

Summer 1988

University of Missouri
Columbia

VIMR

College of Veterinary Medicine and Cooperative Extension Service

**BULLISH
ON EMBRYO
TRANSFER**



DEAN'S COLUMN

Master plan is in the works

Last summer the governor granted the college \$210,000 for facilities planning, and I am pleased to report the money is already hard at work.

On Feb. 4 the Board of Curators hired architects to plan the first phase of the proposed veterinary medicine addition and expansion. The Christner Partnership Inc. of St. Louis, in association with Flad and Associates of Madison, Wis., will design the project.

This comprehensive facilities master plan should, through renovations or new construction, correct the deficiencies cited by the accrediting team of the American Veterinary Medical Association.

We foresee a facility aesthetically compatible with its neighboring structures, and consistent with the Campus Master Plan. We hope the project will convey individuality and an image of what Missouri's College of Veterinary Medicine stands for: efficiency, dedication, caring and sensitivity to the needs of visitors and their animals.

While we anticipate admitting 64 new students this fall, future facilities will be designed for 60 students to achieve the most efficient use of resources. In this era of advancing technology, we believe society will be best served by fewer but better trained veterinarians. Gradual enrollment reductions are in the public interest, and our facilities plans will reflect that philosophy.

By the time you read this we should have a complete master plan in hand. Actual building, however, will require funding from a combination of sources, including state appropriations and private and corporate gifts.

As you know, last summer the

state legislature appropriated an \$850,000 increase in the college's base budget. This addition has helped stabilize finances by supporting education, research and public service activities of all academic departments, the Diagnostic Laboratory and the Veterinary Teaching Hospital.

The University has asked the 1988 Legislature to appropriate another special \$850,000 base budget addition for the college, effective July 1. If allocated, we plan to expend these dollars as follows: \$264,000 for strengthening teaching and research positions (five positions); \$284,400 for strengthening teaching and research support personnel (15 positions); and \$301,600 for building an academic program support base.

If this budget request is granted, it will be the second of the three \$850,000 budget increases needed to make your college contemporary, competitive and accreditable. It is important that legislators and public officials be kept abreast of the legitimate, documented needs of the college.

We sincerely hope that, with your help, we will be able to see the facilities plans come to fruition. For not only will they be extremely cost-effective and functionally efficient, but they'll also be a source of pride to the University, the college, the alumni and the people of Missouri.

Thank you for your help.
Best regards,

ROBERT F. KAHR'S, Dean

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ON THE COVER: The University's embryo transfer program, headed by Dr. Clifton Murphy, is helping breeders produce many times more offspring from a superior cow than would have been possible through natural means. See Bullish on ET, Page 10.



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Marketing your practice

Opinions divided on ethics and profitability
of advertising and merchandising

BY DEBORAH BEROSSET

To advertise, or not to advertise? That is the question.

Or one of them, anyway. A few more are: How do I best ensure clients will patronize my new practice? How do I make sure they come back once they've tried us? Is it ethical to advertise? Is it cost-effective? And what about retail displays in my clinic?

There are lots of choices to make — especially since 1977, when a Supreme Court ruling freed the medical and legal professions to advertise their services. Veterinarians are now debating the ethics of different marketing practices, and are examining the effects on both their purse strings and their professional image.

The AVMA has gradually liberalized its policies regarding advertising. Where it was once considered "unethical" to advertise at all, today the AVMA simply recommends that its members do not mislead animal owners.

The 1867 "USVMA Code of Ethics" read: "In advertising, the veterinary surgeon shall confine himself to his business address. Advertising specific medicines, specific plans of treatment . . . will not be countenanced by his society." In 1988, the "Principles of Veterinary Medical Ethics" are a bit different: "A veterinarian shall not on behalf of himself . . . use or participate in the use of any form of advertising or solicitation which contains a false, deceptive or misleading statement or claim." Practitioners now have to decide for themselves whether to advertise or use other marketing strategies.

The College of Veterinary Medicine recently established a course in public and professional relations on the recommendation of the Council on Education of the AVMA. Visiting lecturers present programs on

marketing strategies, as well as on business practices, legal aspects, ethics and non-practice alternative careers in veterinary medicine.

Dr. Robert Kahrs, dean of the college, feels some advertising is necessary for veterinarians. "I think it's certainly the obligation of those who'll provide emergency service, for example, to have their number

tions. "But I'd draw the line at saying 'We're the best horse practitioners in southern Missouri.'"

Dr. Jack Horton, DVM '57, owner of Horton Animal Hospitals in Columbia, feels that some practices may be getting out of hand. "I don't think it looks bad to advertise, as long as the ad looks professional," he says. "But in terms of cost-



accessible," he says. "The only place I personally draw the line is if veterinarians advertise or list their practice in a way that suggests their services are superior or unique. I think that's degrading to professionals and is, in a way, counterproductive."

Kahrs notes, however, that few veterinarians engage in practices thought to be in poor taste, and adds that it is entirely appropriate to indicate specialty board certifica-

Dr. Robin Smith, DVM '86, is a firm believer in the advantages of retail merchandising in veterinary clinics. Above is Smith by a display in her Columbia practice, Buttonwood Animal Hospital.

effectiveness, I think we've been sold a bill of goods by advertising people.

"See all the box ads here?" Horton asks, opening the phone book Yellow Pages to the section on veterinarians. "This costs a lot of extra money, and I really see no advantage to anyone except the telephone company. Maybe the one who first put one in there had an advantage that year, but as soon as I go ahead and get a box ad, why, we've all got the same thing in here. And it's costing us a lot more money."

Horton has all his new clients fill out a form, at the bottom of which is a space after "referred to us by . . ." And rarely does a client indicate they found him through phone book advertising, he says.

The practitioner does feel it's important for veterinarians just setting up practice to make themselves known. "There's competition for the number of pets that are out there," he says. "And when I started out, it was considered unethical to advertise. I don't think that's necessarily fair. Every professional person should be allowed to place something in the newspaper when he starts off. But clowns and balloons and free spays — somehow, that does not strike me as professional."

The AVMA's division of marketing director, Karyn Gavzer, stresses the importance of client education as an astute marketing strategy. Given the fact that half of all pet owners have never taken their animals to a veterinarian, if that group were educated as to what veterinarians could do for their animals, the client base as a whole would greatly increase. "This makes for a rewarding cycle," Gavzer explains, "that is very rewarding for the client, too." Pooling advertising money to sponsor institutional advertisements is one suggestion.

Almost all veterinarians in clinical practice — 96 percent — advertise in the phone book, Gavzer says. And it often does pay. "If a practitioner is in a small town, that's one thing. But if he or she is located in a high turnover area, like near a university, or industry, or whatever, it makes good sense to place an ad in the Yellow Pages. When new people come to town, they might not know anyone to ask for a referral from."

"We were the new kids on the block," says Smith. "We decided to put in a larger display ad. I know it's been a big benefit."

Gavzer adds that a 1983 AVMA Veterinary Marketing Services Study showed that people usually go to a particular clinic the first time because of location. "It's not how veterinarians *keep* clients," she stresses, "but that's what often gets them in there the first time. So it's



Dr. Jack Horton, DVM '57, questions the effectiveness of bold type and spot color in telephone book ads. A better marketing strategy, says the owner of Horton Animal Hospitals in Columbia, is to provide the kind of service that keeps clients coming back for more.

good to put some sort of landmark or street intersection in your ad as a reference point to help people find you, especially if you have a somewhat out-of-the-way location."

The marketing expert recommends that veterinarians also reinforce their practice identity with their logo or special type style, and that they highlight unique services.

Dr. Robin Smith, DVM '86, owner of Buttonwood Animal Hospital in Columbia, believes wholeheartedly in the power of advertising. She and her former partner decided to run a display ad with a heavy border and spot color in the phone book, and she doesn't regret it. "We were the new kids on the block," recalls the recent graduate. "There's a lot of competition and our location is a little out-of-the-way, so we decided to put in a larger display ad."

And it worked, Smith says. When clients fill out the new patient information sheets, she finds out how they learned of the clinic. "The most frequent way is through referrals," she says. "But next come people who saw us in the Yellow Pages. I know it has been a big benefit."

Smith carefully pored over the advertising sections of other cities' phone books, and was amazed at the variety of styles of veterinarians' ads. Many, she points out, are in poor taste. "I think it's important to be tasteful about it," she says. "Just state what you offer, and give people an idea of what is available. After all, that saves them the trouble of having to call to find out if you treat exotic animals, for instance."

Another matter of convenience that many practitioners are considering is the display of retail merchandise in their clinics. In 1986 the AVMA lifted a ban on the display of non-professional products. Later that year the Judicial Council amended its statement, saying that displays of non-professional products are "undesirable" if clients can buy the products elsewhere in the same area.

Many practitioners feel, however, that incorporating retailing in their practices not only helps to provide a stable financial base, but also is more convenient for their clients, in that it is one step closer to a total-health-center concept. According to the AVMA's Gavzer, a membership survey study prepared in March

1987 indicated that 74 percent of all veterinarians do merchandise products to some extent.

Dr. William Wolff, clinical associate professor, recalls a retail display he and his partner had in their clinic when he was practicing in the late 1950s and early 1960s. "We had one wall behind the reception counter where we displayed products," he recalls, "and a large walk-in cooler with display glasses where we kept vaccines. We didn't actively promote it, but we were trying to indicate to our clients that we were full-service. It was there for our clients if they wanted it, and they seemed to appreciate that."

Horton, who owns The Pet Fair located near one of his hospitals, sees nothing wrong with providing a convenient source of supplies and products for clients. "Some veterinarians don't merchandise in their places at all," Horton says, "and others sell collars and leads and all sorts of things. We don't do it right in the clinic, because we don't have space. But if I were building a place, I'd make it big enough to put everything under one roof."

"It's really a service you're providing," he says.

Smith, owner of Buttonwood Animal Hospital, feels strongly that product displays are in everyone's best interest. "Of all the veterinary hospitals in town," she says, "we probably have the largest display in our waiting room. It's important to let the client actually see what's available to them — I think it's a very important part of veterinary practice. When somebody comes in here with a new puppy, I sit down with them and tell them everything to expect in the next year. They don't necessarily buy products at that time, but if they need to, it's right there for them."

"It's not part of medicine," she adds, "but it is part of the total care of the animal. I have no problem with it, because people want it. Everybody asked us about leashes when they brought their puppies in, so now we have them. People want convenience more than anything else."

Kahrs notes that there is another advantage to retail displays beyond convenience. "After all," he notes, "who is better able to provide accurate, helpful information about vari-

"I think we've been sold a bill of goods by advertising people," says Horton. "And it's costing us a lot more money."

ous products than a veterinarian?"

Practicing veterinarians aren't the only ones interested in the debates surrounding these issues, however. A few years ago Dr. Brent Jones, associate professor of veterinary medicine and surgery, decided the college needed to provide students with more information related to business management. He convinced two companies — Hills Pet Food Products and Norden Laboratories — to establish a grant for that purpose, and for the past four years has organized annual all-day seminars for interested students.

"The attendance at these has been phenomenal," Jones says. "The seminars are always on a weekend, and there is no obligation for students to attend. It's not a course, and there's no grade. But we get about 180 students a year at this thing — and there are only 280



students in the entire school."

This year's seminar, held in March, featured Bob Levoy on "The Solid Gold Practice," and supplied students with marketing strategies "for today's confusing, cost-conscious and highly competitive times."

Jones explains that the seminars boil down to how to be of better service to clients. And that better service, he notes, results in a successful practice. "Students just graduating know very little about business practices," Jones says, "because there's just too much medical material to cover to justify making it part of the official curriculum. But it's something they're interested in."

Horton recalls his start as slow but sure, even without advertising, merchandising or any other fancy marketing techniques. "The first day I opened up, I had one client," he recalls. "But that person told somebody else. Basically you have to sit back and wait, because it comes slowly. But if the quality service is there, it will happen."

Kahrs has an acronym for his philosophy on successful marketing: "It's P-R-I-D-E," he says, "which stands for public relations through individual dedication to excellence. All the marketing and professional relations boil down to the professional individual having pride."

"I'm personally convinced," the dean adds, "that any veterinarian with good communication skills and strong interpersonal relationships, who really enjoys people and animals and is willing to work hard, will be extremely successful. Having those attributes is the best marketing strategy there is." □

Students eager to learn more about marketing strategies pick the brain of Bob Levoy, who in March spoke on "The Solid Gold Practice" at the college's annual all-day seminar on business management. Levoy is director of Professional Practice Consultants in Great Neck, N.Y.

By Mary Ann Bolser

The epidemiology of salmonellosis in pet turtles

The various types of *Salmonella* are currently categorized by serotype rather than species. More than 2,100 serotypes have been identified based on serologic agglutination tests. The genus *Arizona* is now listed as *Salmonella arizonae*, contains many serotypes due to the previous categorization as a genus and remains in the family *Enterobacteriaceae*. In general, salmonellosis is a highly contagious disease, occurs in non-detectable carrier states and is stress related. Serotypes are generally host specific, but a high enough dose of any serotype will cause illness and is referred to as the threshold dose. The organism represents a public health hazard in its relationship with many hosts of which the pet turtle is included.

Turtles were first reported as a source of salmonellosis in the United States in 1946 (8). However, the first turtle-associated *Salmonella* infections in humans were not reported until 1963 (2). In 1968 Washington state became the first to issue regulations requiring that turtles sold in that state be certified as being *Salmonella*-free (1). By doing so, the state practically eliminated the sale of pet turtles. It has been estimated the annual number of cases in the United States was 280,000 until 1972 when the Department of Health and Human Services restricted the importation of turtles or turtle eggs, interstate transport and sale of noncertified turtles (4, 5). Under these regulations, turtles were to be tested for the presence of *Salmonella* and if found to carry the organism, be labelled uncertified and thereby unfit for sale or interstate transport.

Despite the regulatory efforts, cases of human salmonellosis associated with certified turtles continued to occur. These cases probably had to do with the turtles having latent infections that became active with the stresses of shipping, a new environment and new feed (5). Since certification did not guarantee *Salmonella*-free turtles, the Food and Drug Administration in 1975 imposed a ban on commercial



Turtle-associated salmonellosis occurs in children more than any other age group.

distribution and sale of pet baby turtles and turtle eggs. Due to these regulations, it is estimated that Americans were spared 300,000 cases of salmonellosis (17). Since then, the regulation has been amended to permit commercial sale of turtles with a carapice length greater than 4 inches or 10.2 centimeters due to a lower incidence of *Salmonella* in older turtles.

The United States is not the only country with the problem of turtle-associated salmonellosis. Other countries reporting isolation of the organism from turtles or human cases involving turtles include the United Kingdom, Canada, the Soviet Union, Germany, Turkey, Yugoslavia, Channel Island and Africa (13, 14).

Although reptiles represented only a minute fraction of traceable sources of *Salmonella* infections (Figures 1, 2), more concern over an increased number of cases began to mount. The reason for the growing number of reported cases of turtle salmonellosis from the 1940s and 1950s may be due to: 1) improved techniques

and laboratory isolation mediums for identification; 2) increased research and diagnostic activity to detect and confirm cases; 3) better surveillance and reporting efforts by states, the Center for Disease Control and the USDA; 4) epizootics and epidemics promoting more public awareness and epidemiologic activity; 5) higher human and animal population density; and 6) greater mobility of man and animals (12).

The most common pet turtle is *Pseudemys scripta elegans*, and within the pet turtle industry there is no carryover from one year to the next due to high mortality and sale rates (7). With average home care, 90 percent of the turtles sold annually die within 4 months to 6 months; the average life span is only 2 months (10). Since most turtles are not kept very long as pets, they are a potential hazard throughout their stay in the household, and most people become infected within a month of acquiring their turtle (13).

Population at risk

The primary age group involved in turtle-associated cases of salmonellosis is children because of unsanitary habits when handling the reptiles (2). In one study, ownership of pet turtles was four times more common in families where overt salmonellosis was contracted than in other families in the same neighborhood (1). Studies such as this are not free of risk. While obtaining the control group for this study, one of the researchers was picked up by local police on the suspicion he was planning to molest children.

Pregnancy in females also is thought to increase the susceptibility to salmonellosis (12). Pregnancy, lactation and postparturient complications tend to reduce the resistance in lower animals as well. This may be of clinical significance with other household pets such as dogs and cats that have access to turtle bowl water and turtle feces (2). Clinical salmonellosis is uncommon in the dog and cat, as in the turtle, but subclinical infection involving a variety of serotypes can occur in

clinically healthy animals and lead to excretion of the organism (3, 13).

Identification of disease

The production of disease in humans by *Salmonella* is dependent on a minimal dose of between 10^4 and 10^{10} . The primary symptoms with turtle-associated salmonellosis are those of enteritis, including acute fever, severe watery diarrhea, severe abdominal pain and dehydration. Death may occur in two to five days if left untreated.

The organism produces an endotoxin that is capable of damaging gastrointestinal mucosa leading to mucoid or hemorrhagic necrotic enteritis or gastritis. The toxin also may lead to endotoxemia and widespread petechiation and mesenteric lymphadenopathy. The disease is usually self-limiting, but serious complications resulting from septicemia, including meningitis and brain abscesses, have occurred in children who acquired the disease from turtles (1). Furthermore, isolation of one or multiple serotypes of *Salmonella* from turtles in homes where salmonellosis occurred is not conclusive evidence that the human infection came from the turtle. On the contrary, the turtle may have been infected by the human.

Identification of the agent

In differentiating human salmonellosis, viral, parasitic and other bacterial infections must be ruled out. Diagnosis may be missed due to difficulty in antemortem isolation. Culture samples should include diarrhea, gastrointestinal tract tissue and internal tissues if septicemia is present. One study indicates that isolation from turtles occurred most frequently from the intestines after turtles were stressed (5).

Isolation of *Salmonella* is usually done via a selective enrichment media. The two media typically used are selenite and tetrathionate broth. These broths assist in isolation from feces samples that are usually outnumbered by other *Enterobacteriaceae*. The procedure involves mixing the feces with the broth, incubating 6 to 18 hours at 37 degrees Celsius, and streaking the mixture onto selective plates such as MacConkey's and brilliant green. Plates also may be streaked directly from feces samples or tank water. The plates are then incubated overnight and the colonies identified by a typical reddish, pink or white color and microscopically as Gram

negative rods.

A biochemical test for the organism is the *Salmonella* polyvalent agglutination test. Designed for preliminary and confirmatory identification, this test detects the "O" antigen, a lipopolysaccharide cell wall component of the organism. For either a simple screen or official confirmation, a positive test is denoted by clumping.

Transmission

Environmental factors are of great importance in the maintenance of turtle-associated *Salmonella* outside of the host (12). Aquatic environments appear to be most favorable for extrahost survival, especially within a pH range of 6.5 to 7.5. Temperature and humidity also play a role in that infections are more frequent in man and lower animals when the temperature is greater than 90 degrees with humidity greater than 80 percent. Nutritional and other physical stresses may activate latent infections in subclinical carriers.

The primary sources of infections in man are turtle bowl water and turtle feces with excretion occurring intermittently or continuously for a year or more after hatching (1, 9). *Salmonella* also have been isolated from turtle intestines, adult ovaries, eggs and gallbladder (8, 9). These sources represent potential hazards to dogs, cats and other household pets, which could in turn become additional sources of infection to humans if they have access to the turtle bowl. Contact with a fomite harboring the organism also may cause disease (11).

For the turtle, the primary source of infection is the pond environment (8). Because of this, several experiments were undertaken to try and eliminate the organism from ponds, eggs and the turtles. Although contamination of pond water was reduced, there were conflicting reports on the reduction of infection in the turtles (1, 15). Treatment of the ponds also depended on maintenance of minimum levels of disinfectant, which was difficult to do. Even if ponds could be rid of *Salmonella*, with this organism's adaptation to a multitude of hosts including insects, reptiles, birds, mammals and man, the possibility of recontamination is too great to allow maintenance of a *Salmonella*-free pond.

Experiments designed to try and prevent and eliminate infection from

eggs also met with limited success. Pressure differential and temperature differential methods were utilized using gentamicin sulfate. These methods required daily filtration and weekly pasteurization of dip solutions to decrease the protein content caused by broken eggs. An optimal pH of 6 had to be maintained and the solution charged with gentamicin to prevent a drop in the level of activity (15). Water-logged eggs collected after heavy rains prevented adequate penetration of the eggs by the drug. The eggs also had to be incubated in sanitized, closed plastic chambers. Although effective, for the turtle industry to adopt measures like this would create heavy financial burdens.

Attempts also were made to eliminate the organism from hatched turtles. Problems arose with known and subclinical carriers resisting antibiotic treatment (4). In response to these findings, the pet turtle industry promoted a dry-bowl environment of raising baby turtles at home. With this method, turtles were kept out of water all but 30 minutes daily. After removal, the water was discarded. By eliminating turtle bowl water it was thought the reservoir of the organism would be eliminated (10).

The Humane Society of the United States responded to this proposal with a petition to the Food and Drug Administration and the Department of Health and Human Services to protest the plan on the basis that: 1) Turtles would succumb to progressive dehydration, causing warped and cracked shells; 2) Since the turtles only feed in water, the restricted time would lead to malnutrition and starvation; 3) Turtles would not have adequate time for exercising and would not be able to develop their muscular systems; 4) Malformation of the shell results from the legs being pushed up against the carapace if aquatic turtles are kept on land too long; and 5) To ingest and digest food properly, reptiles need a gradient of temperatures for thermoregulation (10). This study also found commercial diets inadequate for maintenance of turtles as household pets.

As with most diseases, the possibility of infection depends on the dose and virulence of the organism, host resistance and immunologic response, as well as the organ or tissue involved. It is important that all of these factors

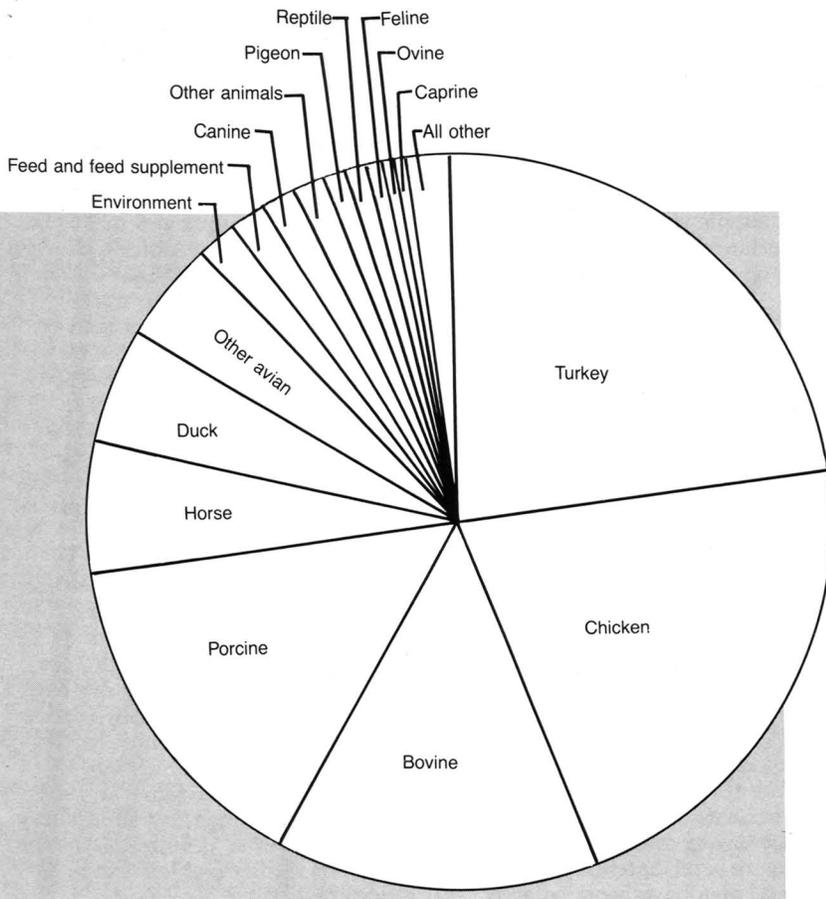


Figure 1. Percent of 3,806 non-human *Salmonella* isolations from the indicated sources in the United States, 1976 (17)

Turkey 23.2
 Chicken 20.8
 Bovine 14.4
 Porcine 14.3
 Horse 6.0
 Duck 5.0
 Other avian 4.4
 Environment 1.8
 Feed and feed supplement 1.6
 Canine 1.5
 Other animals 1.4
 Pigeon 1.0
 Reptile 0.9
 Feline 0.8
 Ovine 0.4
 Caprine 0.8
 All other 2.32

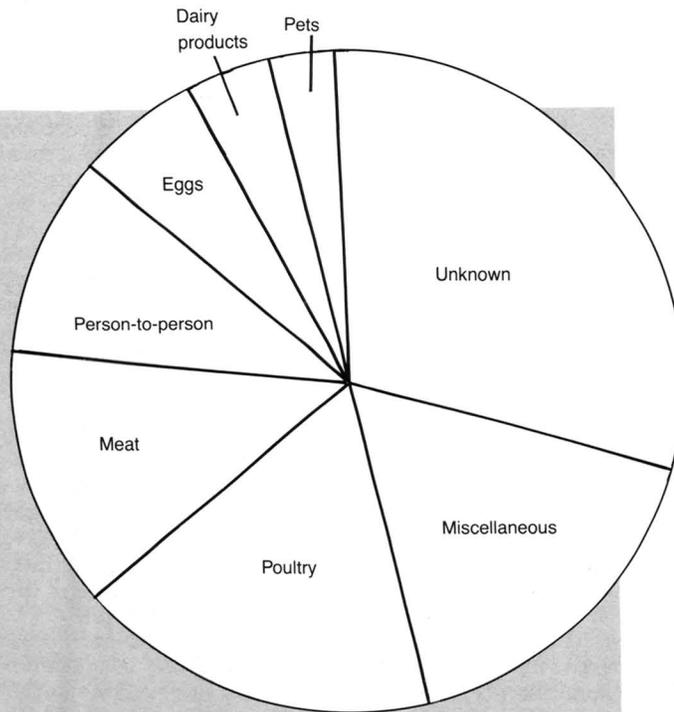


Figure 2. Mode of transmission in 500 human salmonellosis outbreaks, 1966 to 1975 (17)

Unknown 28 percent
 Miscellaneous 19 percent
 Poultry 17 percent
 Meat 13 percent
 Person-to-person 10 percent
 Eggs 6 percent
 Dairy products 4 percent
 Pets 3 percent

*Includes more than 50 vehicles which individually caused less than 3 percent of outbreaks.

are taken into account when diagnosing and treating this disease.

Prevention and treatment

With the lack of available options for preventing infection in baby turtles, the FDA restricted the sale of turtles to those with a carapice length greater than 4 inches. This is not a foolproof method of preventing turtle-associated salmonellosis, but has served to reduce the number of cases. The one method that is foolproof is not to own or handle a turtle.

If turtles must be handled, it is of primary importance that sanitary practices, such as washing hands thoroughly afterward, be utilized (8). Turtles should not be kept in the kitchen or other places where food is prepared or eaten (13). If a turtle is found to carry salmonellosis, antibiotic susceptibility tests should be run and the turtle treated. In addition, it is important for the animal to be kept at a constant temperature for medications to be fully effective (16).

The problem of antimicrobial resistance remains questionable because 20 percent to 30 percent of isolated human *Salmonella* infections are resistant (6). This is a serious potential problem with a variety of serotypes including *java*, *newport*, *urbana*, *muenchen*, *braenderup*, *lichtfield*, *typhimurium* and many *arizona* serotypes commonly isolated from turtles (12). Plasmids or R factors code for antibiotic resistance and can be transferred between family members within *Enterobacteraceae*.

In diagnosing salmonellosis in humans, one needs a history, symptoms and lesions typical of the disease. A bacterial isolation is essential for positive identification. Those ill should be isolated to prevent spread to others. Supportive treatment includes fluids and electrolytes, antidiarrheal medications including absorbants to bind bacterial toxins, vitamin supplements, good nursing care and antimicrobial agents based on susceptibility tests. For oral therapy, nitrofurans are the drugs of choice.

Summary and conclusions

Because of the potential public health hazard of the many serotypes of *Salmonella* carried by pet turtles, the best way to avoid possible infection from this source is to avoid ownership or handling of these turtles. Despite regulatory efforts by the Food and Drug Administration,



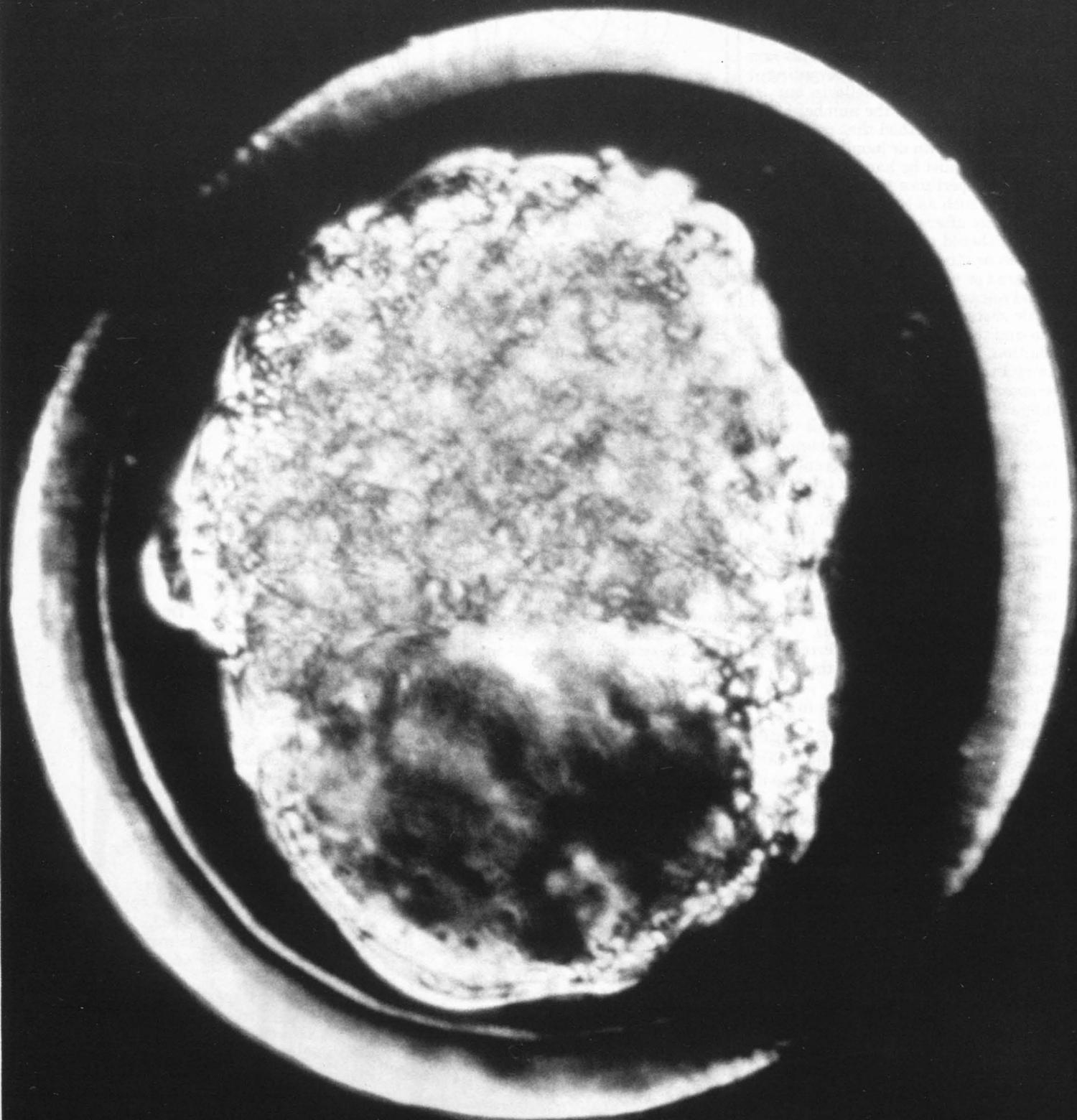
certification that a turtle is *Salmonella*-free is not a guarantee that infection is not possible. Furthermore, since the longevity of the pet turtle is only an average of two months, it may be considered a potential source of serious infection throughout its stay in the household.

In identifying the disease and agent, it is important to differentiate viral, parasitic and other bacterial infections. This may be accomplished via history, symptoms, culture and biochemical tests. Since the various attempts at prevention of the disease in turtles have been unproductive or too expensive to implement, obtaining turtles free from *Salmonella* is a hit-or-miss proposition. □

References

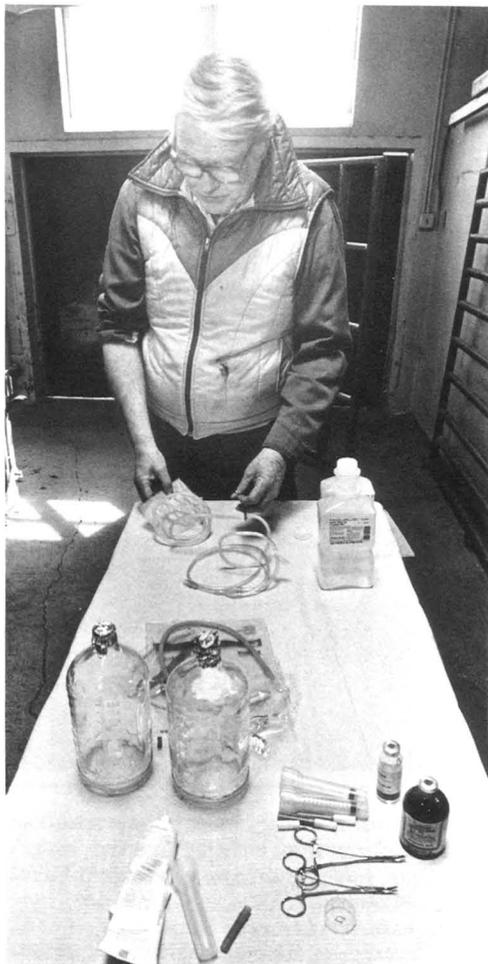
1. Altman, R., J.C. Gorman, L.L. Bernhardt and M. Goldfield. 1972. Turtle-Associated Salmonellosis. II. The Relationship of Pet Turtles to Salmonellosis in Children in New Jersey. *Am. J. Epidemiol.* 95:518-520.
2. Baker, E.F., H.W. Anderson and J. Allard. 1972. Epidemiologic Aspects of Turtle-Associated Salmonellosis. *Arch. Environ. Hlth.* 24:1-9.
3. Borland, E.D. 1975. *Salmonella* Infection in Dogs, Cats, Tortoises and Terrapins. *Vet. Rec.* 96:401-402.
4. Chiadini, R.J., and J.P. Sundberg. 1981. Salmonellosis in Reptiles: A Review. *Am. J. Epidemiol.* 113:494-499.
5. DuPonte, M.W., R.M. Nakamura and E.M.L. Chang. 1978. Activation of Latent *Salmonella* and Arizona Organisms by Dehydration in Red-Eared Turtles, *Pseudemys scripta-elegans*. *Am. J. Vet. Res.* 39:529-530.
6. Holmberg, S.D., J.G. Wells and M.L. Cohen. 1984. Animal-to-Man Transmission of Antimicrobial-Resistant *Salmonella*: Investigations of U.S. Outbreaks, 1971-1983. *Science.* 225:833-835.
7. Kaufmann, A.F., J.C. Feeley and W.E. DeWitt. 1967. *Salmonella* Excretion by Turtles. *Pub. Hlth. Report.* 82:840-842.
8. Kaufmann, A.F., and Z.L. Morrison. 1966. An Epidemiologic Study of Salmonellosis in Turtles. *Am. J. Epidemiol.* 84:364-370.
9. McCoy, R.H., and R.J. Seidler. 1973. Potential Pathogens in the Environment: Isolation, and Identification of Seven Genera of Intestinal Bacteria Associated with Small Green Pet Turtles. *Appl. Micro.* 25:534-538.
10. McKibben, J.S., P.D. Porterfield and J.M. Westergaard. 1978. Effect of Dry Vs. Wet Bowl Environment on Pet Turtles. *Am. J. Vet. Res.* 39:109-114.
11. Meier, J.E., and W. Sanborn. 1982. A Preliminary Report on the Management and Treatment of Salmonellosis with Trimethoprim-Sulfamethoxazole in an Exotic Animal Nursery. *J. Zoo An. Med.* 13:26-29.
12. Morse, E.V., and M.A. Duncan. 1974. Salmonellosis — An Environmental Health Problem. *J. Am. Vet. Med. Assoc.* 165:1,015-1,019.
13. Reptilian Salmonellosis. 1981. *Lancit.* II:130-131.
14. Savage, M., and J.R. Baker. 1980. Incidence of *Salmonella* in Recently Imported Tortoises. *Vet. Rec.* 106:558.
15. Siebeling, R.J., D. Caruso and S. Neuman. 1984. Eradication of *Salmonella* and *Arizona* Species from Turtle Hatchlings Produced from Eggs Treated on Commercial Turtle Farms. *Appl. Environ. Micro.* 47:658-662.
16. Thornson, T.E. 1974. Salmonellosis in Pet Turtles. *Mod. Vet. Pract.* 55:31-32.
17. United States Department of Agriculture. Proceedings: National Salmonellosis Seminar. Washington, D.C. 1978.

BULLISH ON ET



BY DEBORAH BEROSSET

Embryo transfer is a genetic gamble that often pays off for breeders of costly animals.



Above, Dr. Clif Murphy, head of Mizzou's embryo transfer program, prepares to flush fertilized eggs from a donor cow. At left is a greatly magnified cow's embryo, the humble beginnings of what's hoped to be an offspring that makes the most of carefully selected gene pools.

Take one genetically superior cow. Induce superovulation. Transfer eggs to a "recip" cow. The result? A herd of supercattle.

By taking fertilized eggs, or embryos, from a top grade cow and implanting them in genetically inferior animals, the more valuable cow can pass on her traits to more than one calf a year. Her top-of-the-line DNA will be busy reproducing in the fetuses growing in and emerging from other cows' uteri while she continues to create yet more eggs.

The principle behind the procedure is fairly simple, but the techniques are difficult and the results somewhat unpredictable. Yet embryo transfer has in the past 15 years made possible what's never been within reach before: A superior animal can produce, with the help of surrogate mothers, many times more offspring in her lifetime than would have been possible through natural means. No longer a novelty, the technique is becoming more and more widely used; this year more than 100,000 registered calves will be born nationwide via embryo transfer.

In 1984 the University of Missouri-Columbia established its own embryo transfer program, hiring Dr. Clifton Murphy, assistant professor, to do the job. Murphy came to Mizzou from Oklahoma where he'd been operating a commercial embryo transfer company, and had been working with the procedure since its beginning. The other principal specialist in the unit is Dr. John Sikes, professor of dairy science in the College of Agriculture, who has been active in embryo transfer research for seven years.

Today Mizzou's embryo transfer program, a cooperative effort between the Colleges of Veterinary Medicine and Agriculture, is a non-profit program financially supported through research grants, private donations and the services it provides for cattle breeders.

It is the service aspect of the program that provides valuable postgraduate training for theriogenology residents in the program, as they become closely acquainted with the care of donor cows, embryo freezing and recipient management. In addition, the program conducts continuing education for practicing veterinarians interested in learning the latest embryo transfer technology.

The process begins when a cattle breeder with a valuable cow,

whether dairy or beef, decides the cost of the embryo transfer likely will be offset by the value of the calves that will result, and contacts the college's embryo transfer team.

"The client needs to be in the purebred business to the point that the offspring of a particular cow mated to a particular bull will have a value of at least \$2,000," Murphy says. "Otherwise it's not worth it." While the professional costs of embryo transfer run between \$500 and \$2,000, the added expense of maintaining the recipient cows makes the decision to go with the procedure an important one for breeders.

Clients can either board their donor cows at the barn built for that purpose at the college, or can request "housecalls." Given the charges for mileage, Murphy says, the cost of the two options is about equal, but the former has an edge in that it allows the team to monitor their charges more closely.

Whether down on the farm or in the college's digs, the donor cow is injected with the hormone FSH to cause her to superovulate, or produce six to 10 eggs instead of the usual one. The injections are started nine to 14 days after her last estrus and continue for four days. When she comes into heat shortly thereafter, the cow is bred to the bull of the owner's choice, usually by artificial insemination.

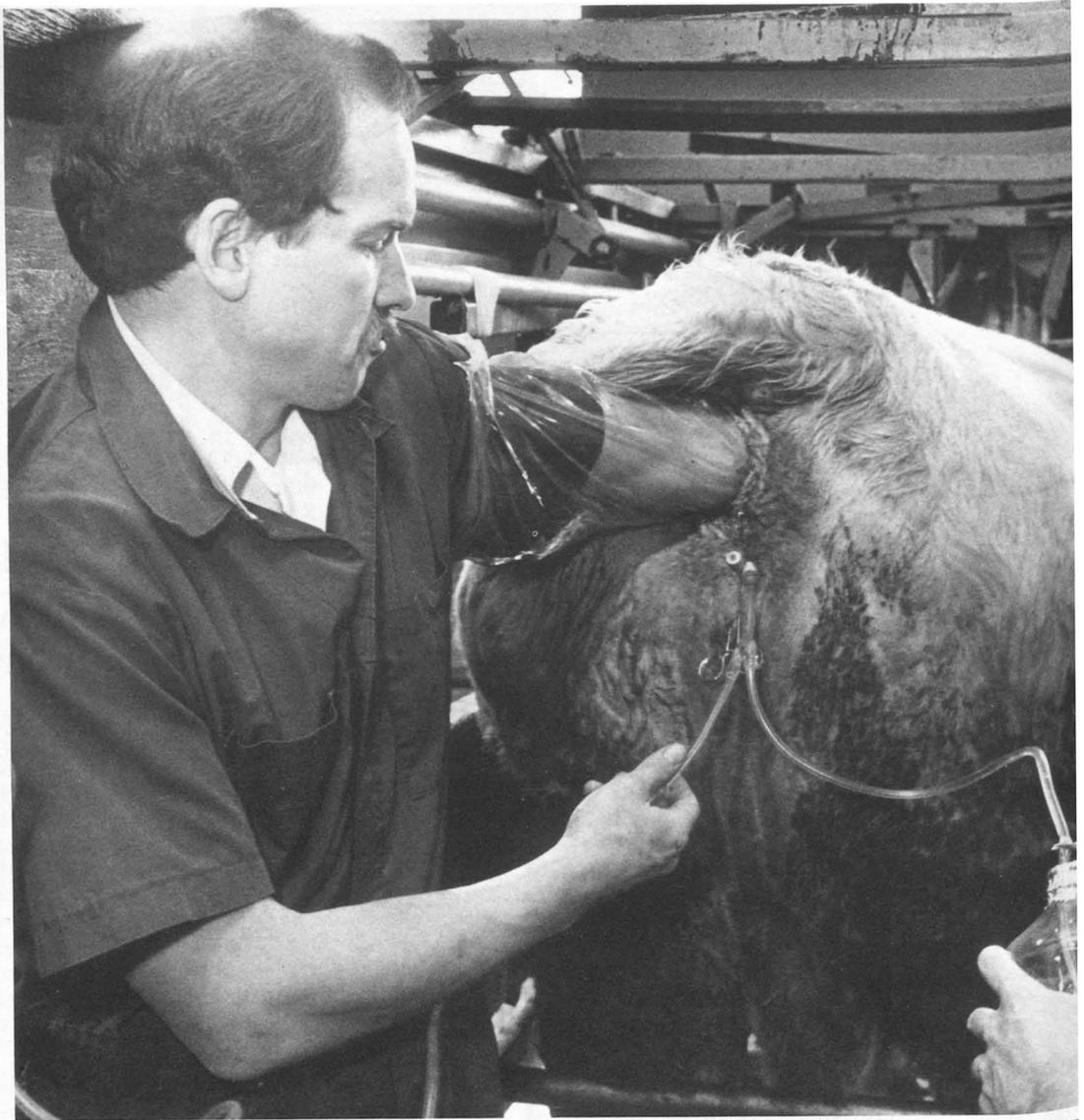
Seven days following breeding, it's time to harvest the fertilized eggs from the donor cow. A specially designed Foley catheter is inserted vaginally to extend beyond the cervix and into the uterus. The veterinarian then flushes the uterus with fluid until it's full, massages it, and allows the fluid to flow out, carrying the valuable week-old embryos — each only five times as large as a red blood cell — with it. Every embryo is examined microscopically and classified according to stage of maturity and quality, and the best ones are selected for either immediate transfer or freezing.

If the breeder's herd is large enough, he or she may have enough cows ready to receive the fertilized eggs and will probably have the embryos transferred immediately. These cows, known as "recips," must be on the same reproductive schedule as the donor cow, the only difference being their eggs have

BULLISH ON ET



Above, Dr. Pat Phillips, one of three residents in the ET program, works with a Santa Gertrudis donor cow boarded at the college's facilities.



gone unfertilized and have died. When synchronization of cycles has been achieved (either naturally or with injections of the hormone Prostaglandin), an individual embryo is nonsurgically placed in a recip's uterus with a straw-like rod. The success rate for implantation of embryos is about 60 percent.

"The donor embryos are each placed in a cow that basically serves as an incubator and allows the fetus to grow," Murphy explains. "Recipient cows have no great genetic value, they're just good mothers."

Sometimes freezing the embryos rather than instantly implanting them is the best way to go, however. "Breeders freeze embryos to control the time of calving, and to make better, more efficient use of the recipient herd," Murphy notes. "And, too, we're seeing more and more sales of embryos for exportation."

Harvested eggs destined to be frozen, on the other hand, must be handled within six hours. "It's a grand rush from the time you flush to the time the eggs are processed," Murphy says.

To prevent ice formation that would destroy cells, the embryos are put through a series of dehydration steps by immersing them in glycerin. The frozen embryos can then be stored indefinitely in liquid nitrogen, just as semen is.

"Freezing embryos is a wonderful tool for the owner," says Dr. Pat Phillips, one of three residents in the program. "Maintaining the recipient herd is the most difficult aspect of embryo transfer, as it's very labor-intensive and very costly.

So with freezing, we can help the breeder spread out this function over time, making it more convenient."

Sometimes it's even possible to create two embryos out of one. Through micromanipulation, experts can split high quality embryos to form two "demi-embryos," which can then be implanted in two different cows to produce genetically identical calves. This is not a common practice, but is sometimes done when there are more recipient cows ready than there are viable embryos, or for research purposes.

Embryo transfer had its beginnings when an Englishman performed the first successful transfer of a fertilized egg from one rabbit to another in 1869. The technology wasn't applied commercially, though, until the 1970s, when there was a widespread effort to rapidly reproduce imported exotic cattle breeds.



Left, Dr. Pete Farin, resident, and Scott King, VM3, collect week-old embryos from a cow by vaginally inserting a catheter into the uterus and flushing it with fluid. Above, Dr. Clif Murphy is assisted by students Melanie Mercer, VM3, and King. After the embryos are collected, they are examined microscopically — the best of the bunch are selected for either immediate transfer to a less valuable recipient cow's uterus for incubation, or for freezing. Murphy, internationally renowned for his expertise in embryo transfer, has taught the technique in Costa Rica, Mexico, Argentina and Portugal, as well as all across the United States.

Collection and transfer were performed surgically, with nonsurgical techniques being developed a few years later. Somewhat higher success rates and lower costs allowed individual practitioners to provide the service. While most embryo transfer work has been done with cows, it is now being applied to horses, sheep, goats and pigs.

Research is going on in all areas of embryo transfer, Murphy says. He expects a breakthrough in sexing embryos eventually, "when the demand warrants it enough to pay for it." And experiments are being conducted, he says, to see if such traits as resistance to toxic grasses can be selected for and genetically passed on to offspring.

Murphy's international reputation in the field has led him to teach the technique in Costa Rica, Mexico, Argentina and Portugal. But wherever he goes, Murphy says, he emphasizes the unpredictable nature of the process. "People often expect calves from the same flush to be identical, to all be clones," he says, "forgetting that any time you breed this cow to that bull, you're gambling a bit as to how their genetic makeups will combine."

And, too, he adds, there's a high rate of variability in success with donor cows. "One out of every three is a complete bust," he says.

Genetic gambling and troublesome donors notwithstanding, however, embryo transfer is still an extremely valuable technique for owners of expensive animals. "Many cattle purchased at sales have such exorbitant pricetags — \$40,000 to

\$50,000 — that to have a cow produce only one calf a year is a losing proposition," Murphy points out. "Nearly every client who gives embryo transfer a try becomes a repeat customer.

"After all, they're getting the results. When a genetically superior cow gets pregnant, that ovary stops working for about a year. It's much better to let that valuable ovary keep functioning and producing eggs."

Occasionally, though, Murphy runs into a skeptic who, after sitting through a description of the intricacies and wonders of embryo transfer, will respond with less than unadulterated enthusiasm: "They'll say, 'That's fine, but it seems to me it'd be a whole lot simpler to just let the bull do it,'" Murphy says with a chuckle, "And I have to admit, that shuts me down in a hurry." □

AROUND THE COLLEGE

Faculty earn development grants

Three college faculty were awarded a total of \$2,345 by the executive committee of the Alumni Association for the purpose of faculty development. Of the 82 proposals received, 26 were approved campus-wide, with awards totaling \$20,000.

Winners from the College of Veterinary Medicine were **Dr. John N. Berg**, professor of veterinary microbiology; **Dr. C.B. Chastain**, professor of veterinary medicine and surgery; and **Dr. Bruce L. Clark**, assistant professor of veterinary medicine and surgery.

Berg's proposal was to attend a symposium on vaccine development, Chastain's was for the creation of a manual for veterinary medical entomology, and Clark's was for the purchase of instructional equipment to illustrate herd health management.

Dean named Veterinarian of the Year

Dr. Robert F. Kahrs, dean of the college and professor of veterinary microbiology, was honored by the Missouri Veterinary Medical Association as 1988 Veterinarian of the Year. The award, presented during the state association's 96th annual meeting in January, is granted to a veterinarian based on professional activities and contributions to the veterinary medical profession, as well as contributions made to the community.

Banquet honors faculty, students

The performances of many top faculty and students were rewarded at the annual Veterinary Medicine honors banquet May 5.

The Norden Distinguished Teacher Award, voted on yearly by the student body, went to **Dr. Donald A. Schmidt**, professor of veterinary pathology. He received \$500. **Dr.**

Gary S. Johnson, associate professor of veterinary pathology, won the Beecham Research Award, a \$500 award given to a faculty member whose research in a veterinary medicine area has promise of national recognition.

Thomas D. Rose, DVM '88, won the \$1,500 Dr. and Mrs. Leslie C. Murphy Scholarship Award for the graduating student with the highest grade-point average. Rose graduated with a 4.0 cumulative GPA.

Mary Jane Wixsom, VM3, won the \$1,200 A.H. Groth Student Research Award, which is for a third- or fourth-year student who has shown superior competence and outstanding potential in veterinary medical research.

Joan R. Coates, VM2, and **Jennifer S. Donaldson**, **Kimberly A. Smith Ehlers**, **Douglas A. Morris**, **Theresa L. Shockley** and **Craig M. Tockman**, all VM3s, won the Frank E. and Ina Hickerson Rhoads Scholarships. The \$3,333 awards are presented to third- or fourth-year students who rank in the upper 10 percent of their class and exhibit professionalism.

Biomedical sciences

Dr. J. Alan Allert, instructor, and **Dr. H. Richard Adams**, professor and chairman, published "Pharmacologic considerations in selection of tranquilizers, sedatives and muscle relaxant drugs used in inducing animal restraint" in the *Journal of the American Veterinary Medical Association*, Vol. 191, 1,241-1,244, 1987. They also edited and had one article in "New Perspectives in Veterinary Pharmacology and Therapeutics," the 1986 proceedings of the fifth biennial symposium on the topic held by The American Academy of Veterinary Pharmacology and Therapeutics.

Dr. John F. Amann, assistant professor, and **Dr. Gheorghe Constantinescu**, associate professor, published "Anury in two Cairn terriers" with Drs. David S. Hall and Dale W. Vogt in the *Journal of the American Veterinary Medical Association*, Vol. 191, No. 9, 1,113-1,115, 1987.

Dr. Fouad K. Mohammad, a PhD student of Dr. V. St. Omer, received

the 1987 New Investigator Research Award from The Behavioral Teratology Society. The winning publication, "Behavioral and developmental effects in rats following *in utero* exposure to 2,4-D/2,4,5-T mixture" was taken from his PhD dissertation.

Dr. Vincent St. Omer, professor, published "The acute oral LD50 of technical pentachlorophenol in developing rats" with F. Gadusek in *Environmental Toxicology and Chemistry*, Vol. 6, 147-149, 1987. He published "Ontogeny of swimming behavior and brain catecholamine turnover in rats prenatally exposed to a mixture of 2,4-dichlorophenoxyacetic and 2,4,5-trichlorophenoxyacetic acids" with F.K. Mohammad in *Neuropharmacology* Vol. 26, No. 9, 1,351-1,358 in 1987.

St. Omer received an NIH grant of \$4,500 for the purpose of exposing selected minority high-school students to veterinary medicine as a possible career choice. With additional sponsorship from Mizzou, six students completed apprenticeships in five laboratories during the summer months and the Christmas holidays of 1987.

Dr. Wade V. Welshons, assistant professor, published "Stimulation of breast cancer cells *in vitro* by the environmental estrogen enterolactone and the phytoestrogen equol" with Dr. C.S. Murphy, R. Kock, G. Calaf and V.C. Jordan in *Breast Cancer Research and Treatment*, Vol. 10, 169-175, 1987. Welshons also published "Adaptation of estrogen-dependent MCF-7 cells to low estrogen (phenol-free) culture" with V.C. Jordan in *European Journal of Cancer and Clinical Oncology*, Vol. 23, 1,935-1,939, 1987.

Diagnostic Laboratory

Dr. Lawrence Morehouse, professor emeritus, was awarded the College of Veterinary Medicine Distinguished Service Award last October in recognition of his outstanding service to veterinary medicine in Missouri and the nation. Morehouse recently retired as director of the diagnostic laboratory. **Dr. George E. Rottinghaus**, assistant professor, published "Toxic

(continued on Page 17)



Convenience is the name of the game at the College of Veterinary Medicine's student-run bookstore. Shown from left are Donna Campbell, Mary Miskovsky and Debrah Turner, all VM2s.

Student bookstore is big business in a small space

It's been said that once a student is accepted into the College of Veterinary Medicine, there's rarely any need to leave the grounds until graduation . . . and thanks to the student-run bookstore, there's more than a little truth to that statement.

Located in modest quarters in a room just off the student lounge, the bookstore provides veterinary students with a convenient place to buy textbooks for all their classes, in addition to instruments such as suture scissors, scalpel blades and stethoscopes.

Students wishing to make a fashion statement (or who are entering their food animal block) can purchase coveralls, and there also are T-shirts, shorts and sweat suits all sporting the college emblem. Come graduation time, DVMS-to-be can order and pick up their caps and gowns there. Even area veterinarians occasionally use the service, ordering hard-to-find books on veterinary medicine from the student-operated bookstore.

"The word 'bookstore' usually brings to mind a picture a little different from this, though," says assistant manager Donna Campbell, a VM2 from West Plains, Mo., gazing at the cramped room with its

stacks of boxes and handmade shelves filled to overflowing. "But here we are, and the system works."

Indeed it does. Before the student-owned and -operated bookstore's day, veterinary students had to purchase all their textbooks at the other bookstores in town, and found that all too often the books they needed just weren't there. The college's eight-week terms didn't coincide with the usual beginning-of-the-semester textbook ordering, and the stores were having to deal with frequent small-volume orders of many titles.

About 10 years ago, things changed for the better. Students, with the guidance of Dr. Ken Niemeyer, associate dean, formed the Missouri Veterinary Educational Service. The MVES is an incorporated, not-for-profit business handled entirely by the students and guided by a board of directors made up of one student from each class and Niemeyer.

The manager of the store, a VM3 student, handles the inventory and the bill-paying. The assistant manager, a VM2 student, is in charge of ordering books and running the store for the hour or two each day it's open for business.

Each year the former assistant manager is promoted to manager, and a new assistant is hired. Both positions are salaried.

All profits the MVES earns are poured back into the college, says manager David Voris, a VM3 from Lee's Summit, Mo., in the form of scholarships for students and donations toward the annual awards banquet. Gross sales total about \$100,000 a year.

The operation has expanded steadily since its beginnings. The most recent improvement was the addition of a couple bookshelves, built over Christmas break by Campbell's husband, Keith. "I was always griping about all the boxes all over the place, and not having enough shelves to put the books on," she says.

Before each term, bookstore managers find out what books will be required, and make sure they have them on hand for students — everything from *Adams' Lameness in Horses* to *Zoo and Wild Animal Medicine*.

"We're here to provide whatever students need for their classes or their blocks," says Voris. "Convenience for the students is what we're all about."



Faculty members Dr. Gheorghe Constantinescu, left, and Dr. Allen Hahn demonstrate their computer animation program.

Video animation gets to the heart of the matter

While not as lighthearted as Saturday morning cartoons, the video animation program designed and implemented by three college faculty members is sure to help cardiology students get to the heart of the matter.

More than a year ago, **Dr. Allen W. Hahn** started considering how to create a computer program that would serve to demonstrate, through animation, the workings of the heart — specifically, the movement of the electrical wave that signals the heart muscles to contract.

Hahn, veterinary computer director and professor of bioengineering and veterinary medicine and surgery, contacted **Dr. Gheorghe Constantinescu**, associate professor of veterinary anatomy and medical illustrator, and asked if he'd be interested in putting his artistic talents to work on such a project. Constantinescu agreed, and the two set to work, with the design assistance of associate professor, **Dr. M. Harold Laughlin**.

A grant proposal sent to the provost's office resulted in enough funds to purchase a Macintosh computer. Constantinescu sketched an idealized dog heart in its various phases of ventricular activation, and the pencil drawings were transformed into computer images with a scanner.

With the help of a high-school student, John Amann (whose father, **Dr. John Amann**, is an assistant professor of veterinary anatomy), the

team prepared 301 separate frames of the heart, with the area affected by the wave of electricity shaded on each frame. The high-school summer research fellow performed all the entry and program work.

At the same time the diagram was to show the movement of the ventricular activation signal through the heart, however, Hahn had designed the program to show also electrocardiographic signals from the three main "leads" monitored on each patient. The leads — left to right, head to tail and chest to back — and the peaks and valleys on their respective diagrams, are often difficult for students to comprehend and interpret accurately.

After painstaking synchronization of the animation of the heart with dots that move along each of the three electrocardiograms, Hahn and Constantinescu managed to produce a program that could graphically show students how each point on the tracings corresponds to what's going on in the heart.

"We think we can illustrate the process of ventricular activation much better with this program than we could with the general gumbeating lecture," Hahn says. With but a few clicks of the computer, he has the program up and running and demonstrates how the program can be stopped and started, run backward and forward, and slowed or speeded up to make understand-

ing the material even easier.

The animation series shows in 15 seconds what takes from one-fourth to one-half a second in a dog's heart. Hahn first used the computer to teach the material to physiology students last fall, projecting the image from the computer onto a large screen. "Electricity is difficult to visualize," notes Hahn, watching the shaded portion of the computer image move from the atria to the tissue of the ventricles and then out to the septum and the outside of the heart. "Students seem to have a better understanding of this process after seeing this."

A good grasp of the process is fundamental to the understanding of cardiac physiology, Hahn says. Practicing veterinarians use electrocardiograms to see how patients with heart problems deviate from the norm, and with them are able to diagnose such problems as arrhythmias or damaged portions of the heart.

Also on the list of projects-to-be-done are programs that animate the workings of the hearts of other species, such as the horse. Then will come programs depicting abnormalities of conduction, so students can see the difference.

"I think what can be done with video animation is limited only by the imaginations of the people working with it," Hahn says. "We've just barely scratched the surface."

(continued from Page 14)

trichothecenes from *Fusarium sporotrichioides* (MC-72083)" with D.G. Corley and M.S. Tempesta in the *Journal of Organic Chemistry*, Vol. 52, 4,405-4,408, 1987. He published "Secondary metabolites from *Fusarium*, two new modified trichothecenes from *Fusarium sporotrichioides* (MC-72083)" with D.G. Corley and M.S. Tempesta in the *Journal of Natural Products*, Vol. 50, 897-902, 1987. Rottinghaus published "Maize yields and the incidence and levels of aflatoxin in preharvest maize" with J.R. Wallin and H. Minor in the book, *Aflatoxin in Maize: A Proceedings of the Workshop*, edited by M.S. Zuber, E.B. Lillehoj, and B.L. Renfro, CIMMYT, Mexico, D.F., 130-135, 1987. He published "A rapid screening procedure for detecting the mycotoxin oosporein in poultry rations" with H.T. Sklebar, L.H. Senter and T.P. Brown in the *Proceedings of the 30th annual meeting of the American Association of Veterinary Laboratory Diagnosticians*, Salt Lake City, Utah, Oct. 24 to 27, 1987. He received an \$8,762 USDA/SEA Animal Health and Disease Formula Grant for the investigation of "Seasonal variation of ergovaline levels in endophyte infected tall fescue stems, leaves and seed heads."

Medicine and Surgery

Two fourth-year veterinary students, Sigrid Lutz and Josep Morsy, are rotating through clinical blocks to fulfill practical training requirements for completion of their veterinary programs. The students are from Justus-Liebig-Universitaet in Giessen, West Germany.

Dr. C.B. Chastain, professor, published "The 38,XX/39,XXY genotype in cats" with Don Schmidt and W.G. Guilford in *Compendium on Continuing Education*, Vol. 10, 18-23, 1988.

Dr. Bruce Clark, assistant professor, became a diplomate in the American College of Theriogenologists after passing the certifying examination at the organization's annual meeting in Austin, Texas, in September.

Dr. Harold Garner, professor, received the first Equine Research Award presented by the Bolshoi Colic Research Program. The award was presented at a benefit sponsored by that organization in the Ritz-Carlton Hotel in Atlanta in October.

Ron Haffey, administrative manager of the Veterinary Teaching Hospital, presented "A computerized

veterinary pharmacy system" at the 12th annual meeting of the American Association of Veterinary Colleges' Business Officers and Hospital Administrators in Boston in October. Haffey also presented the paper to the Veterinary Teaching Hospital at University of California-Davis in November.

Dr. Brent Jones, associate professor, presented seminars on endoscopy and internal medicine to the following state, regional or international groups: Michigan VMA in Detroit; Southwest Regional AAHA in Knoxville, Tenn.; the Massachusetts VMA in Worcester, Mass.; the Maryland VMA in Bethesda, Md.; the Idaho VMA in Sun Valley; the Indiana VMA in Indianapolis; the Society of Ontario Veterinarians in Toronto, Canada; the Western Veterinary Conference in Las Vegas; and the Southeastern VMA in St. Thomas.

Jones recently was elected president of the Comparative Gastroenterology Society. The organization's membership consists of DVMs, PhDs and MDs who have an interest in furthering scientific advances in gastroenterology in all species.

Dr. F.A. "Tony" Mann has been appointed assistant professor in general surgery. Mann, who previously held this position at Auburn [Ala.] University, fills the position vacated by Dr. John Robertson, who went into private practice in Sacramento, Calif.

Dr. Dudley McCaw, assistant professor, gave five different presentations on veterinary oncology for the Looking, Listening and Learning Seminar Program in Osaka and Tokyo, Japan, in February.

Dr. Kristina Miles, resident, presented "The use of intraperitoneal fluid as a simple method for visualization improved sonographs of the canine pancreas" at the American College of Veterinary Radiologists annual meeting in Chicago.

Dr. Cecil Moore, associate professor, published "Density and distribution of canine conjunctival goblet cells" in the *Journal of Investigative Ophthalmology and Visual Science*, Vol. 28, No. 12, 1,925-1,932, December, 1987.

Dr. Cliff Murphy, assistant professor, presented a paper on "Embryo Transfer" at the Symposium on Reproduction in Animals at Buenos Aires, Argentina, in November. He published "Rapid Progesterone enzyme immunoassay as a management tool" with Drs. Pat Phillips and Bruce Clark in *Embryo*

Transfer, Vol. 2, No. 4, 1987.

Murphy published "Stimulation of breast cancer cells in vitro by the environmental estrogen enterolactone and the phytoestrogen equol" with W.V. Welshons, R. Kock, G. Calaf and V.C. Jordan in *Breast Cancer Research and Treatment*, Vol. 10, 169-175, 1987.

Dr. James Tomlinson, associate professor, gave four presentations on Veterinary Orthopedics at the Veterinary Technicians Conference held in conjunction with the Western Veterinary Conference in Las Vegas in February.

Dr. Doug Ward, assistant professor, is now a diplomate in the American College of Veterinary Surgeons, having passed the certifying examination in Tucson, Ariz., at the annual meeting Jan. 30 through Feb. 2.

Dr. David Weaver, professor, presented a seminar on "Bovine Lameness" at the annual meeting of the American Association of Bovine Practitioners in Phoenix, Ariz., in November.

Microbiology

Dr. Hans Addinger, professor, received a Research Council grant for a project called "Establishment of gene expression system in insect cells" in September. He set up a large-scale expression system using insect cell cultures and several baculovirus vectors. The system could be made available to other investigators on campus on a collaborative basis. In January, Addinger was reappointed to the doctoral faculty.

Dr. Gary K. Allen, assistant professor, received funding from the Mizzou Research Council in 1987 for a project called "Electrophoretic analysis of bovine respiratory syncytial virus (BRSV) proteins." In January Allen was appointed to the graduate faculty.

Dr. John N. Berg, professor, received funds from a number of sources: a gift from Merck Sharp and Dohme Research Laboratories for his research in animal disease, a gift from Mobay Corp. for his research on foot diseases of sheep and cattle, and funds from the Mizzou Alumni Fund for Faculty Development to attend a symposium on vaccine development.

Dr. D.C. Blenden, professor, and **Dr. M.J. Torres Anjel**, associate professor, published "Listeriosis" in the *Journal of the American*

Veterinary Medical Association, Vol. 191, No. 12, Dec. 15, 1987. Blenden also published "Modern trends in veterinary public health" in the *Veterinary Quarterly*, Vol. 9, p. 4, October 1987.

Dr. Gerald M. Buening, professor and acting chair, and **Dr. B.K. Ray**, assistant professor, will participate in a grant awarded, "Improved animal vaccines through biotechnology: phase II anaplasmosis and babesiosis." Buening is director of the Missouri subcontract.

Dr. Robert M. Corwin, professor, received an unrestricted gift from Beecham in 1987.

Dr. Theodore J. Green, associate professor, published "Immunochemical analysis of merozoite surface antigen (Pf 43 mz) isolated from *Plasmodium falciparum*" with T.R.

Chaudhuri in *Medical Science Research*, Vol. 15, 999-1,001, 1987. Green received funds from the Committee on Research for a grant called "The establishment of parameters for the *in vitro* culture of canine *Giardia*."

Dr. Bimal Ray, assistant professor, was appointed to the graduate faculty in January.

Dr. B.D. Rosenquist, professor, published "Immune responses of fasted calves in infectious rhinotracheitis virus" in *The Bovine Practitioner*, Vol. 22, 149-154, November, 1987.

Dr. Manuel J. Torres Anjel, associate professor, published "Retrospective evaluation of the immunoreactivity of viral antigens after several years of 'formalin' fixation at ambient temperature: a

rabies virus-immunoperoxidase model" with Dr. D.C. Blenden in the *Review of Latinamerican Microbiology*, Vol. 29, 337-344, 1987.

Mary Jane Wixsom, VM3, has received Phi Zeta funding for her project "Relative prevalence of *Dirofilaria immitis* in foxes." Corwin is faculty sponsor.

Pathology

Sudhir S.J. Batchu, M.D., senior research specialist, joined the staff of the Research Animal Diagnostic and Investigative Laboratory in January. Batchu was formerly a research associate in the department of veterinary microbiology and in the department of pulmonary medicine at University Hospital.

Clinical professor overcomes the gender gap

These days no one thinks twice about the fact that a veterinary student is as likely to be a "she" as a "he" — but **Dr. Frankee Eliot**, associate clinical professor, remembers when things were quite different.

Eliot, who joined the college's veterinary medicine and surgery department as an anesthesiologist in October, was applying to veterinary schools when policies were a good

bit this side of liberal. "In the 1950s," she recalls, "I applied to every single veterinary school in the United States, and got letters back from every one denying me admission because I was a woman.

"I was a little frustrated at the time," recalls the Nebraska native, "but I was determined not to let it stop me. I just said to myself, 'Well, I'll work a little harder and prove to them that I can do it.'"

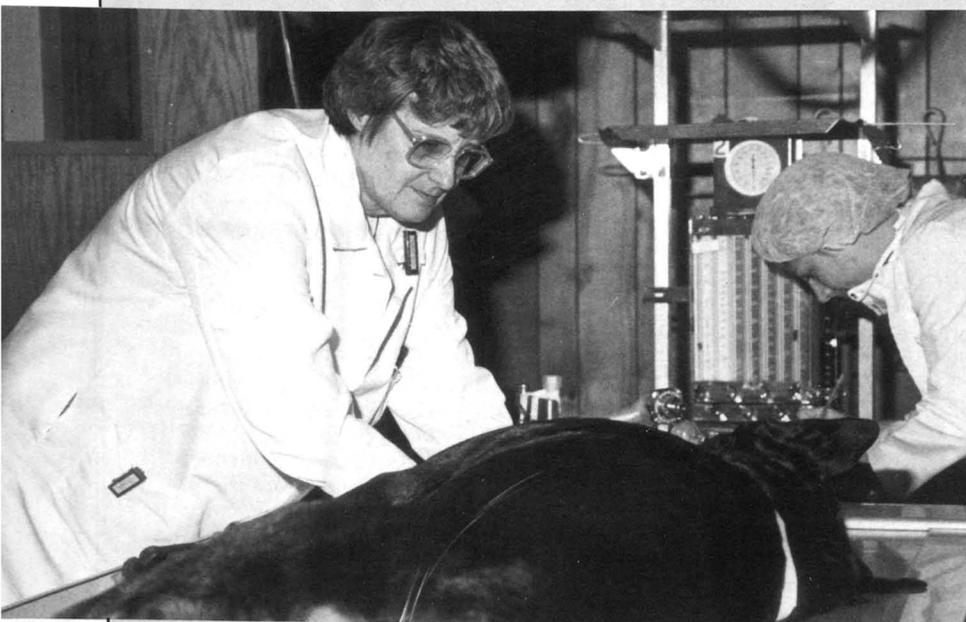
And so she did. The following year, Eliot and another woman were accepted into Colorado State University's veterinary medicine program. "What they did," Eliot says, "was accept us over and above their usual quota of 60, so we had a class of 62. That way, they didn't deny a man a spot."

Eliot may have encountered difficulties in getting into a program, but once she was in, she thrived. "I just worked hard," she says, "and didn't really try to prove anything to anyone."

Eliot graduated a member of Phi Zeta, the veterinary honorary society, and went on to practice in New Mexico for many years with her veterinarian husband, Dr. Theodore S. Eliot Jr. (Yes, he is related to *the* T.S. Eliot of literary fame — he was the veterinarian's grandfather's cousin.)

Eliot also received her master of science degree from Oklahoma State University in Stillwater, taught anesthesiology at Mississippi State University and Ross State University (on St. Kitts, an island in the West Indies) and worked supervising the test barns at various racetracks.

Her professional interests include pain in animals, acupuncture, dentistry, animal behavior, and genetic and predisposed problems in animals. Eliot and her husband, who retired medically in 1982, have three children.



Anesthesiologist Frankee Eliot, left, is helped by Melinda Wilkerson, VM3.

David E. Bean-Knudsen, research associate, and **Dr. J.E. Wagner**, professor and chairman, published "The wire-bar cage top as a barrier to breeding and genetic contamination of laboratory mice" in *Laboratory Animal Science*, Vol. 37, No. 3, 350-351, 1987.

Dr. Cynthia L. Besch-Williford, assistant professor, and **Dr. J.E. Wagner**, professor and chairman, published "Establishment of a commercial production colony of Sprague-Dawley rats free of sendai virus" with C.C. Templemen in *Laboratory Animal Science*, Vol. 37, No. 5, 666-667, 1987. Besch-Williford also published "Biology and medicine of the ferret" in *Veterinary Clinics of North America: Small Animal Practice*, Vol. 17, No. 5, 1987. She was awarded a Committee on Research Grant for 1988 from the College of Veterinary Medicine to work on the role of zinc in neuromuscular function. She and Dr. Cathy Vogelweid, research associate, were awarded another Committee on Research Grant to work on murine models of neurologic lupus. Besch-Williford has, with Dr. Boyd O'Dell and Jane Conley-Harrison, been awarded an NIH grant to study zinc and copper status and nervous system function.

Dr. Linda L. Collier, associate professor, and **Dr. Cecil P. Moore**, associate professor, published "Familial congenital cataracts in cats" with D.J. Prieur in *Transactions of the 18th annual meeting of the American College of Veterinary Ophthalmologists*, 22-31, 1987.

Dr. Patricia Farrar, research associate, received her MS in lab animal medicine in December 1987.

Dr. Susan Gibson, research associate, received the Charles L. Davis Foundation for Advancement of Veterinary Pathology Scholarship at the 1987 annual American College of Veterinary Pathologists meeting in Monterey, Calif. She published "Organophosphate toxicity in rats associated with contaminated bedding" with C. Besch-Williford, M.F. Raisbeck, J.E. Wagner and R.M. McLaughlin in *Lab Animal Science*, Vol. 37, No. 6, 789-791, 1987.

Dr. Gary S. Johnson, associate professor, published "Evaluation of microwave-thawed canine plasma for transfusion" with T.S. Hurst and M.A. Turrentine in the *Journal of the American Veterinary Association*, Vol. 47, 863-865, 1987. He published "Buccal mucosa bleeding times of healthy dogs and of dogs in various

pathologic states, including thrombocytopenia, uremia, and von Willebrand's disease" with A.E. Jergens, M.A. Turrentine and K.H. Kraus in *Veterinary Research*, Vol. 48, 1,337-1,342, 1987. He published "Canine von Willebrand's disease: a heterogeneous group of bleeding disorders" with M.A. Turrentine and K.H. Kraus in *Veterinary Clinics of North America: Small Animal Practice*, Vol. 18, 195-229, 1988.

Also published by Johnson with K.H. Kraus and M.A. Turrentine were "Multimeric analysis of von Willebrand factor before and after desmopressin acetate (DDAVP) administration intravenously and subcutaneously in male Beagle dogs" in the *American Journal of Veterinary Research*, Vol. 48,

1,376-1,379, 1987, "Use of DDAVP for management of surgical hemorrhage from a Doberman pinscher with von Willebrand's disease" in *Veterinary Clinics of North America: Small Animal Practice*, Vol. 18, 276, 1988, and "Plasma from donor dogs pretreated with DDAVP, transfused into a German shorthair pointer with type II von Willebrand's disease" in *Veterinary Clinics of North America: Small Animal Practice*, Vol. 18, 275, 1988. Johnson published "Preparation of botrocetin, a reagent used to evaluate canine von Willebrand factor activity" in *Veterinary Clinical Pathology*, Vol. 16, 64-65, 1987.

Dr. Terri L. McCalla, resident, **Dr. C.P. Moore**, associate professor, **Dr. L.L. Collier**, associate professor, **Dr.**

New leadership at the lab

It's the beginning of a new era for the Diagnostic Laboratory, marked by the appointment of a new director, **Dr. Harvey Gosser**.

Gosser, who reported to work March 21, replaces **Dr. Lawrence Morehouse**, the laboratory's founder and only director for 20 years. For the past 10 years, Gosser had held a similar position as director of the Veterinary Diagnostic and Investigative Laboratory at Tifton, Ga., while serving as professor of pathology at the College of Veterinary Medicine, University of Georgia.

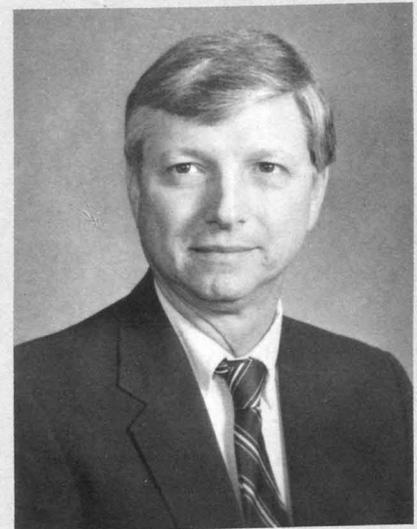
"Of course Dr. Morehouse has done a tremendous job," says Gosser, noting that his predecessor is a tough — though challenging — act to follow.

The Auburn, Ala., native earned his DVM degree from Auburn University in 1962 and his PhD in pathology at Mizzou in 1970. He has served on the faculty at Louisiana State University and the University of Illinois, and held his position in Georgia from 1978 until 1988.

His wife, Barbara, is a kindergarten teacher. "We're looking forward to having four seasons," Gosser says, "instead of just summer and winter."

"It's especially nice to be back in a university atmosphere," he adds. "The diagnostic laboratory in Georgia was located in the south, where most of the livestock is found, and the campus is 200 miles away in Athens. So this is a welcome change for us."

Missouri is not a totally new experience for the Gossers, though.



Dr. Harvey Gosser

His parents were both originally from the Kirksville area, having moved to Georgia in 1927; there are still relatives in the region. Gosser and his wife lived in Columbia from 1968 to 1970 while he got his PhD. "But a few things have changed since those days," he says with a chuckle.

The freshly appointed director is enthusiastic about his new position. "I just enjoy this kind of work," he says. "It's nice to look into interesting diagnostic situations, and I especially enjoy the service aspect of it. We're in the forefront, dealing with people every day, and we have to present a good posture to our public."

J.T. Turk, associate professor, and **Dr. E.R. Pope**, assistant professor, published "Multilobular osteosarcoma of the mandible and orbit in a dog" in Transactions of the 18th

annual meeting of the American College of Veterinary Ophthalmologists, 304-305, 1987.

Dr. Curt Matherne, research associate and NIH postdoctoral

fellow, and **Dr. Susan Gibson**, research associate, attained diplomate status in the American College of Laboratory Animal Medicine by passing all parts of the Board Certification Examination at the AVMA meeting in 1987.

Dr. M.J. Novotny, research assistant, published "Plasma von Willebrand factor in dogs following endotoxemia with and without free-radical scavenger therapy" with M.A. Turrentine, G.S. Johnson and H.R. Adams in *Circulatory Shock*, Vol. 23, 205-213, 1987.

Dr. Donald A. Schmidt, professor, was awarded lifetime membership in the Missouri Veterinary Medical Association at the MVMA meeting in January.

Dr. Larry P. Thornburg published "Understanding copper toxicosis" with C.S. Cook, R.M. Hardy, L. Heyman and I. Sternlieb in *American Kennel Gazette*, Vol. 104, 66-71, 1987. He published "Lesions of experimentally induced Tyzzer's disease in Syrian hamsters, guinea pigs, mice and rats" with K.S. Waggle et al. in *Laboratory Animal Medicine*, Vol. 21, 155-160, 1987.

Dr. Joseph E. Wagner, professor and chairman, and **Dr. Patricia L. Farrar**, research associate, published "Husbandry and medicine of small rodents" in *Veterinary Clinics of North America: Small Animal Practice*, Vol. 17, 5, 1987. Wagner published chapter 8, "Parasitic Diseases," in the book, *Laboratory Hamsters*, edited by J.L. Van Hoosier, et al, Academic Press, Orlando, Fla., 1987. He was awarded a contract for operation of an animal disease diagnostic laboratory from December 1987 through November 1988 by the National Cancer Institute. Wagner and five other college faculty participated in one of the Leadership Training Conferences, part of the PEW National Veterinary Education Program funded by a major award from the PEW Charitable Trusts. The conference was held from Feb. 1 to 5 at the Center for Creative Leadership in Greensboro, N.C.



Dr. Craig Sweeney shares some horse sense with Holly Blagdon, VM3.

College gains new equine surgeon

New to Missouri and the Equine Center is **Dr. Craig Sweeney**, associate professor, who came to the college in October.

Sweeney, originally from North Carolina, is now one of two equine surgeons at the center. His special interest areas are colic surgery and the neonatal care of foals. "I've been particularly interested in helping Dr. Eleanor Green set up the new neonatal unit," Sweeney says. "We're currently capable of dealing with anything that's not ventilator-dependent."

The neonatal unit includes a foal bed, heating pads, fluid pump and cabinet for related equipment. "Basically it provides a more sterile, controlled environment where foals can be aggressively monitored," Sweeney explains. "It's a new avenue of medicine for the equine unit to pursue."

One unusual skill Sweeney brings to the college is his experience with a Yag laser. The Yag laser, he notes, is on the forefront of human medicine and has only been used in veterinary medicine for two years at

North Carolina State University.

The device, often used in conjunction with a flexible endoscope, is especially helpful in upper airway problems, particularly in racing animals, Sweeney says.

Sweeney has been around horses since he was 5 or 6, and is particularly keen on hunters, open jumpers and steeplechase jumpers. "But you don't find many of those in mid-Missouri," he notes. "Most of the horses we see here work in the flat — Western-type horses, dressage, a good percentage of racing animals and, of course, pleasure animals."

Sweeney received his bachelor of animal science degree magna cum laude from North Carolina State University, his DVM cum laude from The Ohio State University, and completed a large-animal internship and a three-year large-animal residency at North Carolina State University.

He and his wife, Monica, a registered nurse, have two children, Christopher and Colin, and are expecting a third.

PEOPLE

'70

Raymond C. Ebert II, BS Agr '68, DVM, was elected president-elect of the 870-member Missouri Veterinary Medical Association. Ebert, a general practitioner in Pleasant Hill, Mo., previously served as vice president. He also has been chairman of the Missouri Veterinary Medical Foundation for the past three years, chairman of the ethics and grievance committee for two years and president of the Mizzou Veterinary Alumni Association.

John M. Koch, BS Agr '68, DVM, has been elected vice president of the Missouri Veterinary Medical Association. Koch is a small-animal practitioner at the Cape Small Animal Clinic, which he opened in Cape Girardeau, Mo., in 1974. He currently serves as a member of the MVMA legislative committee, member of the board of directors of the Missouri Veterinary Medical Foundation and chairman of the foundation's fund-raising efforts.

'81

Tim Bernt, DVM, ended his partnership in Brookfield Veterinary Clinic and is beginning a new practice in rural Johnson County, Mo.

Tina Cone, DVM, and her husband, **Alan Hunnicutt**, co-own the Berryville [Ark.] Veterinary Clinic with two other full-time veterinarians, and have opened a satellite clinic in Shell Knob, Mo.

Rob Foss, DVM, has purchased an equine practice in Columbia.

'82

M. Susan Malcolm Graves, BS Agr '77, DVM, is an associate at the Tri-County Veterinary Center in Bowling Green, Mo. She has charge of the small-animal practice.

Obituary

David Glen Hollis, AB '72, DVM '78, of Willow Springs, Mo., died Nov. 11 in West Plains, Mo., at age 42. Survivors include his wife, Elizabeth Wyldé Hollis, AB '73, MA '77, and two sons.



Auctioneer Ralph Gates fields bids from the crowd at the college's first Gentle Doctor Benefit, held the evening of Parents' Day in March.

Everybody wins at annual benefit

March 12 was a busy day for the College of Veterinary Medicine. Parents' Day and the Gentle Doctor Benefit kept students, faculty and visitors occupied from breakfast time until nearly midnight.

Parents' Day is an annual event during which parents of students have an opportunity to see firsthand the facilities where their daughters and sons are spending so many of their waking hours. The day starts with a light breakfast and includes an address from the dean, meetings with various faculty members who explain the curriculum, a tour of the college and demonstrations by student organizations, such as the raptor group.

Dr. Ken Niemeyer, associate dean, recalls worrying last year, before the first Parents' Day, that few parents would attend. "Fortunately," he says, "we had nothing to worry about. There was an excellent response, and more than 300 parents showed up."

This year's event was expanded to include the Gentle Doctor Benefit, a social fund-raising event featuring silent and live auctions of items and services, including a new pickup truck.

The benefit, held that evening at

the Holiday Inn Executive Center, was hosted by the Parents of Veterinary Medical Students and Friends of Veterinary Medicine Inc., with about 350 attending. Jack Drake, father of veterinary student Michele Drake, VM3, was chairman of the parent organizing committee. "We set out to create a parent community for fund raising," Drake says, "and used the Gentle Doctor Benefit to do that."

Successful bidders left the event with quite an assortment of goodies, including quilts, artwork, wine, videocassette recorders, box seats for a St. Louis Cardinals baseball game, mule rides, two papillon puppies, health-club memberships and an I.O.U. from a registered quarter horse stud for one breeding.

The biggest prize, a shiny red Dodge Dakota-S pickup truck, went to Josephine Grove of St. Louis, mother of Kimberli Grove, VM1.

The function grossed about \$45,000, with the college netting about \$30,000 after expenses. "Everybody gets together and has a good time, and the money goes toward improving the college," says Michael Tarry, director of development. "So everybody wins. We'll definitely be doing this again."



Jo Betty Rosier, long-standing friend and fan of the college, with pal Benji.

That's what friends are for. . . .



The late R.J. Rosier

With a generous gift made in memory of her husband, **Jo Betty Rosier** has established the College of Veterinary Medicine Library Endowment Fund.

By using her gift as seed money and adding other donations to it, the college has a fund from which the interest will be used each year to buy needed books and equipment for the library.

"It seemed like a good thing to do," Rosier says. "I've always been very involved with that school — I love it. Why, I've had a relationship with that school since 1963."

She is a lover of animals who first became acquainted with the college's teaching hospital many years ago. "I had little Michelle then," says Rosier, pointing to a portrait of herself holding a white toy poodle. "Isn't she beautiful? That dog was a human being, I swear it."

Rosier tells a story of Michelle, then a mere year old, suddenly whimpering constantly and being quite restless. "I took her down to the College of Veterinary Medicine," Rosier recalls, "and Dr. Ken Niemeyer, who was at the hospital at that time, took a look at her. And do you know what was wrong? She had pseudocyesis — phantom pregnancy.

"Well, ever since that day I've taken all my animals to the college's hospital," Rosier says. "I can't say enough good things about the people there."

Another person she can't say enough good things about is her late husband, R.J. Rosier, who died in 1983. "He was a true gentleman," his widow says, "and a wonderful man. I wanted to do something nice in his memory."

R.J. Rosier was known to many Columbia residents as "Mr. MFA"; he was one of the founders of the Missouri Farmers' Association in 1929. R.J. Rosier, who was secretary of MFA for nearly 44 years, is credited with having the strongest influence on the growth of the cooperative.

His wife has accomplished a thing or two in her life, also. The energetic woman, who was born in Arkansas and grew up in Mississippi, worked as a nurse anesthetist in Saudi Arabia for seven years and in Columbia for several more.

And retirement hasn't exactly slowed her up. Rosier's calendar is crammed with her various activities: She is president of the King's Daughters, a philanthropic group, and volunteers time at the University's Museum of Art and Archaeology, the bloodmobile and at the United Methodist Church.

Rosier's poodle, Michelle, lived to the age of 18. Since then Rosier's had a few stray cats take up residence in her home, and has most recently been joined by a Lhasa apso, Benji, whose former owners were too busy to take care of him.

"He's my healthy little fella," says Rosier, scratching Benji's back. "When I got him a few months ago I took him right over to the College of Veterinary Medicine and had him all checked out.

"I love living in Columbia and taking advantage of all the wonderful university offerings," says Rosier, beaming. "It's a joy. And so it seemed only right that, considering all I've been given by this university community, I give something back."

Energetic vet is doing it all — and then some

No one's ever going to accuse **Jill Endler-Hanson, DVM '74**, of leading a dull life — not with two mule ranches, a Christmas tree farm, her local hillbilly comedian act, two sons, a husband and lots of community activities. Oh, and there's also her small-animal practice, Hanson Animal Hospital, where she spends about 60 hours a week.

"I have a lot of interests," Endler-Hanson says with chuckle. "You have to keep yourself amused."

Endler-Hanson's friends and family know of her wide-ranging interests and the energy that allows her to pursue them. Recently, however, she received national recognition for these traits when the American Business Women's Association named her one of the 10 top business women in the nation.

It all started when the local chapter of the ABWA in Coos Bay, Ore., voted its president — Endler-Hanson — Woman of the Year. Out of the 120,000 women who belong to the organization nationwide, there are 10 selected to be named Top Business Women in the Nation. And last year, Endler-Hanson was one of those 10.

So it was off to Los Angeles, where the 39-year-old practitioner was honored along with the nine other winners, including a judge, an army major, a pediatrician and an owner of an employment agency.

The Kansas City native started her career with a few years in a small-animal practice and a mixed-animal practice in Missouri and South Dakota, where she met her husband, Tim. They moved to Oregon in 1976, and the following year she started up her own practice. She now works with one

associate veterinarian, and last year the clinic grossed \$260,000.

Endler-Hanson's husband works as her business manager. "I make the money, he spends it," she says. "It works pretty well that way." Apart from him, the five full-time and three part-time employees are all women. "I like to give other women opportunities when I can," Endler-Hanson says. "It's sometimes a little tougher when you're a woman. When you're younger, people think you're the kennel girl. I was very thankful when my gray hairs started to come in."

The energetic practitioner puts in a lot of time at work, and didn't see any reason to change that when she had her two babies. She took all of three days off after each birth, then brought them into the clinic with her. "It seemed to make the most sense to raise them there," she notes. "With Tim working there, too, they could be with both their parents that way. So I didn't miss their first steps or anything."

Buck, 8, and Wes, 6, thrived on all the attention they received from fawning clients, who often would ask to hold the babies in the waiting room. "People would kid me about them being able to bark before they could talk," says Endler-Hanson.

The veterinarian and her husband also have a Christmas tree farm with 20,000 trees, and run two mule ranches. They breed and train pack mules, and are about to try to breed their spotted jack to get spotted mules.

Endler-Hanson is also active in the local PTA and belongs to the Missouri VMA, the South Dakota VMA and the Oregon VMA. In



Dr. Jill Endler-Hanson, DVM '74, was ABWA's Woman of the Year.

addition she is secretary of the local Little Theater on the Bay, and plays a hillbilly comedian in its weekly country and western "Little 'Ole Opry" show each summer. Incidentally, she was voted Woman of the Year by that organization, also.

Endler-Hanson plans to expand her clinic eventually, and has an interest in veterinary cartooning. "For the most part, though, I'll just keep on doing what I'm doing," she says. "I love my work."

New Jefferson Club members



*Hortense Brozman
Kansas City, Mo.*



*Ben Riley
BS BA '65
Columbia, Mo.*



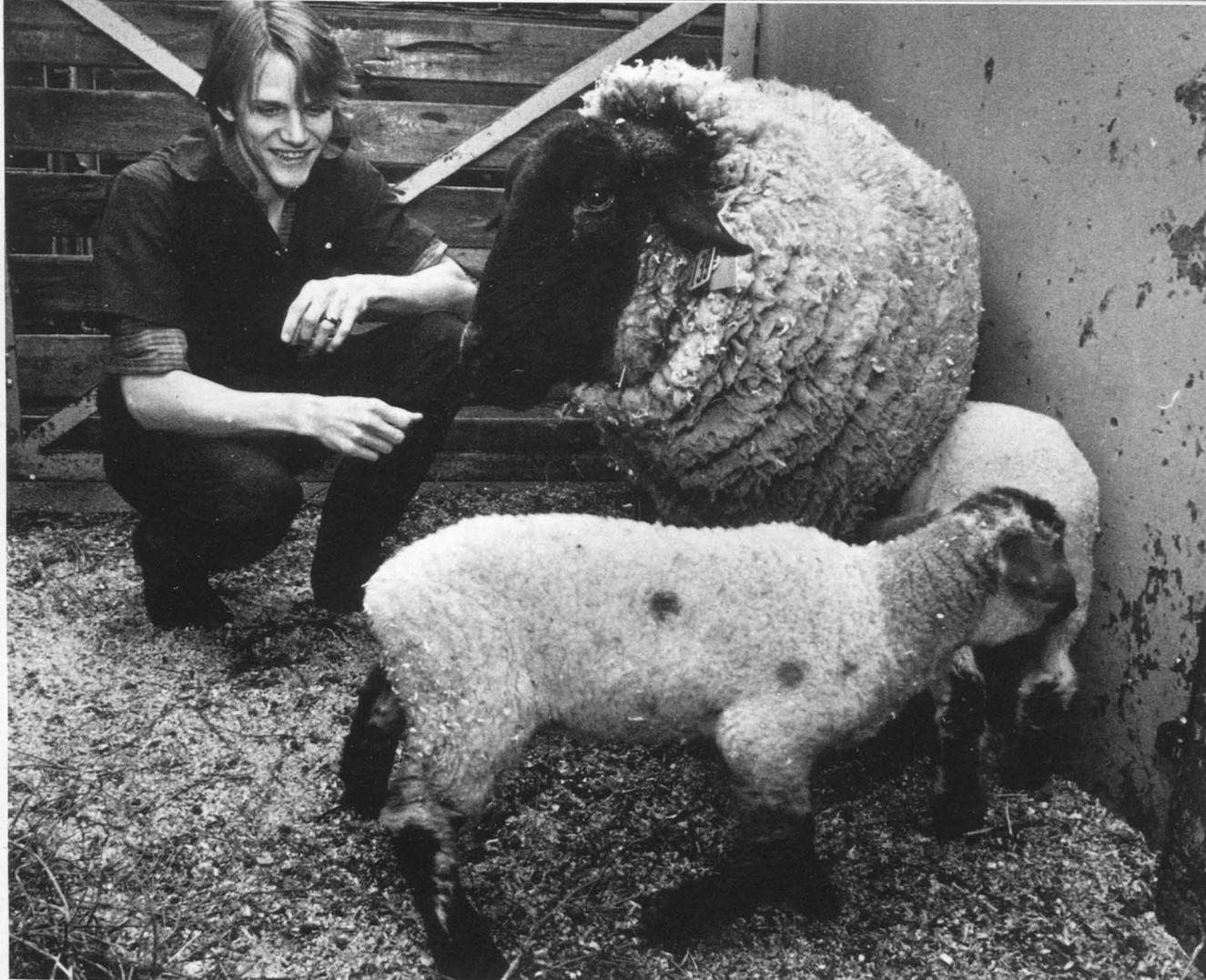
*Donna Dare,
Columbia, Mo., and
Mr. and Mrs. Donald Dare,
Bradenton, Fla.*

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Lamb nannies needed: “This means ewe!”

Old age and a hard udder meant this sheep, donated to the college, was unable to provide milk for her brand-new offspring when they arrived in February. Tim Sandt, VM3, of Florissant, Mo., rescued the distressed damsel by posting

flinders around the college: “Would you like to help feed our newborn twin lambs?” Six student volunteers took on feeding shifts around the clock until the twins, dubbed Jethro and Elly Mae, outgrew the need for their nannies.

Veterinary Medical Review

College of Veterinary Medicine
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