

Young Scholars

What Career Choices Really Mean

By Debra Woodruff

Carin Sunderman wants to be a large animal veterinarian someday. For one week this June, she had the chance to see exactly what that career choice would mean—thanks to the Young Scholars program funded by University of Arizona College of Agriculture Vice-Dean Colin Kaltenbach.

Sunderman sat cross-legged on the hay-strewn concrete outside of a small corral at the UA dairy farm one early morning at the beginning of her week on campus. She peered intently

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through the slats of a rough wooden fence as Dr. S. Peder Cuneo, the university's clinical large animal veterinarian, rolled a dairy cow, which he had injected with a tranquilizer, on its back. His assistants packed bales of hay around the bulk of the sleeping animal.

Earlier in the morning, the cow had been discovered with a teat almost completely torn from its udder. By 7:30 a.m., Cuneo began the delicate process of cutting, repairing and suturing so that the cow eventually could again produce milk. It was careful, time-consuming, bloody work.

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presented to 17 other interested TUSD teachers during a workshop at the UA. The workshop was funded by the Howard Hughes Medical Institute grant and led by Gail Paulin, a project specialist with the district. She, along with Carol Bender from the UA, was one of the original developers of the project. During the workshop, teachers saw a videotape produced when five students—one from each pilot class—spent a day in Bernays' UA lab seeing university research up close. In the video, Bernays described how she personally became involved with grasshoppers—and the melanoplus project. She talked about the importance of introducing research techniques to young people.

"It's no good being told about science only," she says. "You have to do something you can ask questions about. You have to get results and keep an open mind in order to learn."

TUSD's Paulin agreed with the value of exposure to research.

"We'd like to provide kids with a more realistic picture

of what research is, and show them what's going on right here in town," she says. "Liz Bernays was the perfect pilot researcher—she had such enthusiasm. It was exciting to see the non-scientists get some insight into a scientist's personality."

Carol Bender, senior program coordinator for the UA, was first exposed to Bernays' lab when placing undergraduates as research assistants as part of the undergraduate biology research program.

"Her research was visually stimulating and used a minimum of equipment. And I knew a living organism in an elementary classroom is always exciting," Bender says.

Bender approached Paulin and served as a liaison between Bernays and TUSD under the "Science in Action" series. She continues to look for other UA research that can apply to public schools. Sensory perception in earthworms and growing purple bacteria are two ideas currently on the drawing board.

"We're interested in exciting kids about science," Bender says. "Experiments

can't be too high-tech—the teachers must be comfortable carrying them out."

Bender said the UA benefits in several ways from being involved with school children. In the long run, more students will be prepared in science and will be motivated to major in a scientific field.

"Also, we need a more educated citizenry in general," Bender says. "We're asked to have opinions of difficult scientific matters and if we don't have a basic understanding, we can't make informed decisions."

The researchers, themselves, benefit, Bender believes. They can understand better how to communicate with lay people. They get a sense of how to explain what they do to the public.

TUSD educators are excited about building a scientific network in the community, Paulin says. "Working with the university researchers facilitates looking at science in a new way."

In the past, some teachers may have gone into elementary education because they

wanted to avoid science—and they may still want to avoid teaching about the sciences, Paulin believes. As a result of this lack of emphasis, science isn't presented to the children until it's too late.

"We've waited too long before introducing science as a natural field of study," Paulin says. "We don't teach children that they can resolve their curiosities through the scientific process."

If Bernays' experience with the first group of TUSD educators is any evidence, the Marvelous Munching Melanoplus is the beginning of some exciting science projects for grade school students.

"I will be ever grateful for the good science teachers I had while growing up," Bernays says. "I was equally impressed with the nucleus of dedicated teachers, so strapped for facilities, that made a small input from us go such a long way."

Contact Dr. Elizabeth Bernays at the Department of Entomology, 410A Forbes Building, Tucson, AZ 85721. Or call (602) 621-1151.

Horizons Unlimited



John Louder

The cow snored. Cuneo's assistants handed him instruments. And Sunderman, a 17-year-old high school student from Phoenix, became completely involved in a normal working day for a veterinarian.

After Sunderman was nominated for the Young Scholars program, she was selected for a week of one-on-one study with a large animal vet. This summer, she got what she came for—an opportunity to see the myriad tasks Cuneo performs with the dairy cows, beef cattle, sheep and horses at the university farms.

"I feel like my lab is really unique," Sunderman says, watching the last few stitches close the cow's wound. "I get to observe what Dr. Cuneo's real work is—it's really a practice, and I get to see many aspects of it. This experience is everything I'd hoped it would be."

Carin's week at the UA was the second of the two Horizons Unlimited programs sponsored by the College of Agriculture. She was one of 18 top students from around the state who were accepted from 32 applications, says Paul Kohn, the Horizons Unlimited program coordinator. This summer, 72 percent of the young scholars were women and 67 percent were minorities, bringing in students often under-represented in agricultural fields. Requirements for application included a GPA of 3.0 and a ranking in the top 15 percent of their classes. This year the student body had a mean GPA of 3.72 and an average ranking of the top four percent of the state's students.

An upcoming senior at Camelback

High School with a GPA of 4.5, Carin is just the kind of student the college administrators hope will aspire to a graduate degree in applied science. Kohn says a main goal of the intensive Young Scholars program is to expose high school students to genuine, professional scientists—to expose them to the work and the challenges of the researcher's life.

"We need more people to go all the way through school in applied science fields, to get their doctorate degrees," Kohn said. "We want to show the students that scientific research is not just for brainiacs."

It's too soon to know if any of the Young Scholars students will work toward doctorates in applied science since the program was just started in 1988, but the responses have been positive, Kohn says. One alumnus, for example, is now working in an entomology lab as a result of his good experience in the program, and continues to demonstrate his enthusiasm for applied science research.

Cuneo took Sunderman along to do some ultrasound studies on the purebred beef cattle. The studies are part of his liver abscess research for the National Cattleman's Association.

"Dr. Cuneo exposed me to things I'd never thought of," says Sunderman, who has always assumed her future would be focused on caring for horses. "He helped me see that the field is so much broader than just equine medicine. And though my goal has been to major in pre-vet, Dr. Cuneo opened my eyes to the positive reasons to major in animal sciences."

The admiration was mutual.

"She's articulate, intelligent, and she has a good sense of humor," Cuneo says. "By the end of the week I'd say she was even more determined to be a vet."

All the Young Scholars students spent early mornings in seminars covering topics like "Careers in your Future," and "Ethics in Research." Then, students went on to their individual labs—Cuneo's Large Animal Veterinary Procedures was one of 13 offered. Other labs focused on Soil Analysis and Irrigation Efficiency with Kenneth Jordan and Del Fangmeier—Feeding Behavior in Grasshoppers and Aphids with Elizabeth Bernays—Surgical Research Techniques with Don DeYoung and Stephanie Cameron—Muscle Biology with Darrel Goll—and others.

Not far from the UA dairy farm, Juan Valesquez took part in his Young Scholars lab at the Carl Hayden Bee Research Center with Marla Spivak, from the Center for Insect Science, and entomologist Gloria Hoffman.

Valesquez, who will be a senior next year at East Fort Lutheran High School in Whiteriver, isn't sure what he wants to study in college. But, he thought the description of the university's bee research in the Horizons Unlimited brochure sounded interesting, so he signed up for it. He says his expectations were met.



John Louder

Bee researchers spend much of their time sitting and watching insects.

"I learned all kinds of new things about bees because of the research they're doing," he said. "I saw things I'd never see in high school."

For example, Valesquez found out bee researchers spend much of their time sitting and watching insects. In a dimly lit greenhouse-type building, Spivak showed the young student two rows of observation colonies she has built for her research. Bees flew in and out of the colonies constantly and buzzed back and forth through the small shelter, while hundred of others moved and squirmed under the glass of their homes.

Valesquez's job was to zero in on a specific bee—with a pink dot painted on its back—and for 15 minute intervals, exactly record its behavior: eating, resting, walking, cleaning, grooming. Mostly, he was watching to see if the bee would notice purposely-placed diseased larvae and pull it out of the colony before it infested the hive. This hygienic behavior is one of the main research questions Spivak is exploring.

Spivak believes exposure to this kind of research is valuable for a student considering a career in science.



Lori Stiles

Marla Spivak

"There's been a trend away from natural history science in this country toward the more molecular stuff," Spivak says. "But it's important to remember that we need to have behavioral observations to know what kind of questions to ask in molecular research," she says. "I'm hoping that Juan will see something that interests him enough that he'll ask questions about this field."

Hoffman agreed that it was positive for Valesquez to participate in lesser-known research that will possibly have

"Often no one knows this research is even here."

important real life implications for bee keepers.

"These kids who excel in high school and show an interest in science are often set on medical school or vet school," she says. "But it's great for them to see other research possibilities. It expands their options in science."

This exposure is precisely why different departments within the College of Agriculture need to get involved in the Young Scholars program.

"Often no one knows this research is even there," Kohn says. "Students just don't know the kind of applied science that is available for them to study." He hopes to get more departments within the college to take on a Young Scholars student next year.

"Young Scholars is going to go through some major changes this next year," Kohn says. "We need more of a marketing approach to attract and involve our faculty."

Cuneo is one faculty member who consistently volunteers to take on a Young Scholars student. He believes it's extremely worthwhile for anyone interested in working with animals to find out about options other than being a companion animal veterinarian. Youngsters need to see what working with livestock entails before making a career commitment.

"Giving a student this kind of exposure to the field just might spark some interest in studying an agricultural science," he said.

Contact Paul Kohn at the Instruction Office, 211 Forbes, Tucson, AZ 85721, or call (602) 621-3613. Contact Dr. Peder Cuneo at the Department of Animal Sciences, Campus Agricultural Center, 4101 N. Campbell, Tucson, AZ 85719, or call (602) 621-3454. Contact Dr. Marla Spivak at the Arizona Research Labs, Center for Insect Science, 404 Forbes Building, Tucson, AZ 85721, or call (602) 670-6380.

Horse Care... A Study in Caring

By Angela Woida

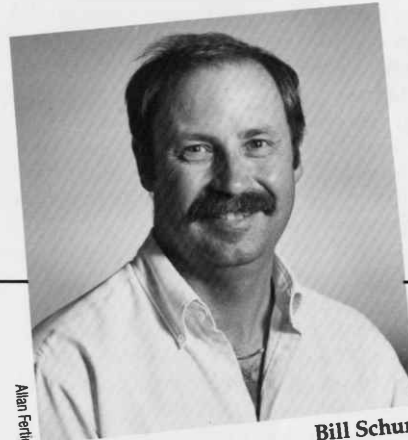
Veterinary and animal science students at the University of Arizona witness one of nature's greatest secrets by assisting in the birth of a foal. Bill Schurg coordinates the class.

The associate professor in the department of animal sciences wanted to create a horse program that lets undergraduate students learn as much as possible about the biological components of horses—and more.

"While they're learning specific biology, they're also learning to work with the animals," Schurg says. Although the UA horse project has a goal of raising athletically built foals with good conformation, Schurg's foremost concern is the students. They take part in the day-to-day management of a horse breeding program, applying classroom science to real situations. Most of the 25 to 30 students put in many more hours than what's required for a standard three-credit course.

"We try to convey our enthusiasm, and it tends to triple and quadruple," Schurg says. "Students come out here and help me paint, clean-up, do all sorts of different things. And it helps a lot."

Schurg—along with horse barn manager Bob Ritchie and students over the years—have built a sizable, successful horse program at the UA Campus Agricultural Center in



Alan Ferlin

Bill Schurg

"We try to convey our enthusiasm, and it tends to triple and quadruple."

Tucson. He started the program with one horse and gradually has increased the herd, mostly through donations, to 25 horses today.

"We've taken over this facility, a barn built in 1935, modernized it, upgraded it and made it look more like a horse facility," Schurg says. The herd size is ideal, he says, because it allows them to be more efficient and to upgrade the quality of horses, rather than concentrating on numbers.

Schurg and Ritchie are on call 24 hours a day, seven days a week, particularly during foaling season. Horses, like human babies, need someone tending to their every need, every day. Veterinary and animal science students take on