AAALAC...THEY'RE BAAACK!

By Dawn O'Connor, LVT, LATG
UCUCA

The University Committee on Use and Care of Animals (UCUCA) and the Unit for Laboratory Animal Medicine (ULAM) are in the process of preparing for the triennial site visit by AAALAC (Association for the Assessment and Accreditation of Laboratory Animal Care), International. The site visit will be conducted during the winter trimester (January - March) 2005, but the Program Description is due December 1, 2004. The Program Description is a document that explicitly describes the UM animal care and use program. This document is about 107 pages long with many appendices!

The UM animal care and use program and facilities have been accredited by AAALAC, International since 1971. The UM is one of over 650 accredited animal care and use programs in the United States. Of the top 100 institutions receiving funding from the National Institutes of Health, over 90% have achieved AAALAC, Intl. accreditation.

To continue the UM's accredited status, AAALAC, Intl. conducts a thorough evaluation of our animal care and use facilities and program every three years. This evaluation consists of: (1) review of the detailed program description, and (2) site visit to the animal care and use facilities. The UM's last evaluation was conducted in 2002, and resulted in continued full accreditation.

In order to continue preparing for this important upcoming inspection, we will need the help of all of you in the UM research community. So far everyone has done a great job of responding to requests for information from the UCUCA Office. Keep it coming!

Thanks for your help! If you have any questions, I can be contacted best by email at oconnord@umich.edu. Keep watching your email over the next weeks for a few more requests for information about animal care and use in your area for the AAALAC program description. Thanks again! 🐾

this “SPOOKTACULAR” issue...

The Backbone is a quarterly publication of the University Committee on Use and Care of Animals (UCUCA)
REDs AND YELLOWS AND GREENs, OH MY!
THE CAGE CARD COLOR CONUNDRUM

By Melissa Rogers, LVT
ULAM

Have you ever walked into your animal room and noticed a red, green, or yellow acetate covering your cage card? STOP! Resist the temptation to remove this! The acetate system is an important way in which ULAM technicians and clinical staff communicate the treatment, observations, or special procedures being used with some animals. We use this system for all animals, from rodents to nonhuman primates. Not only will you see red, yellow, and green acetates; you will also see blue or clear acetates.

RED ACETATE

A red acetate placed horizontally on the cage card indicates that an abnormality has been observed and an Animal Treatment Report (ATR) has been generated. It is then the responsibility of the veterinary technician or clinical veterinarian to do one of the following:

✦ Invert the acetate while trying to contact the lab staff.
✦ Replace with a green acetate if they are going to treat or observe the condition.
✦ Replace with a clear acetate if this is a condition that won’t change, such as a missing eye or limb.

GREEN ACETATE

Indicates treatment or observation of an animal. For example, an animal receiving treatment for dermatitis would receive a green acetate. This is only placed and removed by the veterinary technician or clinical veterinarian.

CLEAR ACETATE

Indicates a condition that doesn’t need to be monitored or treated, such as a missing eye or limb.

YELLOW ACETATE

Indicates a special procedure that varies from the standard operating procedure (SOP). Husbandry staff, a veterinary technician, or a clinical veterinarian may place a yellow acetate. In most cases, an exception form must be posted to indicate the reasoning behind the variation from the SOP. An example would be for special water to be added by the lab or husbandry.

BLUE ACETATE

Indicates a cage is overcrowded and needs to be separated. When the blue acetate is horizontal, it means that husbandry has noted that the cage is overcrowded. The lab staff has 24 hours to separate the animals themselves. If the lab has not separated them within 24 hours, then husbandry will do so at no charge. They will leave the blue acetate up vertically for 24 hours to indicate that they have separated the animals. A blue acetate is also used for dogs if they need exercise because they are in a cage that does not meet the criteria for exemption from exercise.

I hope this very colorful summary will give you a better understanding of the acetate system we use here at ULAM. We have found it to be an invaluable way to let everyone know exactly what is going on. 🐾
SURVIVING SETBACKS:
METEOROLOGICAL AND ENTOMOLOGICAL

THE MASTER OF DISASTER

By Stephen Durkee, BS, RALAT
UCUCA

Imagine the following scenario: After a huge snowstorm, virtually all activity in southeast Michigan is brought to a skidding halt. Snowdrifts are four feet high in some places and it looks like it could take three to four days to dig out. It’s a good thing that the animal facility has a plan developed for how to handle such an emergency! Supplies and personnel will be available to ensure that the research animals receive the same quality of care during the snow days as they do under regular circumstances.

The Blackout of 2003 brought the issue of “disaster preparedness” to the forefront of animal facility agendas across the country. Currently, animal facility managers are all preparing written documents on how various disasters, both natural and man-made, will be managed so as to not affect the quality of animal care in their areas. In order to assist with this process, the UCUCA recently created the “University of Michigan Animal Facility Disaster Planning Guidelines” document. These guidelines provide recommendations on supplies to have on hand for animals and responding personnel, escape routes, evacuation procedures, communication networks, responses to specific types of disasters, and other important information. The UCUCA Office has designated a staff member to assist with the development of a disaster plan for each animal housing area on campus. Please contact Steve Durkee at 936-4983 or email sdurkee@umich.edu with questions or suggestions in the development and implementation of your area’s plan.

WHAT’S BUGGING YOU?

By Stephen Durkee, BS, RALAT
UCUCA

In the fine state of Michigan we are fortunate to be blessed with a large, robust insect population. This is fantastic for those wishing to study entomology, but for those who encounter these critters in the animal facilities, it can be less than exciting and at times downright frustrating! So what can a person do to get rid of the “bugs?” Currently, if you notice an issue with our many-legged friends, you can simply notify the animal facility management. Or, if you happen to be the facility manager, you can call the Plant Department at 647-2059 and report the animal room number, building, and, if known, the species causing the disturbance. Have no fear if you don’t know the specifics: reporting that you have “bugs” is enough to bring out the pest-control experts at the University!

Since some of the weapons in the pest-control arsenal could potentially complicate research projects, typical control methods are applied outside the animal rooms. In extreme situations, or where it won’t affect the projects, action may be taken inside of the animal room. Principal investigators will be contacted by the pest-control team prior to any in-room application. The results are one of the few times it is OK to “bug out!”
ENGINEERING A UNIQUE CAREER PATH: MEET NEW RESIDENT, DR. PAUL MAKIDON!

By Linda Stegmeyer
ULAM

This old world is full of wonders, but sometimes you don’t have to look any further than your own backyard to find something special. Such is the case with Paul Makidon, our local treasure. Paul was born and raised in Flint, Michigan, where his dad worked as an engineer for General Motors and his mom was an RN. He and his brother grew up with the usual variety of pets and an unusual variety of homes; the family moved to a new house every year (a trend Paul has continued on his own), although they never strayed too far from the middle of the mitten. Lucky for us!

Paul grew up with an interest in animals and medicine, so it wasn’t hard for him to imagine a career in veterinary medicine. He did, however, take a slightly different approach to his education than most. On the advice of a respected veterinarian, Paul got his undergraduate degree not in biology or zoology, but in electrical engineering. While at first blush that advice seems a little unusual, it was in fact very sage because it gave Paul a foundation that he has leaned on ever since. His engineering education helped Paul to become strong in deriving information. He sees things from a different perspective, and draws on that way of seeing routinely. It also gave him a field to partner with his love of medicine: bioengineering. After graduation, Paul worked for one and a half years as an electrical engineer before being accepted to veterinary school at Michigan State University, where he graduated as a DVM in 1998.

Paul’s education at MSU prepared him for many things, but it could not have prepared him for his first shift as an intern at the Rowley Memorial Animal Hospital in Springfield, Massachusetts. Although this internship in emergency medicine and surgery lasted for 13 months, it’s the first night that Paul recalls most vividly, the one that can still make him pale when he talks about it. In 32 hours he covered 30 cases, among them two GDVs, a tracheal foreign body, tension pneumothorax, two DKAs—and those all within the first few hours of punching in! That night and many like it galvanized Paul into a solid emergency and critical care practitioner. After his internship he spent the next few years at a large referral hospital in the Boston area practicing general and emergency veterinary care, supervising the teaching of new emergency veterinarians, and providing continuing education lectures for veterinarians and technicians.

While emergency medicine was challenging, Paul felt there was something else out there for him. That something else turned out to be laboratory animal medicine at ULAM, where he could marry his backgrounds in veterinary medicine and engineering with research. Paul’s interests in bioengineering design and surgical implementation could mean his eventual involvement in artificial lung and kidney research. No matter where he eventually concentrates his efforts, he will do so as a principal investigator or PhD.

But that’s still a few houses away. At ULAM, Paul serves as a clinical veterinary resident, and shares the responsibility for the Ann Arbor, Dearborn, and Flint campuses with fellow resident Tom Meier. Since taking the position in May 2004, Paul has found ULAM to be a friendly, supportive home, and Ann Arbor to be a great community for him and his wife, Jennifer. Also at home is Sam, a spirited paraplegic Labrador mix that has been trained to use a wheelchair. Although Sam can walk without his chair now, he serves as a shining example for the owners of other paraplegic dogs who love these special animals. Paul and his wife share Sam’s stories and success with others as encouragement and support.

Continued on page 7...
WELCOME TO THE NEIGHBORHOOD:
MEET NEW RESIDENT, DR. TOM MEIER!

By Linda Stegmeyer
ULAM

Tom Meier, one of the new veterinary residents to join ULAM this past June, has always been a neighbor, of sorts. Born and raised in Coon Rapids, Minnesota, a northern suburb of Minneapolis, he shares with us a northern climate, a countryside abundant with lakes and streams, and deep Midwestern roots that are not easily shaken. Now he shares something else: a workplace with like-minded colleagues and researchers committed to advancing medicine through animal research.

Medical research was not one of Tom’s goals, but animal medicine was. With one uncle who farmed and another uncle who was a veterinarian, some of Tom’s best and earliest memories are of times spent in the company of these men and the animals in their care. During his high school years he sometimes got to accompany his uncle on veterinary rounds. On one such occasion he assisted his uncle in restoring the prolapsed uterus of a cow. The experience exposed him to the wonders and reality of living animals, and to the positive, sometimes life-saving intervention that veterinarians could provide. He was hooked.

Tom spent three years at the University of Minnesota-Duluth, then four years at the University of Minnesota College of Veterinary Medicine in St. Paul, leaving there as a DVM in 2002. When asked if he has any significant or special memories as a vet student, Tom is decisive: meeting his wife, Susan. Brought together in the same class, they married as students and completed their education together. Today Susan is a small animal veterinarian in private practice.

Another experience, while not quite as profound, was to have great impact on him as well: his introduction to lab animal medicine. Laboratory animal medicine is not taught in veterinary school; if it’s mentioned at all, it is only briefly. Tom was introduced to the field through a cousin who worked at a pacemaker company. That visit sparked enough interest for him to participate in two-week internships, both here and at Pfizer, but not enough for him to go directly into lab animal medicine. Instead, Tom decided to work in private practice at small animal clinics for a couple of years to get clinical experience. While he enjoyed the work, Tom learned a few things that quickly turned him back in the direction of lab animal medicine. He learned that two small animal vets in the same family rarely saw each other, and he wanted more out of family life than that. He also wanted a job that brought a greater diversity of cases than are found in small animal practice; and he wanted to be near research, where amazing things happen in medicine every day. All signs pointed to ULAM, and that is how he came to be with us today.

At ULAM, Tom shares his clinical responsibilities with fellow resident Paul Makidon. His future holds a Master’s degree in public health, and a career as a clinical veterinarian either at a research university or with a biomedical organization. Tom is interested in genetics and transgenics, and he would like to continue to develop his surgical skills. How to combine all these goals and interests is something he’ll spend a fair amount of time thinking about between now and next June, when his research officially starts. But that’s a whole year away, and for a Midwesterner, that’s a very long time. In the meantime, Tom and his wife will continue to get to know their new community, and Tom will continue to enjoy learning about this new but somehow familiar state, trying it out as he spends his free time as a hunter, angler, and camper. If you see him out and about, be sure to say hello; that would be the neighborly thing to do. 🐾
REST YOUR EYES ON THIS:
DR. MARK OPP AND HIS SLEEP RESEARCH

By Linda Stegmeyer
ULAM

“We are such stuff as dreams are made on; and our little life is rounded with a sleep.”
– William Shakespeare, poet, playwright

Sleep. We have pondered it for centuries. It consumes a third of our lives so that it may restore and sustain the rest. Its absence results in dullness, confusion, and poor motor response. In healthy individuals it does not occur in excess, nor can it be induced naturally if there is no biological need for it. We know that sleep brings on partial or complete loss of consciousness, with a resulting decrease in body movement and responsiveness to external stimuli. Non-rapid eye movement (NREM) sleep is the phase that accounts for about 80 percent of sleep, where heart rate and blood pressure are low and regular, and dreams are ephemeral and hard to recall. During rapid eye movement (REM) sleep, heart rate and respiration are irregular, and we dream the stuff that stays with us, the stuff we sometimes want to forget. While some of the mysteries of sleep have been revealed, there is much more we have yet to learn. What, exactly, does sleep do for the brain? Why do we sleep more when we’re sick? Why does sleep come easily on some nights and not at all on others? What remains to be learned about the functions of sleep is left to the modern researchers who are journeying to the other side of night in search of answers. You are about to meet one of them.

Mark Opp, Ph.D., has dedicated his career to studying sleep. As a professor in the Department of Anesthesiology, his NIH-funded research investigates interactions between the brain and the immune system as they relate to brain function. As a professor in the Department of Molecular and Integrative Physiology, Dr. Opp contributes to taught graduate courses, and lectures on sleep and behavioral physiology. His research focuses on how the brain reacts to two specific kinds of stressors: psychological (not related to physical trauma or injury) and the physical stress caused by infection. While each kind of stress produces similar, predictable anatomical and chemical reactions, their behavioral reactions diverge. Psychological stressors agitate, resulting in increased wakefulness, whereas infection results in a greater need for sleep. How sleep and the immune system operate together is one of the mysteries Dr. Opp is trying to unravel today at this modern research university. It’s a long way away from his first laboratory on the rain-soaked Washington coast.

Dr. Opp’s early research involved glaucous (gray) winged gulls in Puget Sound. He wanted to learn how mated pairs defended their property, eggs, and chicks, and specifically, how these behaviors were affected by temperature. During sleep, some of the processes that thermo-regulate the body do not function. What, then, happens to a bird’s behavior as it guards its nest under varying weather conditions? Will a hot day cause the bird to neglect its parental duties for an urgent dip in the ocean, or will it suffer heat exhaustion or worse to stay near the nest? What Dr. Opp found is that as the temperature went up, the gulls slept less. This wakefulness allowed them to regulate their body temperatures as needed, and to remain on the nests longer to protect their young. What other types of regulating behaviors occur in relation to temperature? Would these mechanisms impact health? Would they be the same across species? The questions his observations provoked were enough to give him a lifetime of research.

Continued on next page...
REST YOUR EYES ON THIS:
DR. MARK OPP AND HIS SLEEP RESEARCH

...Continued from previous page

“Much sleep is not required by nature, either for our souls or bodies, or for the actions in which they are concerned.”
– Plato, Greek philosopher

“Sleep is a weapon.”
– Robert Ludlum, novelist

Theories and observations, even moral implications, have been connected to sleep: whether one gets too much or too little of it, how it affects character, how it affects cognition. But what about its impact on health? Consider the interaction between sleep and body temperature when the immune system is challenged by infection. What is it about infection that causes us to sleep more? Is it the fever that usually accompanies infection? Does sleep help us to heal faster, or does increased body temperature do that by purging the body of infectious agents? What are the mechanisms that cause the central nervous system to react to some insults with sleep? What is the function of sleep under these conditions, and what happens if sleep is disrupted or absent? Before one question can be answered, another is raised, and yet one thing appears to be certain: sleep and health are inexorably connected.

“If you don’t go to sleep, you’re going to get sick.”
– Mom

What Mom always knew, Dr. Opp and his colleagues are beginning to support empirically. Years ago sleep research involved total sleep deprivation and gave predictable results, but that was not a realistic scenario. How many of us go days on end without sleep? More to the point is the effect on our health of getting less sleep than we need; a condition Dr. Opp calls “sleep restriction,” a condition that many embrace as part of a modern lifestyle. In our fast-paced, almost manic society, we have come to believe that we must fill every hour of every day before time gets away from us. In the process, we’ve gradually decreased our quality sleep to fewer and fewer hours each night, leaving us in a state of chronic sleep restriction and fatigue. Without demands to be awake, and given the chance to catch up, most of us will make up for our losses and sleep until we’ve reached a level that is healthy: 8.2 hours on average for adults. But most of us don’t allow ourselves the time needed for a full night’s sleep, and the result is what Dr. Opp describes as a growing public health issue.

The evidence is beginning to pour in. In discussing sleep restriction in general, Dr. Opp points to those characteristics that many of us can identify from personal experience: loss of concentration, impaired coordination and physical responsiveness, and overall malaise. Add to the list heightened irritability and sluggish cognitive function, and it’s easy to see how an exhausted public is more vulnerable to—and more likely to be involved in—motor vehicle accidents, work place accidents, lost productivity, and impaired social and personal relationships.

...Continued on page 10

Paul Makidon...continued from page 4

In light of this generosity of spirit, it’s not surprising to learn that Paul has set one more special goal for himself: to work for a philanthropic organization where he can help large populations of people. He hasn’t found that group yet, but the desire and the drive to find them are there. When he does, he will be their treasure. ✍️
OF MICE AND MONKEYS: A FEW LINES ABOUT GUIDELINES

A SHORT TAIL

By Astrid Haakonstad
UCUCA

Three blind mice, see how they run!
They all ran after the farmer’s wife, who cut off their tails with a carving knife.
Have you ever seen such a sight in your life as three blind mice?
— Nursery rhyme

A tail biopsy is a surgical procedure that involves the amputation of the end of a mouse’s tail. I’m not talking about the tail being sliced off with a carving knife in an attempt at visually challenged murine pest extermination by the wife of a farmer, as the old rhyme illustrates. I am referring to the act of removing 10-15 mm of the distal end of the tail of a transgenic or mutant mouse, in order to yield a 50-100 mg sample of high molecular weight DNA for genotype analysis.

Precise maintenance of genetic lines is extremely important when it comes to working with transgenic and mutant mice. These special animals help researchers to isolate and study disease characteristics and effects, which aids scientists in the discovery and development of medicines and preventive health measures. The farmer’s wife, in her haste to remove the three blind mice from her home, may never realize that studying a strain of blind mice could one day lead to a cure for blindness!

The UM document, “Recommendations for Tail Biopsy of Mice,” contains guidelines for performing the procedure in order to minimize pain and distress in the mice during and after the biopsy, while still allowing researchers to obtain a viable sample of genetic material. Recommendations include such things as the best age at which to perform the procedure, use of anesthesia and analgesia, proper instrument maintenance and sterilization, and post-operative recovery. A properly done tail biopsy is a much more humane and controlled process than what is exemplified by the farmer’s wife in “The Three Blind Mice.”

Wee short tails, help cure what ails!
They all provide us with DNA, that help the researchers pave the way,
To fight diseases another day, those wee short tails!
—Breeding colony rhyme

Please see www.uceu.umich.edu to download a copy of “Recommendations for Tail Biopsy of Mice.” [Note: This document has been updated! The last sentence in Guideline #3 should read, “Topical anesthetics, e.g. lidocaine, are also acceptable but their efficacy at relieving pain associated with tail biopsy is unproven. Hence their use should be limited to those situations in which isoflurane cannot be used. These situations need to be scientifically justified in the animal use application and approved by UCUCA.”]

As always, feel free to call the UCUCA office at (734) 763-8028 if you have any questions or animal concerns. 🐶
MORE FUN THAN A BARREL FULL OF RHESUS MACAQUES

By Astrid Haakonstad
UCUCA

“Stop monkeying around!” All of us have heard this statement at least once in our lives, usually during a spree of childhood mischief. Usually it is a parent, teacher, babysitter, or other such authority figure that implores us to settle down and start acting like miniature adult humans instead of a troop of chimpanzees. We sometimes forget, though, that Homo sapiens is indeed a species of primate, and that periodically acting like a baboon actually makes us feel better and improves our quality of life. Hence, the requisite “monkey bars” apparatus that exists on schoolyards and playgrounds everywhere.

While researchers and laboratory staff may themselves be disinclined to engage in simian shenanigans, they are responsible for providing the primates under their care with environmental enrichment in the form of food treats, perches, social and visual interaction with members of their own species, playtime, toys, and devices that exercise the mind. The purpose of this enrichment is to promote the physical, mental, and emotional well being of these intelligent, complex animals.

The UM Primate Environmental Enrichment Program (PEEP) outlines specific guidelines for nonhuman primate enrichment strategies that are in compliance with the Animal Welfare Act. The PEEP Coordinator (a faculty veterinarian) oversees the entire program. Principal investigators and their laboratory staff must work with the PEEP Coordinator, veterinarians, technicians, and husbandry staff to tailor a specific enrichment plan for their animals that benefits each individual primate as much as possible without causing injury or compromising the scientific research being performed.

Please see www.ucuca.umich.edu for more information on PEEP and primate use here at the UM. As always, feel free to call the UCUCA office at (734) 763-8028 if you have any questions or animal concerns.

TB TESTING

By Donna Capron
OSEH

Employees that have incidental contact with nonhuman primates are required to be TB tested every 6 months. The TB clinics that were typically held at ULAM/ARF for a couple of hours in September and in March are going to be eliminated. The TB testing will be done at the Mworks Occupational Health Clinic (located next to the Emergency Room at the Hospital). This change was made due to changes in the way that syringes are allowed to be drawn up and consideration of employees’ privacy. You can contact your supervisor if you are unsure of whether or not you need to be tested. The clinics for September are scheduled on a walk-in basis, Tuesday through Thursday from 1 pm until 3:30 pm, September 7 through September 23.

Remember that the TB test is not valid until the completed self-read form is received in a timely manner!
BONE FRAGMENTS

OSEH ANIMAL HANDLER PROGRAM
By Donna Capron
OSEH

The “Risk Assessment and Health Surveillance Questionnaire” program continues to expand as the number of researchers grows. This questionnaire is an annual requirement. However, researchers that have contact with or exposure to fish, frogs, turtles, and chickens will no longer be required to complete the zoonoses questionnaire. They will be directed to the “General Information for All Animal Handlers” section of the OSEH web page, and then to species specific information. 🐢

Happy Halloween
From The BackBOOne!

ANIMAL CONCERN HOTLINE:
(734) 763-8028

The University of Michigan is strongly committed to the humane care and use of animals in research. The Animal Concern Hotline (763-8028) provides a mechanism for U-M staff members and the public at large to report any matter of concern about humane aspects of laboratory animal care and use. The University Committee on Use and Care of Animals (UCUCA) will promptly investigate any report submitted and will maintain confidentiality, within University guidelines, regarding the source of information it receives.

IF YOU SEE ANYTHING THAT TROUBLES YOU, PLEASE DO NOT HESITATE TO CALL!

Dr. Opp’s Sleep Research...continued from page 7

The research done by Dr. Opp and his colleagues around the country is revealing that the affect of restricted sleep on each of us as biological organisms is even more profound. Opp points to one study conducted at another institution that found a direct correlation between the amount of time needed to recover from infection and the hours of sleep realized. Cutting the amount of sleep even a few hours added days to the recovery process. Other recent studies suggest that chronic sleep restriction may in fact lead to diabetes. That chronic restricted sleep leads to a compromise in the immune system is a sobering truth clear not only to basic researchers, but one that has also become apparent to clinical doctors who are experiencing its effects on their side of medical science. They have become the driving force behind funding basic research, and the horizon towards which Dr. Opp aims his current research.

In his office in the medical school, Dr. Opp is only a few steps away from the hospital patients whose lives he hopes to touch. Research has shown that sleep restriction can and does have a negative effect on the immune system, but a hospital is a sleep disruptive environment. How can we improve the quality of sleep so that patients can heal sooner? Anesthesia, so necessary to many medical procedures, suppresses the immune system. Dr. Opp asks what many have wondered: What happens to the patient whose immune system has been assaulted by infection or injury, anesthesia, and continually disrupted or poor quality sleep? How are patients supposed to heal in the modern hospital? The clinicians, who have looked into the faces of the sick, who have held the weak pulses between finger and thumb, are asking the same questions. The partnership between basic sleep researchers and clinical doctors is one that Opp sees as a natural and mutually supportive liaison, one that will give everyone a better night’s sleep at the end of the day. 🐾
BONE FRAGMENTS

ARACHNOTRIVIA
From the files of www.freakyanimals.com and www.phobialist.com

The Backbone has scared up some creepy, crawly arachnoid factoids from a dusty corner of the attic, just in time for Halloween! Enjoy...if you dare!

✦ The fear of arachnids, usually referring to spiders, is called arachnophobia.
✦ You are more likely to be killed by a Champagne cork than by a poisonous spider. (Fear of wine: oenophobia)
✦ On average, people fear spiders more than they do death. (Fear of death: necrophobia)
✦ Spider web filaments were used in gun sights as the “cross hairs” until the early 1960s. (Fear of firearms: hoplophobia)
✦ The average human eats eight spiders in their lifetime at night. (Fear of eating: phagophobia)
✦ The weight of insects eaten by spiders every year is greater than the total weight of the entire human population. (Fear of insects: entomophobia)
✦ Scientists have managed to mix a goat with a spider to create a goat that produces spider’s silk in its milk. By inserting just one spider gene into a goat’s egg, the adult goat produces milk that can be processed to create an incredibly strong spider’s silk fabric. (Fear of fabric: textophobia)
✦ Spider silk is a protein that is formed as a liquid by silk glands and squeezed out of spinnerets like toothpaste from a tube. The liquid thread hardens as it leaves the spinneret and some types of such thread become stronger than a steel thread of the same diameter. (Fear of string: linonophobia)
✦ Spiders are believed to have existed for more than 300 million years. (Fear of the elderly: gerontophobia)
✦ Spiders have noses on their feet that can pick up the odors of possible prey, predators, or mates. (Fear of odors: olfactophobia)
✦ The black widow spider can devour as many as twenty mates in a single day. (Fear of coitus: coitophobia)
✦ The venom of a female black widow spider is more potent than that of a rattlesnake. (Fear of snakes: aphidiophobia)
✦ If one places a tiny amount of liquor on a scorpion, it will instantly go mad and sting itself to death. (Fear of stings: cnidophobia)
✦ Scorpions can withstand 200 times more nuclear radiation than humans can. (Fear of radiation: radiophobia)

BARKBACK!
Do you have questions, comments, corrections, or suggestions about The Backbone? Is there a topic you would like to see covered in a future issue? We want to hear from you! Email us at UCUCA.office@umich.edu or call (734) 763-8028 and tell us about it!

GET A BACKBONE!
Readers wishing to receive future issues of The Backbone can be included on the mailing list by completing and returning the request form on the back page of the newsletter. Additional copies of The Backbone are also available from the UCUCA office.

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Topics/areas of interest you would like to see explored in future issues: ______________________________

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