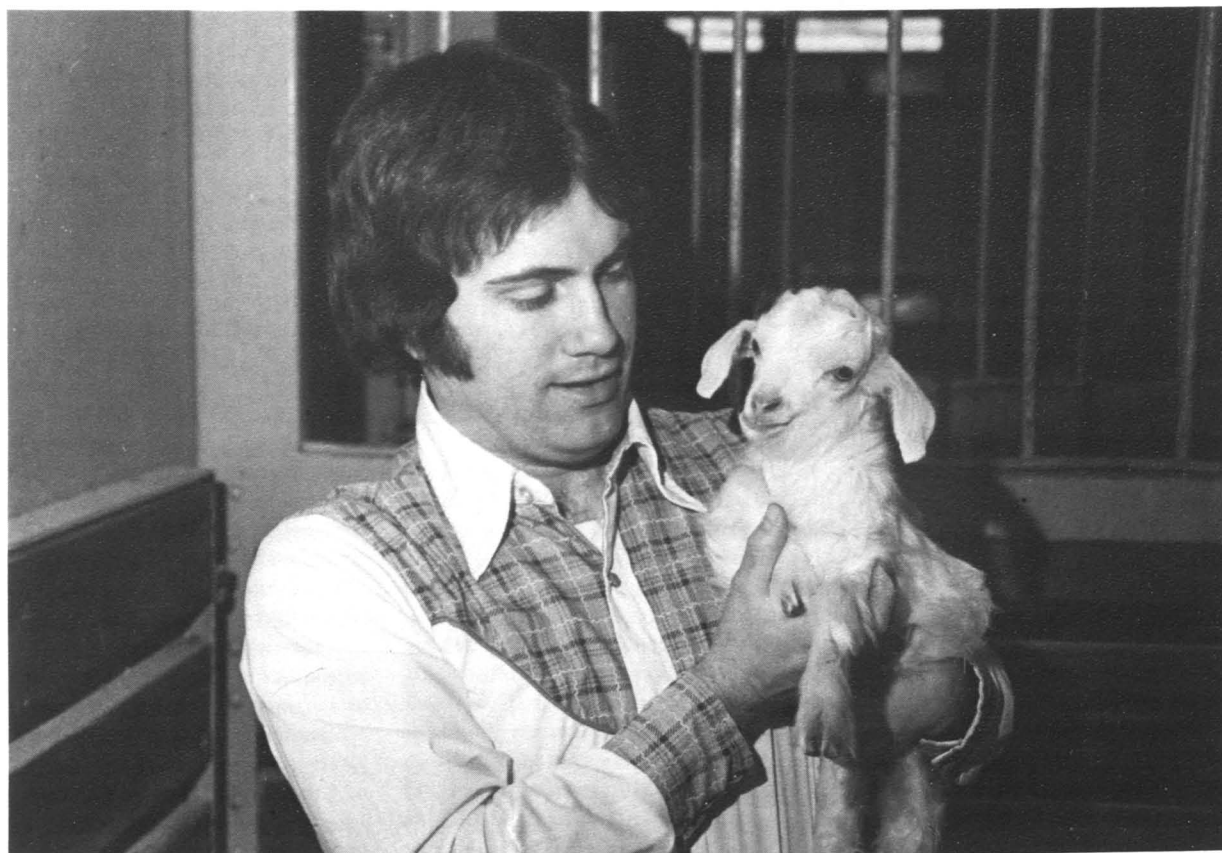


Veterinary Medical Review

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University of Missouri-Columbia

Sudden Death in Goat Kids

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"There is no sadder time for the goat owner than finding dead kids at morning feeding when the night before they were perfectly fine," said Dr. William Braun, shown here holding an Angora Goat kid. Dr. Braun discusses three causes of sudden death in kids: enterotoxemia, coccidia problems and selenium deficiencies. See p. 4.

Other Continuing Education articles in this issue are concerned with pinkeye (p. 8), pentachlorophenol poisoning (p. 2), and two virus-caused diseases of dogs discussed in an interview with Dr. L. E. Carmichael (p. 6).

**Faculty Respond to Toxic
Chemical Spill in
Sturgeon—p. 3.**



American Kennel Club Donates to College

The Dog Health and Education Committee of the American Kennel Club donated in January \$15,000 to the College to promote canine research efforts.

This marks the first year such a donation was made to the College by the AKC. With some of the monies gained from its nation-wide system of pure-bred dog registration, and sanctioning of dog conformation and obedience shows, the AKC has supported in the past specific research efforts at several veterinary colleges in the U.S.

In addition to this recent grant, the AKC presently supports research at the College on the early diagnosis of rabies under the direction of Dr. Donald Blendon.

Visiting Lecturer

Dean Kenneth Weide (C) presents Dr. Alexander de Labunta (L) a small memento of the College as Dr. Louis Corwin, Jr. (R) looks on.

Dr. de Labunta from Cornell University was the College's second Visiting Lecturer for the academic year. Appearing on January 11, he presented "Anatomic Basis for Neurologic Diagnosis". His talk was co-sponsored by the College's Visiting Lecturer Series and the Student Chapter, AVMA.

Exposure of Livestock to Penta-Treated Wood

Gary Van Gelder, D.V.M., Ph.D.
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What Is Safe?

Toxicologists use the concept of hazard to describe the likelihood that toxicosis in an animal will result from the conditions of exposure to a hazardous substance. In the instance of pentachlorophenol (penta or PCP) the two major routes of exposure for farm animals are oral and inhalation. Dermal exposure is usually minimal.

For oral exposure, how much penta-treated wood would a herd of cattle have to consume to result in toxicosis of each animal?

A typical pole barn that would house 125 cows would contain approximately 4000 board feet of treated lumber above ground. Assuming this lumber has been treated to specifications, the total amount of penta present would be 130 pounds or 59 kg. If the 125 cows weighed 1100 pounds each, and 20 mg/kg penta to body weight is figured for a toxic but non-lethal dose, then all of the cows would need to consume daily about 2% of the barn or some 80 board feet of lumber per day to be poisoned. Clearly this situation does not occur since it would mean that the barn would last for only two months.

From review of all toxicology studies of penta, exposures of 1 - 3 mg/kg/day do not result in any significant effects (see September/October, 1978, *V.M.R.*). So, continuing this hazard assessment, the

cows could 'safely' eat the typical pole barn in 950 days. In a properly designed barn, however, much of the wood is not accessible to the cattle.

Animals may also be exposed to penta through inhalation of vapor. Penta is normally dissolved in oil for treating wood. Treated wood for the farm market is usually impregnated with a 5 - 7% penta-oil solution at the rate of seven pounds of solution per cubic foot of wood. Penta in oil has an equilibrium vapor density of 0.115 mg/cubic meter of air at 20°C. This implies that in a closed chamber (no air exchange whatsoever) eventually penta would vaporize until an air level equal to the vapor density was reached.

Based on the amount of air inhaled by an average-sized cow in 24 hours, the resulting inhaled dose in this closed chamber would amount to 0.02 mg/kg, assuming the animal retains 100% of what she inhales. However, as pointed out in the September/October, 1978, *V.M.R.*, penta is rapidly eliminated in the urine (half-life in the body of less than two days). As with oral exposure, the hazard due to inhalation of penta in a typical pole barn is therefore low.

Recommendations

While no evidence exists that inadvertent, low-level exposure of livestock to penta-treated wood presents any hazard to livestock or to the food chain, the general public has developed an attitude that

chemicals such as penta should be kept out of the food chain as much as possible. In this regard, the following suggestions are made on the use of penta-treated wood in food animal production.

1) Wood is treated with penta to help prevent it from rotting when exposed to the weather, soil, or continuously moist conditions. Treated wood should be used under those conditions. However, wood used inside of a building where it is dry does not need to be treated. If the inside of the building is very damp, ventilation should be increased (see May/June, 1978, *V.M.R.*).

2) Treated wood which is in service that is oily or 'bleeding' the treating solution should be replaced or covered. Freshly treated wood that will be used in construction should be allowed to weather first to remove the excess oil. Wood with a surface residue should not be used in places where animals might lick it. Treated wood should be dry.

3) Penta-treated wood should not be in continuous contact with animal feed. More important, treated wood should not be used for feed bunks. Sows should not be permitted to farrow on uncovered oily wood surfaces. If such surfaces are present, they should be covered with plywood or adequate bedding.

4) The wood treating industry is capable of producing an acceptable product for the farm market. Problems can develop when users of these products fail to follow the above recommendations.

New Department Head

Dr. Charles A. Carson has been named Chairman of the College's Department of Veterinary Microbiology. He began work on March 1, 1979.

Dr. Carson received his Veterinary Medical Degree (V.M.D.) from the University of Pennsylvania in 1962. After work as a private practitioner and then instructor at Texas A&M University, he entered that school's graduate program and received his M.S. degree in 1969. He continued to work at Texas A&M as Assistant Professor of Veterinary Public Health until 1972.

Dr. Carson went to the University of Illinois in 1972 to become Assistant Professor of Veterinary Clinical Medicine. In 1974, he was awarded a Rockefeller Foundation Postdoctoral Fellowship to complete his research for his Ph.D. in Veterinary Microbiology. Much of Dr. Carson's research work has been with anaplasmosis and hemotropic diseases of livestock.

After receiving his Ph.D. degree in 1975, Dr. Carson became Associate Professor at the University of Illinois. He was awarded Diplomate status in the American College of Veterinary Microbiologists in 1976. He has also been co-director of the Rockefeller Foundation project designed to explore the protective immunity related to transmissible blood disease of man and animals, using bovine anaplasmosis as a model.

When asked about his appointment, Dr. Carson stated: "The Department of Veterinary Microbiology is strong at Missouri. A fine and well-balanced staff exists, and I am looking forward to working with them."



Dr. Carson

Faculty Publish

Egger, E. L., and Stoll, S. G.: "Ulnar Styloid Transposition as an Experimental Treatment for Premature Closure of the Distal Ulnar Physis", *J. Am. An. Hosp. Assn.*, 14, 6:690-697.

Burk, R. L., Corley, E. A., and Corwin, L. A., Jr.: "The Radiographic Appearance of Pulmonary Histoplasmosis in the Dog and Cat; A Review of 37 Case Histories", *J. Am. Vet. Radiol. Soc.*, 19, 1.

Barsanti, J. A., Jones, B. D., Bailey, W. S., and Knipling, G. D.: "Diagnosis and Treatment of Peritonitis Caused by a Larval Cestode *Mesocostoides* spp. in a Dog", *Cornell Vet.*, 69, 1.

College Responds to Crisis

Sturgeon Chemical Spill Brings Faculty Help

A common saying runs: "Everyone is apathetic about disasters until one happens." But that old saw cannot be applied to many of the College's faculty. When a disaster did occur in Sturgeon north of Columbia on the night of January 10, 1979, several faculty members provided fast, reliable advice and on-the-scene help for local authorities and residents.

Just before midnight on January 10, one of the trucks supporting a railroad tank car collapsed while the train was passing through Sturgeon. The tank car carried 20,000 gallons of orthochlorophenol, destined for Washington state to be used in treating wood.

When the truck gave way, the moving tank car sagged to the track bed and ruptured, spewing out the noxious chemical for 900 yards along the railroad's right-of-way.

Local officials quickly reacted to the spill by ordering all 800 residents of Sturgeon and nearby rural areas to evacuate because of the potential hazard presented by the chemical's evaporate. As the pungent fumes of orthochlorophenol wafted up into the cold night air, that air was also filling with unfounded rumors such as cattle near the spill suddenly dropping dead. Concern was growing into fear because no one knew the toxic nature of the tank car's contents.

One of the first faculty members to take an active role in coping with the disaster was Dr. Donald Blenden, Professor of Veterinary Microbiology and a recognized expert on rabies.

Dr. Blenden is also a ham radio operator and currently serves as Emergency Coordinator for the Amateur Radio Emergency Service in central Missouri. He was alerted to the potential need of emergency messages in and out of Sturgeon and neighboring communities via radio.

While in the role of radio coordinator, Dr. Blenden met with several county and city officials at the Emergency Operations Center in Columbia. Being aware of his background in veterinary medicine, officials at that meeting discussed with Dr. Blenden the health hazards of such a spill. Dr. Blenden answered questions to the best of his ability even though many of them

were not in his area of expertise. As he said, "Community health is my business, not toxicology, but I certainly know where to find toxicologists."

Dr. Blenden gave the officials the names of Dr. Gary Osweiler, Associate Professor of Veterinary Anatomy-Physiology and an expert in chemical toxicology, and Dr. Arthur Case, Extension Veterinarian and toxicology expert at the College.

One of the first tasks facing the three faculty members was to have someone properly identify the spilled chemical—some people were calling it "carbolic acid". After proper identification was made, Drs. Case and Osweiler were able to provide better help.



Dr. Case



Dr. Osweiler

Dr. Osweiler was contacted by two area veterinarians, Dr. D. H. Farmer of Centralia and Dr. T. J. Vogelweid of Moberly who had been called by local farmers and pet owners concerned about their animals left behind in the evacuation.

Dr. Osweiler was able to quickly answer questions about the toxic properties of orthochlorophenol because last summer he had prepared a report of the substance for the Environmental Protection Agency.

Others in the Sturgeon area called Dr. Bonnard Moseley, another Extension Veterinarian with the College. Like Dr. Blenden, he answered questions to the best of his ability and referred several callers to Dr. Osweiler or Dr. Case. Taking what facts that were given him, Dr. Case eased many fears of his callers by saying the hazards of this particular spill were not as bad as the odor in light of the prevailing weather conditions.

When word came to Dr. Blenden that the Missouri Department of Agriculture was sending a veterinarian, Dr. James Badger, to Sturgeon the day after the accident to inspect the spill, Dr. Blenden requested that someone from the College accompany Dr. Badger. The veterinarian from the College was Dr. Donald Mueller

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William Braun, D.V.M., Dept. Veterinary Medicine & Surgery

The dairy goat has recently experienced a dramatic upsurge in popularity in this country. The American Dairy Goat Association (ADGA) reported an 800 percent increase in purebred registrations for the ten year period 1966-1976. Admittedly many of these goats are owned by back-to-nature, self-sufficiency type people, but many more are raised by those seeking an alternate milk source, whether for health reasons or self-satisfaction.

Today's veterinarian can and should play a vital role in this expanding facet of animal industry. Goat owners are more than willing to seek competent veterinary assistance, provided it can be offered. These people are disappointed when turned away under the pretext that the veterinarian knows little or nothing about the animal. We must realize that the goat is basically a small ruminant and work from there. Even the small animal practitioner can effectively care for goats. The clients are happy to bring the animals to the clinic, and most are able to pay small animal based fees. Dairy Herd Improvement Recording Associations in most dairy states of the United States have moved to accommodate production testing of dairy goat herds.

The foundation of herd existence and improvement is the goat kid. A good foundation for herd health lies in the care given to the kids, for it is here that the herd expands.

Three problems can cause a lot of heartache for the client: enterotoxemia, coccidiosis, and Vitamin E/Selenium deficiencies. These three entities have one common characteristic when manifested in kids—*sudden death*. There is no sadder time for the goat owner than finding dead kids at morning feeding when the night before they were perfectly fine.

These causes of sudden death can be effectively combated. The health care and management of kids is basically similar to that given to dairy calves, except of a slightly smaller scale.

Enterotoxemia in goats is caused by toxin produced by the organism *Clostridium perfringens*, Types B, C and D.

Sheep are most susceptible to Type D toxin, but goats are highly susceptible to both C and D Types. Under normal conditions of management and feeding, the possibility of enterotoxemia in dairy goats of any age is present, but the most devastating consequences occur in kids less than one month of age. It is impossible to manage a herd of dairy goats without experiencing this disease.

The organism is a natural inhabitant of the intestinal tract. Normally the continual passage of ingesta thru the intestines via peristalsis does not allow sufficient numbers of organisms to grow and produce toxin in harmful quantities. However, any factor that causes peristalsis to be slowed, with a concomitant decrease in oxygen tension, sets up an environment for the rapid accumulation of organisms and increased toxin production. These factors include soft lush foods, foods rich in carbohydrates (grain), heavy milk feeding and overeating, thus "overeating disease".

Those animals most susceptible to enterotoxemia are goats in good condition and on a high plane of nutrition. The most common victim is the single kid still nursing the dam or the most aggressive feeder at the lamb-bar. In baby kids, excess feeding or sudden access to palatable feed, or changes in feed may cause acute enterotoxemia with sudden death. In peracute cases there will be sudden death without premonitory signs, death occurring within 2 to 3 hours. In the acute form, death may occur within 24 hours preceded by severe abdominal pain, violent struggling, recumbency, convulsions, diarrhea (sometimes with blood present), and coma.

Diagnosis of enterotoxemia is difficult at best. In the living animal, a presumptive diagnosis may be made if there is any positive response to the injection of massive doses (40-100 ml) of Type C and D antitoxin, no matter how slight. On postmortem, the mouse inoculation test on a filtrate of fresh ingesta is the best diagnostic tool. The efficacy of this test rapidly decreases shortly after death. So samples should reach the lab within 2 hours of death. Postmortem lesions include

hemorrhagic enteritis, ulceration of the intestinal mucosa, subendocardial and subserosal hemorrhages, and rapid decomposition (pulpy kidney disease). The epsilon toxin of Type D also causes a hyperglycemia that may be detected as a glycosuria, so a test of glucose in the urine may be valid. A differential diagnosis would include enterotoxemia, coccidiosis, and acute worm infestation.

The basis of attack on enterotoxemia is through prevention and control since treatment is often futile on those cases that survive more than a few hours. This treatment should include massive doses of C and D antitoxin (40-100 ml) half given intravenously, intestinal sulfas, broad spectrum antibiotics, and electrolytes. It is imperative when raising kids to feed small amounts at frequent intervals or give kids constant access to milk, grain, and forage. Changes in feed for animals of any age should be gradual, taking 10-14 days to accomplish. This gradual change includes feeds of different sources as well as when increasing protein or energy contents.

The foundation for any control program should be a routine vaccination program. However, reliance on vaccination alone will not prevent problems or losses. All animals in the herd should be given two initial doses of *Clostridium perfringens* Type C and D toxoid at a two week interval, followed by yearly booster vaccinations. A booster to does thirty days prior to kidding will increase antibody levels in the colostrum and afford passive protection to baby kids. The kids themselves should receive first toxoid at 3-4 weeks of age followed in two weeks by a booster dose.

Goats share three species of coccidia with sheep: *Eimeria ninakoblyakimovae*, *E. arloingi*, and *E. absata*. Coccidia problems are usually limited to kids under 4 months of age. Kids with mild infections may show only transient inappetence and soft stools, but kids with severe infections may show bloody or tarry diarrhea with straining, dehydration, and death.

Merozoites and gametocytes are the pathogenic stages in that they cause rupturing of the cells they invade with conse-

cont., p. 5

Missouri Pork Producers Fund Swine Research

The Missouri Pork Producers Association has awarded a \$2,500 grant to Dr. L. D. Olson for "Field Evaluation of an Indirect Fluorescent Antibody Test for Swine Dysentery", a \$5,000 grant to Dr. R. F. Solorzano for "Pseudorabies in Missouri", and a \$3,856 grant to Dr. D. G. Thawley for "The Role of the Raccoon and Other Wildlife in the Transmission of Pseudorabies Virus Among Swine Herds."

Dr. Gerald Buening has received an \$18,000 grant for "Cell-Mediated Immune Response in Bovine Anaplasmosis" from USDA. Dr. Buening's research in this area was described in the January, 1978, issue of *V.M.R.*

Dr. Lonnie Dixon has been appointed Resident in Laboratory Animal Medicine. He received his D.V.M. degree from UMC in 1975 and had been in practice in Kirksville.

Goat kids, cont.

quent exfoliation of the epithelial lining of the intestines. Incubation period is about 14 days, the first signs being a sudden onset of severe diarrhea with foul smelling, fluid feces containing mucus and blood. This is accompanied by straining, dehydration, emaciation and, in severe cases, death which may occur within 12 hours of the onset of signs. Postmortem examination reveals congestion, catarrhal enteritis, with severe cases showing ulceration or sloughing of the mucosa with whole blood or blood stained feces in the lumen. A fecal examination is diagnostic if done at the time oocysts are being shed.

It is not realistic to eradicate coccidia from the herd, but a reduction of numbers and thus lessening the severity of lesions is desirable. Intestinal sulfas or amprolium are effective. The sulfa regimen consists of a four day treatment of either sulfaguanidine or sulfaquinoxaline at a dose rate of 0.6 gr. per pound body weight per day followed by four days treatment with sulfathiazole or sulfadimethoxine at 0.5-1.0 gr. per pound body weight per day. This sulfa treatment may in itself cause diarrhea; so, a far better and more effective treatment is the use of oral amprolium. Amprolium (Corid(R)) on a five day treatment regimen is safe and effective. The treatment consists of diluting 3 ounces of Corid in 1 pint of water and drenching each animal once a day for five days with 1 ounce of dilution per 100 pounds body weight. To feed baby kids still on milk add 4.8 ml

Endoscopy Workshop Held at College

Flexible endoscopy is now emerging as a valuable diagnostic and therapeutic tool in veterinary medicine. With this device a veterinarian can examine the inside of such organs as the stomach or trachea without resorting to surgery.

In that endoscopy is still in the pioneering stage, most veterinarians have rarely had the opportunity to receive training in its use.

Dr. Brent Jones, now Assistant Professor at the College, was one of the first veterinarians to explore the use of the endoscope when he was a resident studying at the New York Animal Medical Center in 1973.

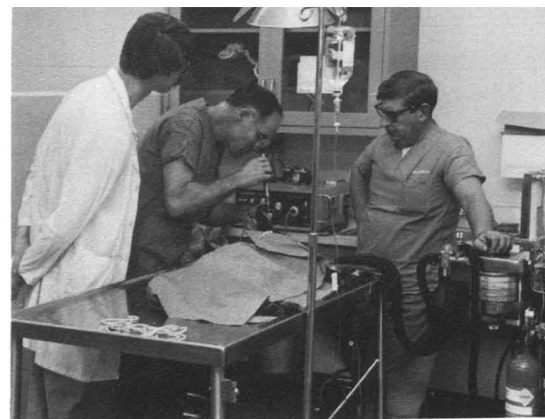
This College, in cooperation with the University of Missouri's Extension Division, offered the first continuing education workshop in the Midwest on endoscopy techniques. Dr. Jones was the principal

of nondiluted Corid into each gallon of milk consumed and treat for 5 days.

Sanitation plays a large part in the control of coccidia. Build up of the organism is aided by confinement, overcrowding, and poor sanitation. Care must be taken not to cause fecal contamination of hay, grain feeds, or water. Feeders should be designed so that the goats cannot stand or defecate on the feed or water. Avoid overcrowding, and keep pens dry and cleaned out frequently. Baby kids should be separated from older animals, and anytime they are placed on ground or pens previously occupied by older animals, they should be prophylactically treated with amprolium, until they are several months old.

Selenium deficiencies occur in much of the United States east of the Mississippi River; the state of Missouri is considered to be marginally deficient. Selenium/Vitamin E responsive disease, or white muscle disease (WMD) causes muscular dystrophy and "stiff lamb (kid) disease". The disease affects kids from birth to 3 months of age. It shows up first as stillbirths or weak kids that die soon after birth; older animals may be stiff, have a stilted gait and show various lameness.

White muscle disease occurs in skeletal and cardiac muscles. The signs of cardiac WMD are rapid and weak pulse, accelerated breathing, pulmonary edema and sudden death. Sudden death in kids less than 2 weeks old can occur without any



Dr. Roudebush (L) checks on two veterinarians as they run through an endoscopy procedure in the wet lab.

instructor for the workshop, which was held December 8 - 9, 1978, and which drew veterinarians from as far away as New Jersey and Louisiana.

Dr. Jones, with the help of Drs. Philip Roudebush and James Noxon, emphasized clinical techniques of the instrument. On the program's second day, each of the ten participating veterinarians performed several endoscopy procedures.

other signs from muscle degeneration in the heart and diaphragm. On postmortem there will be white patches under the lining membrane of the heart in the ventricles and sometimes atria. Suggestive laboratory tests include myoglobinuria and increased SGOT (serum glutamic oxaloacetic transaminase). Other suggestive signs are a dyspnea that is caused by degeneration of the diaphragm and intercostal muscles and the dams of these kids will show poor uterine involution accompanied by retained placenta, metritis, and pyometra following kidding.

Treatment for WMD is often unsatisfactory with prevention the best method of control. Dietary levels of selenium at 0.1 ppm are adequate to prevent problems, and recently FDA has allowed this supplementation for sheep rations. Injections of gestating does with 2.5-5 mg Selenium 60 days prepartum and again 15 days prepartum is usually effective. Newborn kids may be given 1 mg Selenium at birth and again at one month of age. A good product to use is one that contains both Selenium and Vitamin E such as BO-SE(R) (Burns-Biotec) which contains 1 mg Selenium and 50 mg Vitamin E per milliliter.

These three entities of the sudden death syndrome are obviously impossible to treat if the only sign is sudden death. While there are less severe forms of each, the devastating effects occur with the peracute forms for which prevention is the only cure.

Coronavirus and Parvovirus Problems in Dogs

Interview with Dr. L. E. Carmichael

Dr. L. E. Carmichael, noted researcher in canine virus diseases, is a John M. Olin Professor of Virology at the James A. Baker Institute for Animal Health, New York State College of Veterinary Medicine, Cornell University.

Dr. Carmichael was a featured speaker at the Fourth Annual Canine Symposium, "Keeping Rover Healthy", held February 10, 1979, and sponsored by the College and the UMC Extension Division. During a break in the program, Dr. John Rhoades, Extension Veterinarian with the College, had the opportunity to interview Dr. Carmichael on two diseases of dogs that have recently become serious.

Rhoades: Is coronavirus new, being recognized for the first time, or have we controlled something else that has allowed it to emerge?

Carmichael: Coronavirus has been present in the dog population for at least two years in the United States. Dr. Leonard Binn of Institute of Medical Research at Walter Reed Army Medical Hospital first recognized the canine coronavirus in dogs in Germany ten years ago. Coronavirus has only been recognized as occurring in the United States and causing disease for the last two years.

It has been present, but it has been ignored until recently. When it appeared in several animals of a breed of show dogs, the dogs' owners became very concerned. There was excellent communication between those owners and our laboratory, and the disease was brought to the public's attention.

Rhoades: The major outbreak in the United States occurred about a year ago and five months

later parvovirus came along. Parvovirus has emerged as a much more severe problem in the dog population. So is the coronavirus anything to be concerned about now?

Carmichael: I am not sure we can dismiss coronavirus as something we cannot be concerned about. For example, the National Institute of Health and Communicable Disease Center mobilized immediately to attack Legionnaires' disease, which is a rather trivial disease. Coronavirus has some facts in common with Legionnaires' disease. These are diseases which may have been present for many years but come into focus when you get a lot of susceptible populations together. We have put coronavirus as a secondary priority due to lack of resources, but continue to study it. I think we have to know more about basic immune response of the virus (we know how to grow it now), how it grows in dogs and whether a reasonable immunity occurs following infection before we embark on practical studies of immunization.

However, parvovirus infection is a higher order of magnitude on a log scale, more serious in that it is *clearly a virus that can kill young puppies; it is highly contagious and highly prevalent*. Parvovirus is the *most important* canine disease that we have now, second to distemper, and it is newly emerging.

The nature of the virus is such that control by immunization is feasible and I think we can simply give credit to those who have carried on research for the last 20 years in feline panleukopenia which has provided us valuable hindsight about parvovirus. Considerable research has been

done on panleukopenia that can be applied to the canine parvovirus problem.

Rhoades: Is parvovirus being found all over the world or is it fairly localized in its occurrence?

Carmichael: Where people are looking for parvovirus they are finding it. It is known to be present in the United States from coast to coast. We have isolations and serological evidence of its presence in Anchorage, Alaska. It is known to be present in Australia, Belgium and I expect very shortly for reports in *Veterinary Record* of its presence in England. The Canadians have diagnosed about 20 outbreaks as of last week. The initial outbreaks of canine parvovirus disease were recognized by Dr. Konrad Eugster, Texas A&M, in 1977. Until this year there was no recognition of existence of parvovirus associated with diarrhea and this being a nation-wide disease problem.

Rhoades: What is your advice or recommendation to veterinarians at this time as to how to handle, prevent or treat this virus disease?

Carmichael: It is premature to give formal recommendations at this time. There are very few facts. The first fact is the premise on which the disease occurs can be effectively disinfected only with Chlorox bleach. Parvovirus is an extremely resistant virus. The quaternary ammonia products and organic iodine do not have any effect whatsoever on parvovirus but will nicely kill distemper virus or coronavirus.

The second fact is that there is no sufficient information to recommend specific immunization programs. It is known from laboratory studies that feline panleukopenia virus will protect against canine parvovirus. Both inactivated and

Three Students Chosen for Air Force Scholarships

Three of seven Air Force Health Profession Scholarships given nationally to veterinary medicine students have been awarded to Mr. Stephen Collier of Albany, Mr. Johnnie Eighmy of Bruce, South Dakota, and Mr. William Stehnach of Chesterfield.

The scholarships will pay all academic expenses plus a living allowance while the students are enrolled in the College. Upon their graduation in 1981, the three recipients will enter the Air Force as veterinarians with the rank of Captain.

Missouri Kennel Clubs Give to College

The St. Louis Dog Breeders Association recently donated over \$4,400 to expand and update the paging system of the College's Teaching Hospital.

The old paging system had been installed in 1961. When the Teaching Hospital expanded into the adjoining Veterinary Medicine Building, completed early in 1977, the paging system was found to be inadequate.

The donation made by the St. Louis Dog Breeders Association not only permitted expansion of the present paging system, but also added the capability of selecting particular areas of the Teaching Hospital

for address and background music.

In November, the Southeast Missouri Kennel Club, Inc., presented two checks, totalling \$3,500, to the College.

Referring to the College's "excellent veterinary program", that kennel club specified that \$1,500 be used for purchase of instrumentation for the Small Animal Teaching Hospital. The remaining \$2,000 was to be used for canine research efforts.

The Southeast Missouri Kennel Club draws its membership from dog breeders and exhibitors from Cape Girardeau County south to the Bootheel.

College Responds to Crisis, cont.

who had just started work as a Public Health Resident. With only 45 minutes notice before leaving Columbia, Dr. Mueller spoke with Dr. Osweiler about orthochlorophenol and quickly reviewed what literature he had on hand.

After arriving in Sturgeon, Dr. Mueller responded to questions with firm facts about the hazards presented and thereby quelled needless fears. For example, a farmer whose cattle and baled hay were down-wind of the spill was very concerned about his animals' health and whether or not his hay had been contaminated by the chemical's evaporate. The farmer relaxed when Dr. Mueller told him what some of the signs of orthochlorophenol poisoning were (the cattle were not showing any), and that his hay was probably not ruined.

By the time Dr. Mueller had arrived in Sturgeon, representatives from the Kansas City office of the Environmental Protection Agency were already there and had monitored the air from several localities. They stated that they found no hazard present in the atmosphere. Meanwhile, railroad and chemical company officials were making arrangements to clean up the spill.



Dr. Moseley



Dr. Mueller

When assessing the crisis, Drs. Case, Mueller and Osweiler concluded that in spite of the foul odor in the air the concentration of the chemical's evaporate was probably not enough to be toxic outside of the immediate area of the spill. All of them agreed that the very cold temperature during the night kept down the concentration in the air—in fact, the chemical congealed. However, "the problem would have been very different if that had happened in the summer," added Dr. Osweiler.

Drs. Case and Osweiler went on to say that the hazard to local waterways is still in doubt. Orthochlorophenol is more toxic to fish than to mammals. Seepage into the ground was reported to go as deep as twelve feet in some spots.

Virus Problems in Dogs, cont.

live virus vaccines have been experimentally injected into dogs and in controlled challenge studies both live virus and killed virus has provided protection. Attenuated live virus gave better serological responses than the killed virus vaccine.

We do not recommend at this time injecting a living virus from cats into dogs. I believe we should be cautious in injecting living material into a species where it has not been tested extensively. The inactivated feline viral vaccine gave rise to low levels of antibody against canine parvovirus. Two injections of killed vaccine have given rise to antibody levels of 1:80 and 1:60 by hemagglutination inhibition. These are low titers but they were protective against intravenous challenge with virulent virus. These are the facts as we know them. We don't know the level of antibody necessary to protect animals, but we know two injections of killed vaccine are necessary. We can't formally recommend this as a procedure because of federal licensing laws. Feline vaccines today are licensed for cats, but I am sure killed feline vaccines are not going to cause infections in dogs. Veterinarians being requested to use feline vaccine in dogs should make it clear to the client that this is not approved medical procedure. If the owner has some reservations of the possible safety of such vaccines,

then you should not vaccinate the dog.

Studies on attenuated vaccines are very encouraging at this point, but there is a time lag between development of attenuated strains and developing adequate data to show it is safe, effective, doesn't spread and doesn't cause tumors; so a killed vaccine will be available before a live virus vaccine.

Rhoades: One last question: Is there anything new on treatment of canine brucellosis?

Carmichael: No, really nothing new on treatment of canine brucellosis. We know that sustained treatment with tetracycline drugs where treatment is continuous and sustained in association with Streptomycin for at least two weeks has cured some dogs. There is no universal treatment for canine brucellosis. Each patient has to be evaluated and treated with a continual followup (serological and cultural) after treatment. There is hope that newer antibiotics such as minocycline (differs from tetracycline in that it is more soluble in lipid and will get into cells more efficiently) will become available. The drug is very effective, but nothing is 100% effective in brucellosis treatment. Unfortunately, price is the major problem with minocycline. I must emphasize, however, that nothing is totally effective, and the decision to treat must be considered very carefully.

Within a week following the spill, a private firm was cleaning up the chemical. Some area residents still were complaining about the lingering odor.

Three animals suspected of being poisoned by orthochlorophenol were brought to the College early in February. Post mortem examinations revealed that the causes of death were not from the chemical. Dr. Osweiler is developing a procedure for analyzing tissue samples from these animals to detect orthochlorophenol.

The opinion of all faculty involved was that the College's response was appropriate and effective. Furthermore, they feel that the team approach as used in this crisis is essential in meeting professional responsibilities when faced with situations ranging from chemical spills to disease outbreaks. The team approach requires good internal and external communication systems, coupled with sensitivity to the public's reactions as well as need.

Dr. Donald Mueller, recently appointed Resident in Public Health, received his D.V.M. degree from Kansas State University in 1976 and his Master of Public Health in 1978 from the University of Minnesota-Minneapolis.

Nutritionist Appointed to Faculty

Dr. Gene M. Zinn has been appointed Assistant Professor, effective December 15, 1978, to the College's Department of Veterinary Medicine and Surgery. Dr. Zinn's teaching responsibilities are mainly in animal nutrition and herd health. He is one of several faculty members charged with ambulatory duty.



Dr. Zinn

Dr. Zinn received his D.V.M. degree from Iowa State University in 1956, and went into practice in Bethany, Missouri. In 1970, he was awarded his Ph.D. degree from UMC, and then returned to Bethany.

Blood Drive at College

The Student Auxiliary sponsored a blood drive at the College on February 3, 1979. In spite of the bad weather, 95 pints of blood were obtained.

The drive was held in the Student Lounge. Ms. Rebecca Gants coordinated the effort.

Pinkeye in Missouri Cattle

Surveying the Problem

"Pinkeye" tends to be used by many people as a catch-all term for diseases and injuries of the eyes of cattle.

However, only one form of pinkeye, Infectious Bovine Keratoconjunctivitis, concerns Dr. Lloyd Selby and Dr. Jonathan Webber. This form is highly contagious, and is caused by *Moraxella bovis*, an aerobic, gram-negative bacteria.

Dr. Selby, Associate Professor, and Dr. Webber, Teaching Associate, are in the Department of Veterinary Microbiology. Dr. Selby has been working on this problem since fall, 1976. The research has been supported by a grant from the Veterinary Medicine Research Council.

Although pinkeye is not fatal, the American National Cattlemen's Association has labeled this disease as one of the more important diseases affecting beef cattle today. The disease most often strikes calves on pasture in the summer. Infection results in poor weight gains and lost market value for the calves due to partial blindness.

To ascertain the severity of the disease in Missouri, in June of 1978 Drs. Selby and Webber requested through newspapers statewide that any livestock producers whose herds may have pinkeye to contact the two researchers. More than fifty producers did. Dr. Webber took specimens from the eyes of infected animals on those farms; *Moraxella bovis* was isolated from over 90% of the sampled farms.

Drs. Selby and Webber next made a random mail survey of more than 2,000 livestock producers throughout Missouri in order to determine the incidence rate as well as distribution of pinkeye in the state. Although the two researchers have not finished compiling and interpreting the data obtained in that survey, they say that

pinkeye is not confined to any particular region and that any producer's herds may be susceptible.

After they have studied the extent of the pinkeye problem in Missouri, Drs. Selby and Webber will then attempt to identify all factors contributing to the spread of the disease in any herd. The researchers are looking ultimately to control pinkeye by better herd management practices coupled with use of a more effective vaccine.

Treatment of Pinkeye

Lloyd Selby, D.V.M., Dr.P.H.
Jonathan Webber, B.V.Sc.
Dept. Veterinary Microbiology

Livestock producers can use a commercial bacterin to prevent pinkeye infection in their herds, but the vaccine's use has often met with mixed success. Too many producers vaccinate their cattle only after pinkeye has appeared. The vaccine is most effective if administered at least three weeks before a pinkeye outbreak occurs.

In that the ideal time for vaccination usually coincides with calving or spring planting, many producers put off their immunization program. Furthermore, of those producers who do vaccinate, most do so only once a year. To be best protected, cattle should receive a booster vaccination two to three weeks after the primary vaccination. Efficacy of the vaccine rests with its proper use.

Besides problems encountered with correctly using it, the vaccine is poorly antigenic and contains only a few strains of *Moraxella bovis*. There are many field strains of the bacteria, with not very good cross-protection between strains.

No strains of *Moraxella bovis* have been found that are resistant to commonly used antibiotics.

Treatment, if initiated early, is usually



Dr. Selby (L) and Dr. Webber (R)

successful. Utilization of topical antibiotic ointment, subconjunctival injection of antibiotic and corticosteroid, as well as isolation of affected calves in a dark barn give the best results. As an alternative to isolation in a barn, eye patches may be used on calves with good success.

However, treatment is seldom initiated early enough. Often, the commercial cow-calf man feels that it is "too much trouble" to check his herd daily, and then catch individual calves and treat them. Hence, treatment is often neglected.



Animal Control Association Honors Two at College

Dr. John D. Rhoades (R), Extension Veterinarian, and Ms. Carol McAllister (L), Continuing Education Coordinator, were given honorary membership to the Missouri Animal Control Association during that group's Third Annual Animal Control Officers Training Program held recently at the College.

Dr. Rhoades and Ms. McAllister were recognized for their efforts during the past three years in helping organize the annual meetings for that group. All annual meetings had been sponsored with the cooperation of the College and the UMC Extension Division.

Veterinary Medical Review

College of Veterinary Medicine
and Cooperative Extension Service

Editor: Barry L. Siler, W-205 Veterinary Medicine Bldg.,
College of Veterinary Medicine, University of Missouri, Columbia, MO 65211

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