers have been able to conclude the standardization of an *in vitro* cytotoxic microtest for cell-mediated immune response in infected chickens that is both sensitive and economic. They reported on their findings at the Third International Symposium on Oncogenesis and Herpesviruses, held at Harvard University in Cambridge, Massachusetts, last July.

With this test, a tool is now at hand which makes possible the direct study of the nature of cell-mediated immune responses to Marek's disease virus infection in chickens and what the role of the cell-mediated immune response is in chickens that either survive or die in the course of Marek's disease. Information obtained in these studies is hoped to benefit the understanding of infections caused by oncogenic herpesviruses in other animals and man.

## Dr. Case Awarded

Dr. Arthur A. Case, Professor of Veterinary Medicine and Surgery at the College, was one of eighteen recipients of Faculty-Alumni Awards, given annually by UMC's Alumni Association. The award was presented to Dr. Case on September 23 at a special banquet.



Dr. Case, who has been with the College of Veterinary Medicine since 1947, was responsible for the initial establishment of the teaching hospital. Through his efforts, a nucleus of a staff was recruited, and physical facilities with equipment were obtained.

Dr. Case received his D.V.M. degree from Kansas State University in 1942. His main interest now is toxicology relating to poisonous plants. He is a charter member of the American College of Veterinary Toxicologists and a certified Board Diplo-

## Veterinary Medical Review

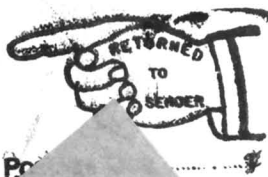
College of Veterinary Medicine and UMC Extension Division

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