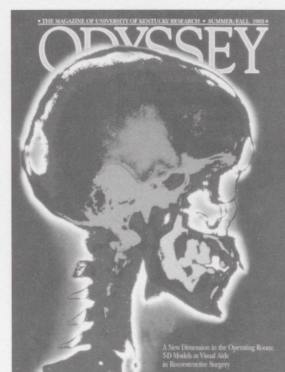


• THE MAGAZINE OF UNIVERSITY OF KENTUCKY RESEARCH • SUMMER/FALL 1993 •

ODYSSEY



A New Dimension in the Operating Room:
3-D Models as Visual Aids
in Reconstructive Surgery



The University of Kentucky, the commonwealth's graduate education and research institution, exists to provide opportunities for the education, personal growth and development of individuals and to contribute to the improvement of society.

With this mission as its premise, one goal of the university is to conduct programs of basic and applied research which support graduate and professional education, provide for the advancement of knowledge, and seek solutions for the acute problems of society.

The university's research mission also acts as a magnet for attracting top graduate students who want to participate in nationally competitive research projects. This research experience can offer them a significant advantage in their education while laying the foundation for future research and development. *ODYSSEY*, through articles about various research projects and graduate education programs, reflects the breadth of the university's search for new knowledge and the myriad of research endeavors underway. The progress that the university has made toward achieving its research mission and securing the extramural funds required to support these types of endeavors would have been impossible without the talents and dedication of our researchers.

The goal of *ODYSSEY* is to offer the reader the opportunity to share in some of the excitement, curiosity and creativity evident in the research underway at the University of Kentucky.

ODYSSEY

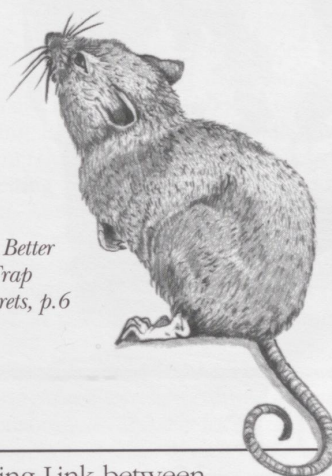
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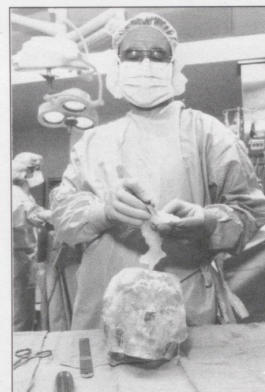
ODYSSEY



Trading Places, p. 31



*Building a Better
Mouse to Trap
Genetic Secrets, p.6*



*3-D Models as Visual Aids,
p.11*

Volume XI, No.1

ODYSSEY is published by the Office of the Vice President for Research and Graduate Studies. Each issue of ODYSSEY describes only a few of the many University of Kentucky research projects underway in a variety of areas.

Requests for permission to reprint material and readers' comments regarding ODYSSEY are welcome and should be sent to the Editor, Communications and Advancement, University of Kentucky, Lexington 40506-0057 (phone 606/257-8297).

The publication of ODYSSEY is not financed by the State General Fund.

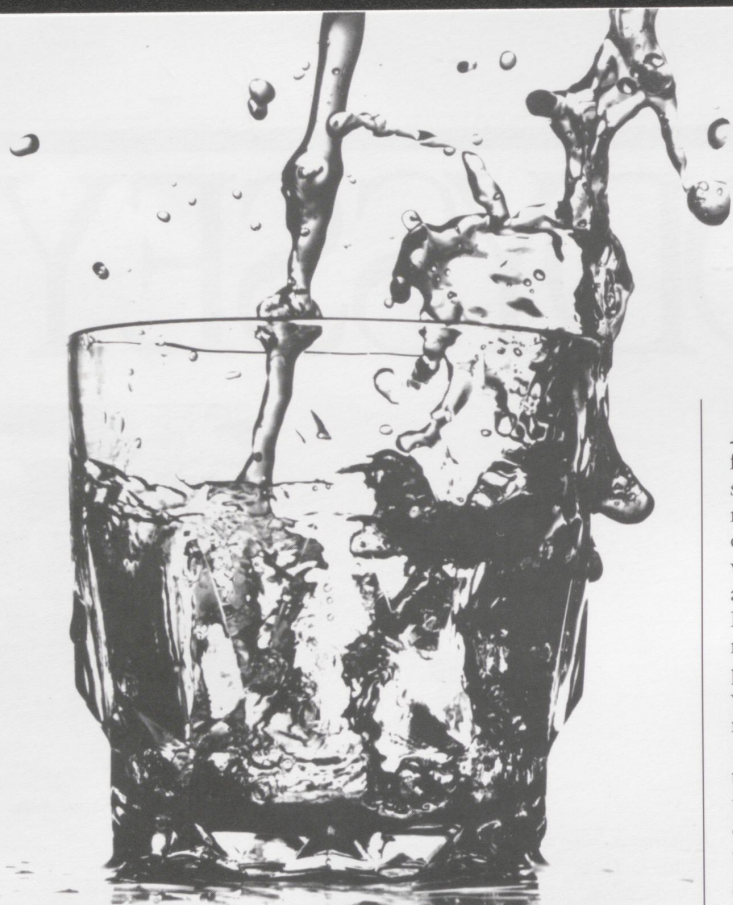
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Printing: Merrick Printing, Inc.

Credits: Cover illustration by Joseph Drivas, The Image Bank; photos on the Contents Page and on pp. 4, 8, 9, 11, 13, 27, 28, 29, 31, 32, 34 and 35 by Ken Goad; photo on p.2 and on back cover by Ed Braverman, FPG International; photo on p. 30 by Bill Wells.

Contents

Looking for the Missing Link between What We Eat and What We Drink	2
Building a Better Mouse to Trap Genetic Secrets	6
A New Dimension in the Operating Room: 3-D Models as Visual Aids in Reconstructive Surgery	11
Honorable Mention: Impact and Achievements of UK Graduate Program Alumni	17
BRAVO! Stellar Students Choose UK	27
Kiosk: Students Create Visual History of WWI, Banking on Tobacco and Thoroughbreds, and More...	30
Update: The Rodney Dangerfield of Legumes	35

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Looking for the Missing Link between What We Eat and What We Drink

How drinking and diet affect
body weight of non-alcoholics

by Sharon Reynolds

Alcohol is the drug of choice for Americans. Up to 75 percent of the population can be found, at least occasionally, tipping, toasting or sipping a variety of libations. For some, the martini hour is a nightly custom; and on rare occasions, people may overindulge. But the vast majority of Americans aren't alcoholics and are not physically dependent upon ethanol. Furthermore, most people usually try to be responsible drinkers by laying off liquor if pregnant or by making sure to leave parties with a designated driver if they've had one too many for the road.

In our increasingly health-conscious society, though, even moderate drinking is coming under scrutiny. It has been implicated in breast cancer, heart disease, hypertension and diabetes. Now, a University of Kentucky anthropologist is attempting to find out how drinking, along with eating habits, may be affecting the overall health of non-alcoholics. Bryan Johnstone, assistant professor of behavioral science, is in his third year as principal investigator of a six-year study titled "Alcohol and Diet: General Population Relationships." The study is being funded by a \$300,000 grant from the National Institute on Alcohol Abuse and Alcoholism (NIAAA).

"We know a lot about alcoholic drinking patterns and diet," says Johnstone. "For example, we know that alcoholics can get as much as 50 percent of their total caloric intake from alcohol alone. We know that they tend to neglect other aspects of their diet, suffer malnutrition and lose weight. And, in part, the risk for liver cirrhosis may be affected by an interaction between alcoholic drinking patterns and dietary intake. What we don't know a lot about is the relationship between moderate, or normal, drinking and other aspects of diet and body weight."

Johnstone, who began researching alcohol and nutrition while working on his dissertation at the University of Arizona, looks at three major issues in his study of non-alcoholics: drinking and eating patterns, drinking and body weight, and possible interactions between alcohol and food that may influence body weight.

The first quantitative study of its kind,

Results of the first phase of Johnstone's research indicate that among women alcohol consumption is associated with weight loss, while the opposite is true of men.

Johnstone's current research is an outgrowth of his work with the Alcohol Research Group in Berkeley. He has used 50 national-level studies, comparing drinkers and abstainers in the general population and categorizing drinking patterns as moderate or heavy.

Data on the nutritional, dietary and alcohol habits of a broad-based sample of Americans from 1971 to 1989 have been pooled from several national surveys, including the National Health Interview Survey, the Nationwide Food Consumption Survey of Individuals, the National Health and Nutrition Examination Surveys and the Continuing Survey of Food Intake. Adjustments have been made for factors such as smoking, exercise and total caloric intake.

Results of the first phase of Johnstone's research indicate that among women alcohol consumption is associated with weight loss, while the opposite is true of men.

"With men, we see a positive relationship between drinking and increased body weight; and as the amount of alcohol intake goes up, men get heavier," says Johnstone. "With women, alcohol appears to have a weight-reducing effect. There really has been very little speculation as to why that sex difference may be present."

Additionally, African-American women, who have very high rates of abstention, also have high rates of obesity, he notes.

Johnstone's findings shouldn't be taken as an encouragement to adopt a liquid diet, he is quick to point out, although experimental studies conducted in the fifties and sixties did lead briefly to a "drinking man's diet." Subjects in those studies were placed on a controlled alcohol diet and those people whose total

caloric intake was 25 percent alcohol experienced weight loss.

"The idea was that if you substitute alcohol for other kinds of food, you would lose weight. Now, that's a very dangerous thing to do," Johnstone says. "It puts you at risk for all the other health outcomes associated with heavy drinking—cirrhosis, cancer, heart disease, and so on."

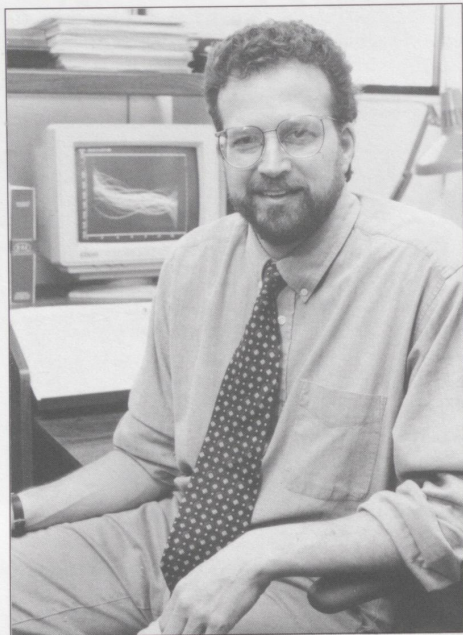
There are a number of reasons why it's important to understand the relationship between diet and alcohol. Although drinking, like smoking, is declining in the overall population, a recent Louis Harris poll shows that Americans are getting fatter: 66 percent of us are overweight. Aerobics and lean cuisine apparently haven't been enough to combat the trend towards more sedentary jobs. And similar findings elsewhere show that children are pudgier, a result in part of logging more hours of TV time.

Furthermore, the NIAAA is very interested in exploring the interrelationships between alcohol consumption and diet for clues to the cause or prevention of other diseases. In recent years, research has pointed to a relationship between moderate drinking and breast cancer, coronary heart disease, hypertension and diabetes mellitus. Evidence also suggests that interactions between alcohol and body weight may significantly influence the risk of these diseases. Nevertheless, except in the case of hypertension, contradictory studies also exist, Johnstone notes.

One of the biggest controversies currently raging in the scientific community is over a French study that suggests moderate drinking may protect against heart disease. Inconclusive results show that abstainers and heavy drinkers tended to die from certain types of heart disease in greater numbers than did moderate drinkers. The study is dubbed the "French Paradox" because the French have a very high fat diet and consume considerable quantities of wine, yet tend to have lower mortality rates from heart disease.

One of the biggest controversies currently raging in the scientific community is over a French study that suggests moderate drinking may protect against heart disease.

continued on page 4



Bryan Johnstone's current research project on alcohol and diet is an outgrowth of his dissertation work at the University of Arizona.

"In trying to understand the relationship between alcohol and heart disease or cancer, we have to study the relationship between alcohol and dietary fat," Johnstone says. For example, alcohol appears to influence fat distribution for some people, particularly some male drinkers who develop a "beer belly." "If alcohol affects fat distribution, it might affect the risk for other health outcomes associated with obesity," he says.

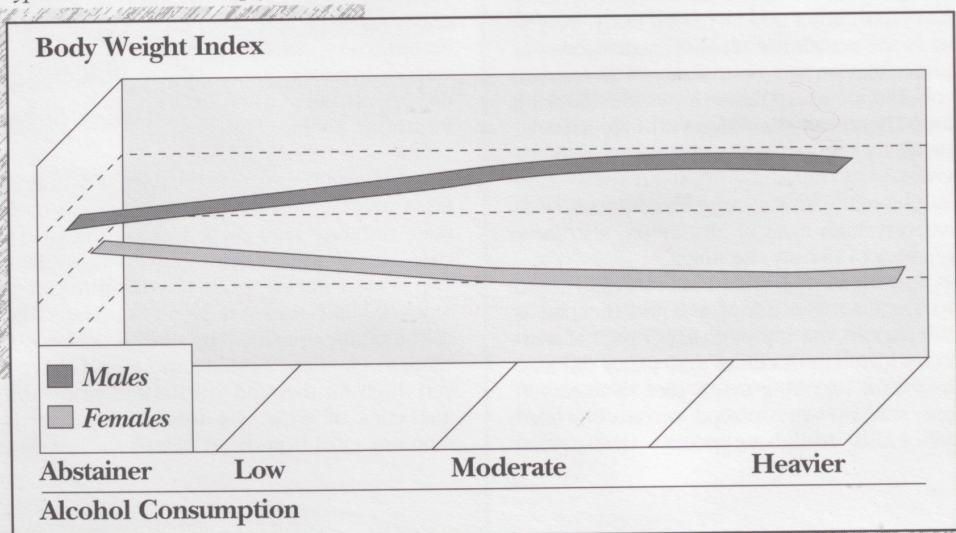
But are we adding calories or subtracting them when we consume alcohol?

"Alcohol is very high in calories, so we'd imagine that it would contribute to obesity," Johnstone explains. "But we know, to some extent, that's not true for alcoholics, because they tend to lose weight. It's not clear whether diet or metabolic change might be at work here.

"Some people say heavy drinkers tend to waste all types of calories, more than do moderate and non-alcoholic drinkers. So the suggestion is that metabolism is primed to eliminate alcohol and other calories."

What happens to other food sources when alcohol is added to the diet? Another aspect of Johnstone's project will examine the relationship between normal or moderate drinking and the intake of protein, carbohydrates, fat and dietary cholesterol.

Hypothesized Relationship for Non-Alcoholics between Alcohol Consumption and Body Weight



"There has been a specific suggestion that male drinkers tend to be heavy meat eaters. A hamburger and steak-type diet is very common among heavy drinkers. We also know that alcohol is very similar to carbohydrates in many ways, so carbohydrates overall tend to decline in the diet with alcohol."

"Some people say heavy drinkers tend to waste all types of calories, more than do moderate and non-alcoholic drinkers. So the suggestion is that metabolism is primed to eliminate alcohol and other calories."

It helps to associate alcohol, like food, with appetite, says Johnstone, rather than with addiction. "We find clinically, when we look at alcoholic populations, that as people try to abstain, they start to crave sugar particularly and other sources of carbohydrates. And, in fact, we think carbohydrates may modify their craving. Appetite regulation, which seems to be unbalanced in some way for alcoholics, may be in part a function of the relationship between alcohol and sugars and other carbohydrates. So there may be a suggestion as far as the development of alcoholism that there is some role of carbohydrate food sources in that process."

Thus, one implication for Johnstone's findings might be the development of nutritional therapies for alcoholics. "If we understand alcohol consumption and other appetite behaviors, we may understand how the craving for alcohol develops," he says.

Johnstone anticipates a continued high interest in the subject of alcohol and diet, especially in light of the recent controversies about the role of alcohol in breast cancer and heart disease. "If this research has some kind of significance for understanding how alcoholics develop an uncontrolled appetite for alcohol, that's fine. But I think the implications for the general population of normal drinkers is also very important, particularly when it comes to understanding obesity and chronic diseases."♦

Beer Increases Risk of Both Lung and Breast Cancer in Older Women

Beer may be a factor for increased risk of both lung and breast cancer among postmenopausal women, according to two recent epidemiological studies.

In the studies supported by the National Cancer Institute, nearly 42,000 women in Iowa filled out a questionnaire that included questions on nutrition, alcohol consumption and other health information. After analyzing the data, the scientists discovered that postmenopausal women who drank one or more beers a week were at double the risk for lung cancer, compared to women who drank less than an average of one beer a week. The findings, however, only held true for postmenopausal women who smoked, the researchers note.

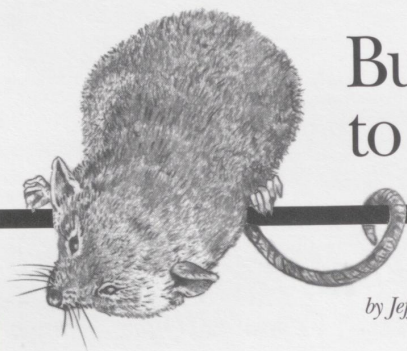
"We don't really know why alcohol, and specifically beer, increases the risk for lung cancer for female smokers," says Thomas Sellers, one of the epidemiologists who helped with the studies, which were conducted at the University of Minnesota. "However, we do have some theories," says Sellers. He hypothesizes that beer depletes the stores of vitamin A in the liver. Vitamin A is an antioxidant, a chemical that neutralizes the activities of free radicals, substances which are potential carcinogens. Beer may also exacerbate the deleterious effects of smoking.

In a second study, the Minnesota epidemiologists found that women who drank one beer a day had a 50 percent greater risk for breast cancer than women who drank less than one beer a day. Among women who were also taking estrogen supplements, this risk rose to 80 percent.

"Beer may stimulate prolactin, a hormone that causes the mammary gland cells to divide more rapidly," explains Sellers. Cells that divide more rapidly are considered more likely to become malignant.

This research was published in the September 1992 *Annals of Epidemiology*.

—Judy Folkenberg, from NIH Healthline, March/April 1993



Building a Better Mouse to Trap Genetic Secrets

by Jeff Worley

transgenic manipulation:

a process which involves altering an animal's genetic system by the injection of some other mammalian genetic material

In September of 1991, University of Kentucky researcher Brett Spear observed some very unusual behavior by one of his transgenic lab mice. Instead of scampering around in its cage, the mouse was pulling itself along, with some difficulty, by its front legs.

"There wasn't a complete loss of muscle control in this mouse—he would pull his back legs away if I touched them—but there was a noticeable paralysis," says Spear, a molecular biologist who has been at UK since 1989. "We were curious why this had happened. We wanted to know if this was a result of our genetic manipulations with these animals."

Spear and others at UK were intrigued by this discovery because it has important implications for researchers trying to discover the causes of degenerative diseases of the aging nervous system, such as Alzheimer's disease, Parkinson's disease and amyotrophic lateral sclerosis (ALS). What all three of these diseases

have in common is that they are inevitably progressive: the cells just shrivel and disappear, and

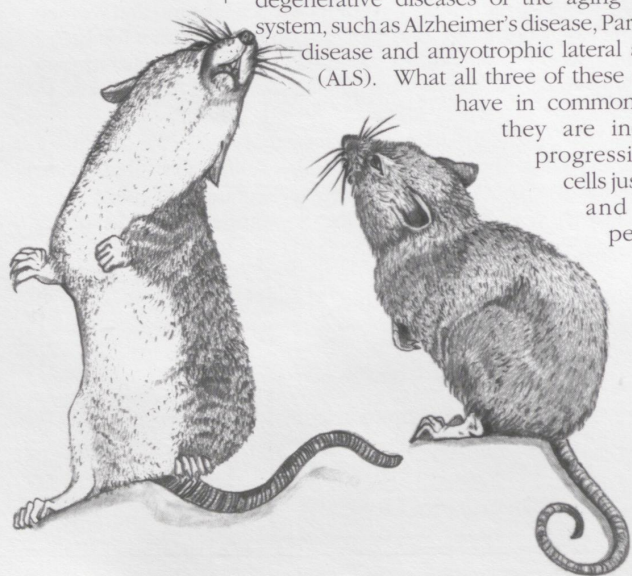
the patient eventually dies from the disease.

"This animal looked to have symptoms similar to those of people who have motor-neuron degenerative disease," says UK neurologist Edward Kasarskis, who examined the mouse soon after Spear noticed its disability. "Although we don't know yet in what ways this discovery may be important, it is clearly a significant development. If the disease is found to parallel ALS, for example, Spear's work may become very important as it relates to our understanding of this disease." The progressively paralyzing disease ALS became known as Lou Gehrig's disease for the New York Yankees star who died of the illness in 1941. Faulty genes are blamed for about five to 10 percent of ALS cases, and the disease affects an estimated 30,000 Americans at any given time, according to the ALS Association.

Spear and his associates were extremely interested in the possibilities of this finding. As so often happens in research, however, they aren't certain just where they went right.

"We certainly weren't trying to make an animal that would develop this hind-limb paralysis," says Spear. "This was totally unexpected. But we are trying to take advantage of it to understand something about mouse development as well as human genetic diseases." Only one group of mice being used in Spear's transgenic research has shown hind-limb paralysis. To date, of the 387 pups that have been born in this group, 104 have had the defect.

Along with researchers in the Department of Anatomy and Neurology, Spear has looked at cells within the spinal cord of these animals using electron microscopy techniques. What



they've found is that the motor neurons degenerate in the same way that those of people deteriorate that have similar degenerative diseases.

The original line of research, funded for five years by the National Institutes of Health, involved genetic manipulation of mice in order to understand how genes are switched on in the liver. Spear's research team, which includes graduate students Tennore Ramesh and Ke Li, and technicians Amy Ellis and Mike Green, is now working intensely in both areas.

The Transgenic Mouse: Background

Recent advances in biotechnology have made it possible to use mice to study a variety of diseases. In 1980 and 1981, the introduction of cloned DNA into the mouse through microinjection of fertilized eggs was achieved. This method attracted widespread attention when it was found that the procedure noticeably changed the mouse's hereditary make-up.

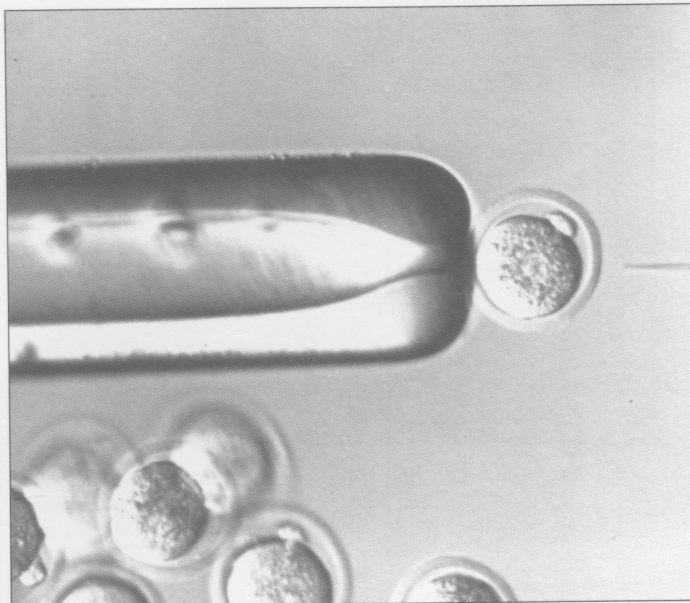
Gene expression was first demonstrated in 1982 by the dramatic growth of transgenic mice harboring the human growth hormone gene.

"Our major goal, of course, in looking at the hind-leg paralysis of these mice, is to identify the particular gene we're disrupting in the mouse..."

These "super mice," nearly twice as large as normal mice, captured headlines around the world. Since that time, "transgenics"—the creation of an animal which contains genes from another organism—has helped to revolutionize the study of genetics and illness.

"Transgenic mice have been made that mimic certain human disorders," says Spear. "Mice have been generated that are genetically programmed to have cancer, arthritis, obesity, diabetes, and other diseases."

Thousands of varieties of these "guinea mice" are now providing models for testing possible treatments. In a *U.S. News & World Report* article



One pipette (left) holds the mouse embryo in place with a slight vacuum as the other pipette (right), an ultra-fine needle, is used to inject a small amount of prepared DNA into the cell's pronuclei.

which appeared in November of 1991, Charlene Crabb reports that scientists have protected mice from cardiovascular disease by giving them genes for high-density lipoproteins, or HDL, the "good" cholesterol that has long been suspected of reducing the buildup of fatty tissue in the arteries.

A Harvard Medical School team has patented transgenics that reliably develop cancers, and researchers in California have created mice carrying the gene for beta-amyloid protein, the principal component of the plaques riddling the brains of people with Alzheimer's. Says Richard Palmiter of the University of Washington, a pioneer in the field, "The transgenic mouse is a wonderful experimental tool to study almost any question of genetics."

To try to understand disease processes, the mouse has been a frequent choice for researchers because it bears a striking biological similar-

continued on page 8



The transgenic mouse research team includes (from left to right) Brett Spear, principal investigator; Ke Li, from China; technician Amy Ellis, from Danville, Kentucky; and Tennore Ramesh, from India.

ity to humans. "There are very few animal models we can use to study neuro-degenerative disorders," Spear says. "For mammalian systems, the mouse is probably the best choice to work with. Its nervous system is highly analogous to the human nervous system, it's a relatively small animal, and mice breed faster than any other mammal. Understanding how biological systems function in mice is directly applicable to our understanding of gene function in humans."

But why use mice at all? Why not utilize the technology of computer modeling instead?

"Computer modeling can go only so far," says UK Veterinarian Ward Crowe. "It's only as sophisticated as the human mind that programs it." Nothing, at this time, Crowe says, can parallel the highly complex biological system of the mouse. "Perhaps one day researchers will have an alternative so that animal models won't be necessary," Crowe adds. "Until then, it is essential that laboratory animals be used for the betterment of both humans and animals."

How Transgenic Mice Are Made

Spear explains that the creation of a transgenic mouse starts with DNA, the basic molecular material that determines heredity in animals. The researchers use "recombinant DNA," which is prepared in the laboratory by breaking up and splicing DNA from several species. "We do this in a petri dish, in bacteria, which allows us to manipulate the DNA in various ways," Spear says.

The next step involves setting up mouse matings. The day before the researchers are ready to do a particular experiment, they pair off a number of normal mice, placing a male and a female mouse together in a cage. "Twelve hours or so later, we identify which females have mated by the presence of a 'copulation plug,'" Spear explains. This mucous-like plug, formed in the presence of semen, lets the researchers know which females have mated.

After a period of gestation, those female mice are then painlessly euthanized and the embryos removed. At this time the fertilized embryos are placed into a petri dish.

The next step involves injecting the prepared DNA into these embryos. This is where senior research analyst Mike Green comes in. Green performs the delicate task of microinjecting the embryos in UK's Transgenic Mouse Facility, a 300-square-foot lab in the Combs Cancer Building.

"If we can identify this gene," Spear says, "it would be relatively easy to identify the parallel gene in humans involved in the nervous system.

Hopefully, we will eventually come to understand how this gene functions and why . . ."

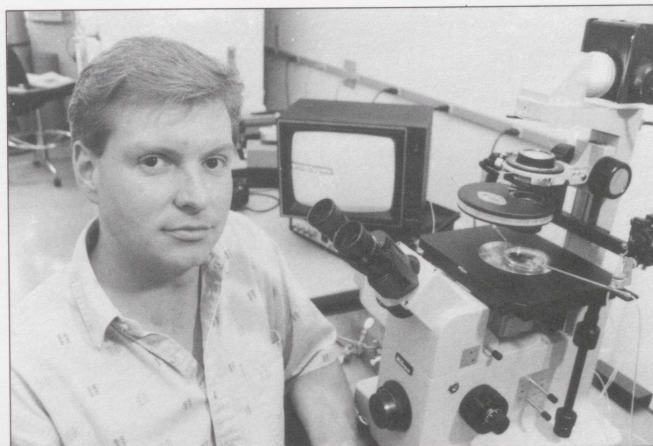
Green sits at what appears to be a standard microscope, except for the two extended handles on either side of it. "These are micro-manipulators," Green explains. "They control two lines that come into the microscope. Each line holds and controls a pipette—a long, thin glass cylinder." The pipette on the left is a needle with a finely polished end so that with a slight vacuum pressure it holds the embryo in place. The other pipette is an ultra-fine needle, through which a small amount of prepared DNA is injected. "This takes extensive training and a really steady pair of hands," Spear says.

The embryos, now containing the genetic information Spear wishes to implant, are ready to be surgically placed into other female mice. To maximize the possibility that the embryo cells will grow and divide properly, Spear and his staff set up a second round of matings. This time, though, females that are hormonally ready to mate are paired up with vasectomized males.

"We do this," Spear explains, "so that the females will actively mate with none of their eggs becoming fertilized. But they are physiologically ready to accept fertilized embryos." The genetically engineered embryos are then surgically implanted by Green into the oviducts of these female mice. Twenty-one days later, a litter of pups is born. Hairless and pink at birth, each resembles a small jelly bean. And for two weeks all of them appear to be completely normal baby mice.

When these mice are two weeks old, researchers take a small tail biopsy to check whether or not the injected genetic material exists inside each mouse. Any part of the body could be biopsied, since ideally each cell contains the transgenic information, but a tiny piece of the tail is taken because, Spear says, "they have very little feeling there."

Because the injected DNA may be lost before becoming part of a chromosome, only 10 to 20 percent of the mice biopsied will contain the genetic material injected. However, the good news for the researchers is that once these 10 to 20 percent have been identified, each of these can start a "founder line," passing this DNA on



Senior research analyst Mike Green in UK's Transgenic Mouse Facility, established in 1989



continued on page 10

*Once this gene is identified,
then studies can be done to further
understand human genetic disorders
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to their offspring and eventually generating hundreds of offspring who contain the genetic material.

Although a great deal of work will be necessary to identify the gene responsible for the neuro-degenerative defect, this isn't a "needle-in-a-haystack kind of thing," Spear says. "We know what type of DNA we put in, and we know that the disrupted gene is right next to this microinjected material," he explains. "So we have, in effect, tagged the disruptive gene—it's physically linked to our DNA material."

What Can Be Learned?

"Our major goal, of course, in looking at the hind-leg paralysis of these mice, is to identify the particular gene we're disrupting in the mouse," Spear says. "I think that's realistic for a three-year study like this one." Once this gene is identified, he says, then studies can be done to further understand human genetic disorders that affect the nervous system. "If we can identify this gene," Spear says, "it would be relatively easy to identify the parallel gene in humans involved in the nervous system. Hopefully, we will eventually come to understand how this gene functions and why, when you alter the gene, hind-limb paralysis and other related disorders result."

By the end of the grant period, Spear and his colleagues hope to be able to report the kind of discovery that James Gusella of Massachusetts General Hospital recently announced. Gusella was a member of a large team of researchers who worked together to track down the renegade gene that causes Huntington's disease, a progressively debilitating disease which affects about 25,000 Americans. Although an eventual cure is still far from certain, Gusella says that now, "It may be possible to develop effective treatments to slow or stop the progression of this frightful disorder."

The use of transgenic animals to find answers to a host of medical questions has ushered in a new era for medical research, Spear says. "A tremendous amount of insight can be gained into how genes regulate the body, how they switch on and switch off, how they express themselves. This is an extremely exciting time to be a molecular biologist involved in this type of work." ♦

A New Dimension in the Operating Room

3-D Models as Visual Aids in Reconstructive Surgery

by Jeff Worley

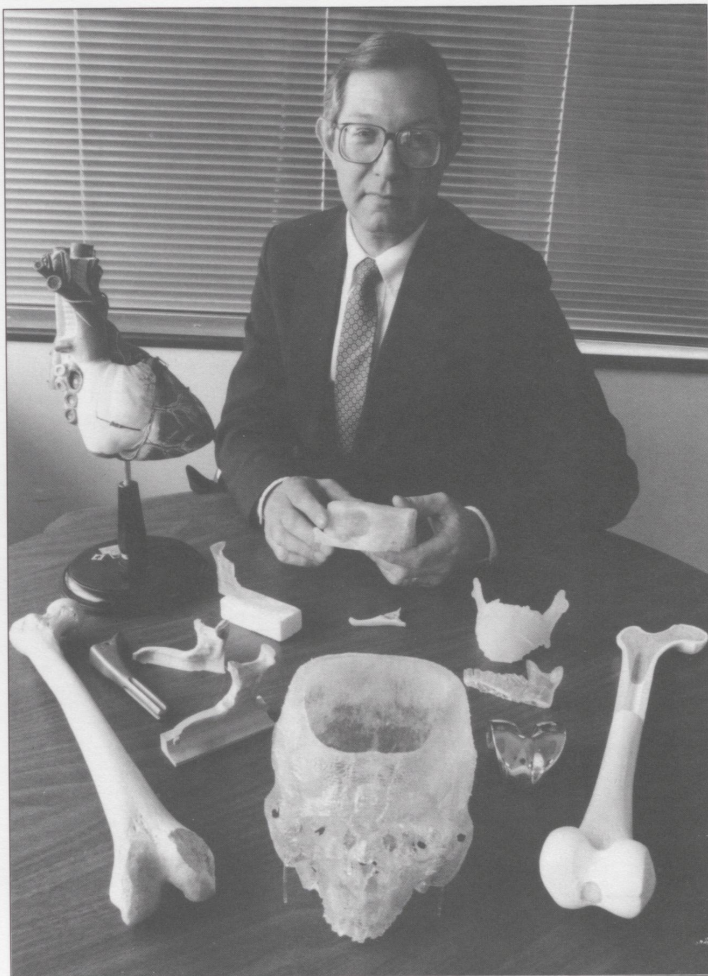
In late summer of 1989, a young man from southeastern Kentucky lifted a shotgun to his face, cocked the hammer, and pulled the trigger. Though he failed in his suicide attempt, the left half of his jaw was destroyed by the blast. Months later he still had to be fed with tubes. He was unable to talk. Though the man would live, relatives wondered with pessimism about the rest of his life.

Then a team of researchers at the University of Kentucky came up with a possible solution to try to reverse the man's seemingly hopeless condition—reconstructive surgery based on the emerging technology of stereolithography.

"The images we had gotten of the man's face from CAT scans and Magnetic Resonance Imaging were difficult to interpret," recalls Henry Vasconez, a UK plastic surgeon whose specialty is cranio-facial surgery and microsurgery. "So I called Dr. Knapp and asked him to make a computer model of the mandible, a three-dimensional model of the missing piece I could examine before the surgery."

Knapp, director of UK's Center for Biomedical Engineering, was confident such a model could be constructed through the computerized stereolithography work being done at UK's Center for Robotics and Manufacturing Systems (CRMS). Stereolithography is a system that enables engineers to draft an object on a computer screen, then watch as a machine creates a full-sized, three-dimensional plastic model of the object.

Vasconez gave Knapp some CAT scans of the patient's head, and Knapp's group was off and running. The first step was to create the three-dimensional model of the head. "With this process," Knapp explains, "we get a 3-D image, look at the undamaged side of the face—the uninjured jaw in this case—and flip the image over." The flipped-over image is what the jaw



Charles Knapp, director of UK's Center for Biomedical Engineering, sits behind several acrylic and wooden models built at UK and used as surgical aids. Such models allow the surgeon to see, instead of imagine, the third dimension.

continued on page 12

"This equipment was obviously built for industrial applications, but Dr. Knapp and Dr. Vasconez saw that it could be used for medical purposes. We did the plastic jaw in about seven hours."

looked like before it was damaged.

Next, the computer image was sent to CRMS, where it was used to guide a laser system. Though the next step—the "growing" of the jaw—might seem like science fiction, Knapp characterizes it as a "pretty straightforward" process.

"Picture a tank," Knapp says, "similar to a fish tank full of liquid plastic. The unique thing about the plastic is that it's ultraviolet sensitive—wherever the laser hits it, it sets up, it hardens." He goes on to explain that because the laser is fed all the profiles of the patient's jaw, the laser knows exactly what points to hit, layer by layer from the bottom up, to form the needed structure. "It's a little laser light show," Knapp says, recollecting the image, "similar to a downtown Fourth of July display." After hundreds of layers have been scanned and have solidified, the end result is a highly accurate model in hard plastic.

The model sits on a platform in the tank. When the laser has finished its job, the model and the platform are put in a drying oven to completely harden the material. Then the model is ready for the surgeon.

Stereolithography technicians have used this process to make prototype parts before, for example, to create a brake/rudder pedal for a B-52 aircraft and an automobile water pump impeller blade that may be used in vehicles built by the Ford Motor Co., but it had never been attempted in a medical application at UK.

"It was pretty exciting," says CRMS automation technician R.J. Robinson, who monitored the process. "This equipment was obviously built for industrial applications, but Dr. Knapp and Dr. Vasconez saw that it could be used for medical purposes. We did the plastic jaw in about seven hours."

Then it was time to make surgical use of the technology. The patient was anesthetized, and in an all-day operation Vasconez supervised two teams of surgeons. One group prepared the jaw area while the other extracted a jaw-sized piece of bone from the patient's leg. Once that was accomplished, Vasconez used the plastic jaw as a model and carved an exact duplicate from the patient's own bone.

"Having the model in hand was extremely useful," Vasconez says. "I could see what the missing piece should look like. I could hold it in my hand and turn it to fashion the chunk of bone." In the past, reconstructive surgeons have had to rely on two-dimensional images and imagine what the third dimension looked like. "Having such a model," says Vasconez, "takes a lot of the guesswork out of the process—I don't have to imagine the third dimension."

A second advantage is that the patient spends less time on the operating table. "When we do the actual work of reconstruction, it takes time," says Vasconez. "You're thinking, you're moving, cutting a little here, cutting a little there, trying to fit the pieces into the puzzle. With the model literally at hand, the surgery takes less time."

"The operation was successful from the point of view that we were able to reconstruct the mandible and provide skeletal structures where there were none before," he says. "The last time I saw this patient, he was doing well—opening and closing his jaw much better."

Though Vasconez is pleased with what CRMS has been able to provide him, he admits the process has its limitations. "It's easy to get a bit greedy at times and think, 'What I really need now is an exact replica of the deficit, a more true-to-life model.'" Knapp agrees that the models are a bit rough. "The slices from the CAT scans are pretty thick, and there is some slight misalignment," he says, turning the plastic mandible in his hand. "You can see some obvious 'stairsteps' where the actual contour would be much smoother." But this is a correctable technical issue, Vasconez says. If the CAT scan



UK surgeon Henry Vasconez examines a hard plastic model of a patient's skull before performing reconstructive surgery.

takes more slices per inch, the models would be more nearly exact replicas.

Another limitation to using the models is the surgeon's race with time. If it takes seven hours to "grow" a mandible, this process obviously isn't feasible for emergency surgery. But this doesn't mean, Vasconez says, that this will always be the case. "With our galloping technology, there may come a time when we can go from X-rays and CAT scans to the finished model—an implantable model, perhaps—in a short enough space of time to bring this process into the emergency room."

One time-saver, currently being developed in the medical application of stereolithography, is a computerized milling machine. Knapp says that such a machine would employ computer programs to run the mechanical carving of bone replacements and that this process would be better for the patient because it would be faster and more

accurate than the current method.

"We have a milling machine here in Wenner-Gren now," Knapp says, "and have made some wooden reconstructions. This one looks a bit

continued on page 16

"Having such a model," says Vasconez, "takes a lot of the guesswork out of the process."

Child Abuse Victim Aided by High-Tech Computer Modeling

Katrina's father couldn't understand why she was having so much trouble feeding from her bottle. Not a patient man, he became angry, very angry. In a sudden rage, he began hitting six-month-old Katrina—with his fist or with a blunt object—on the side of the head. When she quit breathing, the man went next door and told neighbors what he had done. They called the emergency medical number. Within minutes, a medical team arrived. They managed to resuscitate the baby—twice—on the way to the emergency room at UK.

Neurosurgeon John Walsh remembers that day well. He was on duty when Katrina (not her real name) was brought in.

"When I first saw her," says Walsh, "she was in a coma and one pupil was dilated. She was near death. Our goal was simply to save her life."

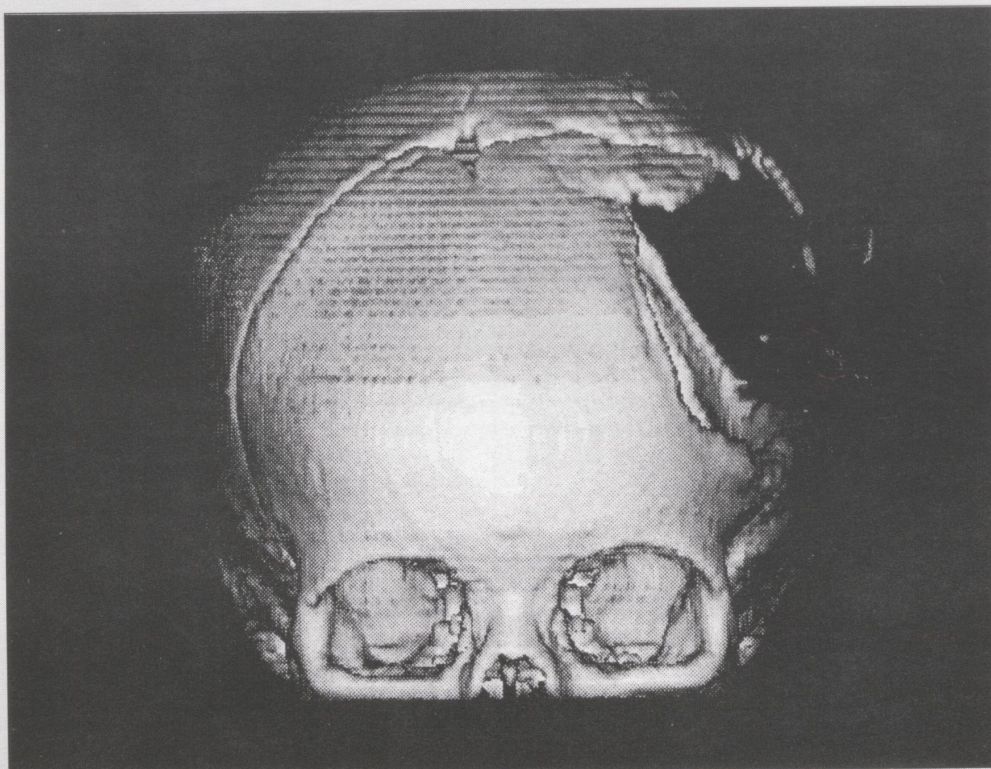
Walsh made an incision in Katrina's scalp and opened the skull in order to take out a large

blood clot. After he had accomplished this, he tried to put the bone back, but the brain was swelling so badly he couldn't.

"Though there was still substantial residual swelling of the brain, we were still pleased with the results," says Walsh, who left UK in April to take a position at the University of Texas.

"This surgery was in October of 1991," recalls Katrina's current foster mother (we'll call her Jean). "Katrina came home, to us, from the hospital just before the Christmas holidays, and though she was out of immediate danger she had lots of problems. She slept a lot, she was listless, she didn't have many motor skills," says Jean. "Her high-pitched screaming and wailing would go on for hours. And she was having grand mal seizures—so many that she'd be just recovering from one when the next one hit." A five inch by five inch area of Katrina's skull was open, covered only by thin scalp, so she had to wear a custom-fitted, hard plastic helmet at all times.

A CAT scan reconstruction of Katrina's skull was used to program a laser, which then "built" a model out of liquid plastic.



Then Walsh referred Katrina's foster mother to UK plastic surgeon Henry Vasconez. With Katrina, she met several times with Vasconez in the winter and spring of 1992 and Katrina, then past her first birthday, was scheduled for reconstructive surgery in July.

"This baby had a very large defect of her skull which went almost from the forehead all the way back on one side," says Vasconez. "There was no protection to the brain in this region."

In preparing to operate on Katrina, Vasconez asked bioengineer Charles Knapp and his team to build him a three-dimensional model of that part of the child's head. As in previous collaborations with Vasconez, Knapp created a three-dimensional model from CAT scans.

"Having this model was a terrific advantage," says Vasconez. "This gave us a much more accurate view than a simple X-ray: we could see curvature, we could see the extent of the damage, we could see exactly which areas were indented."

The operation itself was far from routine. In many cases of extensive damage to the skull, a solid steel plate is inserted to protect the brain. Katrina's skull and brain, however, still had a lot of growing to do. So Vasconez opted for a different solution—wire mesh.

"This wire mesh is a metal, but it has holes," Vasconez explains. "So it allows for the growth of tissue and is better tolerated by the body than a plate, which would have caused restriction in growth." A complex surgery followed, which included using fibrin glue to attach small pieces of the patient's bone over the dura mater, the tough fibrous membrane that envelops the brain. The goal was to stimulate bone growth underneath the mesh so that her own bone would fill in the space.

Though modesty might prevent Vasconez from using the word "miraculous" to describe Katrina's change in behavior and mood since this surgery, Jean isn't so reluctant. "Yes, miraculous is the word," Jean says. "Thirty-six hours after surgery, it became obvious to everybody that Katrina was 50 percent more alert, a noticeably different child."

Now, nine months after the operation, Katrina is continuing to recover from the child abuse that nearly ended her life. "She's much more curious, she jumps up and down and squeals in her crib, and the irritability is gone," Jean says. Though Katrina still has occasional seizures, they're milder and better controlled. "She's just now beginning to talk; the speech part of her brain was badly damaged," says Jean.

Despite the fact that Katrina is behind developmentally, Vasconez agrees that her progress over the last few months is "really remarkable. When I saw her here yesterday, she was walking, she was picking things off my desk—she was responding much more actively." Vasconez will continue to monitor Katrina's progress. "My hope is that after a little more time, we will be able to take the metal mesh out, that her own bone will be stimulated enough to provide her again with natural protection of the brain."

Meanwhile, Katrina lives with Jean on a "permanent placement basis" until some legal problems regarding Katrina's status are resolved. Though her father is in prison, convicted of child abuse in this case, and her mother has voluntarily terminated her rights to Katrina, the legal system, Jean observes, "takes its time."

Jean says that Katrina will have a home with her until she is adopted. And for now, Katrina will have plenty of playmates and lots of activity to keep her newly triggered curiosity engaged, since Jean is—and she says this with an almost audible gasp—the mother of 14. "Yes, that's right—14," she says. "Two are my biological children, four are adopted, and the others are foster kids."

"It's just a normal household—a very *large* normal household—with lots of activity and excitement."

like George Washington's teeth," he says, holding up a wooden model of a mandible. "The hope is that we can find a way to put a sterilized boot on the milling machine so that it's safe to use actual bone for a patient. Right now, we don't have a way to guarantee that it will be sterile."

Vasconez says that even if a way could be found to mill a sterilized part out of bone for implantation in a patient, there are probably better biocompatible materials available. He explains that in many cases, human bone successfully transplanted into the body doesn't acquire the necessary cells and blood vessels to incorporate the part totally. There is also the consideration of infection or rejection by the patient's immune system.

"One material we've been using lately instead of actual bone is hydroxyapatite," he says. "It has the mineral elements of bone but is made from coral. And it seems to be very well accepted by the body." Vasconez explains that a person's cells and blood vessels grow into this material, which functions as a scaffolding, gradually solidifying the piece into place. One obvious advantage of using such a bone substitute is that no bone material has to be taken from the patient. "The key elements in any such material," Knapp says, "would be strength, reproduceability, compatibility and degradability. Right now we aren't there. Maybe we will be, but that's still a few years into the future."

Vasconez admits he likes to look ahead a few years—he won't say how many—to a time when the whole process of bone or bone substitute implantation is set up right in the operating room.

"Imagine that a shotgun victim with part of his jaw missing is brought in. He is stabilized and given a CAT scan. All the pertinent data is fed into computer equipment right there in the O.R. A computer feeds instructions into a milling

Stereolithography is a system that enables engineers to draft an object on a computer screen, then watch as a machine creates a full-sized, three-dimensional plastic model of the object.

machine, which carves out from bone or some biocompatible material the missing part. The surgeons then implant this part into the patient. And it might happen all in one room."

Again the question: When?

"Let me answer that by looking back at a little history," Vasconez says. "At the beginning of this century, I don't think anyone would have predicted man would be walking on the moon by 1970. Fifty years ago, few would have predicted that we could stop someone's heart in order to do surgery. The way technology is advancing and the way creative minds are working, this operating room scenario is certainly within the realm of possibility in the not-too-distant future." ♦

HONORABLE MENTION

Determining whether or not to pursue a graduate degree is a big decision. Will it make any difference in your quality of life? Will another degree increase your income, advance your career or, perhaps, affect the contributions you can make to your community?

The answers to these questions are as diverse as the people who ask them, and the paths that alumni of UK's graduate programs have chosen show the tremendous diversity and breadth of their choices. From rising through the ranks to rear admiral to founding an international school in Saudi Arabia to developing navigation and targeting systems for the military to serving as a warden in a Kentucky prison to singing in an opera at the John Hay Whitney Foundation—all of these activities have been undertaken by our graduates. The scope and impact of their work are remarkable.

Not only do they range across a whole spectrum of careers, but these alumni are also scattered throughout the world—Italy, Iraq, Cyprus, Argentina, Egypt, Germany, Brazil—to mention a few countries that are now home to UK graduates. They also live in every state of the union—with nearly 800 in California, 200 in Massachusetts, 400 in Maryland, nearly 700 in Texas and 300 in South Carolina. But the vast majority live here, in Kentucky. And many of them are community, state and national leaders.

"Honorable Mention" will in each issue of *Odyssey* feature a number of our alumni, where they are, what they are doing and, in some cases, we will report on the research they were involved in as graduate students at the University of Kentucky. As a native Kentuckian myself, I find the accomplishments of our graduates to be inspiring. I think you'll agree.

If you also have a graduate degree from UK and would like to let us know what you are doing, fill out the form on page 25 and send it to us. We will share as many of your responses as possible in future issues of *Odyssey*.

Impact and Achievements of UK Graduate Program Alumni

*compiled and edited
by Susan Hodgetts Stempel*

Michael W. Glover,

M.D., Medicine, '72, says he fulfilled a childhood dream when he established his obstetrics and gynecology practice in his hometown of Danville. Since establishing his solo practice in 1975, he has added three partners, and the group now serves as the sole provider of ob-gyn care for the Ephraim McDowell Regional Medical Center in Danville. They perform over 800 deliveries each year and have from 15,000 to 18,000 patient visits per year. Among the UK faculty Glover particularly appreciated as a student were Professors John Greene and Jack Duhring.

Fred A. Engle, Jr.,

Ed.D., Education, '66, went from his studies in commerce and education at UK to teaching at William & Mary and then on to Eastern Kentucky University, where he served as chair of the faculty senate. He is now a professor of economics. Among his career achievements are co-authoring two volumes, titled *Madison's Heritage*, and authoring an article on Richmond in *The Kentucky Encyclopedia*.

Douglas C. Griffin,

M.S., Civil Engineering, '65, a native of Henderson, worked as a graduate student with Professor Robert A. Lauderdale on a project concerning the removal of pesticides from water. A recipient of a U.S. Public Health Service fellowship while a UK graduate student, Griffin is now vice president of Kenvirons, Inc. of Frankfort.

Betty Jean Hisle,

M.A., English, '66, was a student of Professor William S. Ward's at UK. One of the highlights of Hisle's career was the founding and her subsequent role as headmistress of Tabuk International

continued on page 18

HONORABLE MENTION



Betty Jean Hisle, in a classroom of the school she founded in Tabuk, Saudi Arabia in 1976, says she has very few photographs of the school because photographs were not approved of by the Saudi government at the time.

Community School in Tabuk, Saudi Arabia in the mid-'70s. Hisle says her students included British, American, Swedish and Lebanese children. Each morning in the spring, she says, "we had to clear away a layer of sand from our books and desks before we could begin work. The sandstorms penetrated every crack!" Living on an air force base in Tabuk with her husband, Leon, who headed the base hospital, she says she made friends with a number of Saudi women, teaching them English and how to swim at the base pool. When Hisle and her husband left Tabuk, the school had 60 students and six teachers, three British and three American. A native of Liberty, Kentucky, Hisle received her undergraduate degree from Berea College and has been involved for several years as a volunteer docent at the UK Art Museum.

David A. Flanagan,

D.M.D., Dentistry, '67, has a dental practice in Lexington specializing in new restorative and cosmetic procedures with new adhesive dental techniques and materials. Flanagan is originally from Russell Springs.

H. Lee Durning,

M.A., Finance, '75, recalls his research as a graduate student with Professor Herman Ellis, collecting statistical data for financial growth prospects. Durning is now president of Hamilton Enterprises in Louisville, serving as entrepreneur-owner/consultant in finance, insurance, real estate and investments. He has also been vice president of the Central Bank of the South Investment Division and founded and managed the Kentucky Department of Commerce's West Coast Office for Economic Development in the late '70s.

Diana Parker Horn,

M.A., Education, '71, is an administrator for the Ephraim McDowell Cancer Research Foundation at the University of Kentucky. Formerly she was dean of students at Midway College. Horn, from Maysville, also earned an undergraduate degree in accounting from UK.

Louise Gettys Dutt,

Ph.D., Educational Psychology and Counseling, '71, says she surprised herself when she entered UK at the age of 39, intending to receive a master's degree but, ultimately, earning both a master's and a Ph.D. Soon after completing her degrees, she developed and established a non-credit course for women now called "Women in Transition." The course, taught through UK Community Education, provides counseling and testing for women making a change in career or in their education, and has served thousands of women since its development. For over 20 years, Dutt was a staff psychologist in the Counseling and Testing Center at UK and now has a private counseling practice in Lexington.

Georgia Anderson Hill,

Ph.D., English, '67, has had her poems published and has also given vocal concerts at Eastern Kentucky University

and Kentucky State University. Now retired and residing in Lexington, Hill also taught workshops in creative writing at KSU.

Darrell R. Gilliam,

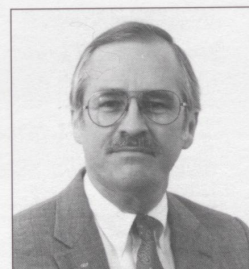
M.A., Economics, '69, has been appointed by Governor Brereton Jones to the new Kentucky Economic Development Partnership. Gilliam, a resident of Harold, Kentucky, had a National Defense Education Act assistantship as a UK student. He is now executive director of the Floyd County Development Authority and a past president of the Kentucky Industrial Development Council.

Barbara Joyce Lake,

M.A., English, '51, headed back to school after raising her family and in 1992 received a Ph.D. in history from Ohio State University. She is now an assistant professor at Capital University in Columbus, Ohio. As a UK student, she was the recipient of both Fulbright and Woodrow Wilson fellowships.

Arvil Van Adams,

M.A., Ph.D., Economics, '70, is the senior economist for the International Bank for Reconstruction and Development (The World Bank). Adams, a resident of Springfield, Virginia, has also been a professor at George Washington University, the executive director of the National Commission on Employment and Unemployment Statistics, and a faculty member at the University of Utah and Ohio State University. As a student at UK,



Arvil Van Adams says serving under U.S. President Jimmy Carter is his most significant career achievement. Currently, Adams is senior economist for The World Bank.

HONORABLE MENTION

he had a research/teaching assistantship working with UK economists Ray Marshall and Virgil Christian under a grant funded by the U.S. Department of Labor and the U.S. Equal Opportunity Commission.

Sudhakar Neti,

Ph.D., Mechanical Engineering, '77, is a professor at Lehigh University in Bethlehem, Pennsylvania. A native of Madras, India, Neti had a teaching assistantship at UK and worked on research projects with Professors O.J. Hahn and Roger Eichhorn in mechanical engineering.

Nancy Lewis Harris,

M.S., Home Economics Education, '62, says she just completed her 30th year of teaching. Working in Statesville, North Carolina, Harris has been selected twice as her school's outstanding teacher and has served as teacher recruiter for the school for five years. One of her best-remembered instructors at UK was Professor Anna Gorman in the home economics education department.

Kenneth Kolson,

M.A., Ph.D., Political Science, '72, is deputy to the director in the Division of Research Programs at the National Endowment for the Humanities. A Pennsylvania native, Kolson as a UK student worked with Professor Bradley Canon, studying the impact of U.S. Supreme Court decisions on Kentucky juvenile courts.

Franklin David Master,

M.D., Medicine, '65, is a psychiatrist for the state Department of Prisons in Nevada. Past president of the Nevada Psychiatric Association and a Fellow of the American College of Forensic Psychiatry, the Louisville native cites his most significant career achievement as helping shape the pattern of forensic psychiatric testimony in the Nevada

court system. A National Merit Scholar at UK, Master, in his graduate work, studied under Professor Robert Straus in the Department of Behavioral Science.

Marie Blevins,

M.A., Education, '62, taught in Kentucky's first integrated school, Griffin, which was a one-room school in Wayne County housing first- through eighth-grade students. Opened on July 18, 1955 with 53 students enrolled, the small, one-room school was the first integrated public school in the nation (the school calendar of eight months ran from July through February, putting this school in session a few weeks earlier than schools elsewhere). Blevins, now retired and residing in Monticello, Kentucky, has three sons who have degrees from UK: Carter, an oral surgeon; Phillip, a plastic surgeon; and Parker, an electrical engineer.



Marie Blevins with some of her students in 1955 in the classroom of Kentucky's first integrated school, a one-room schoolhouse in Wayne County

James A. Cunningham,

Ph.D., Chemistry, '68, is program director at the Wright-Patterson Air Force Base in Ohio for the LANTIRN Weapon System. Cunningham is responsible for all decisions regarding the development, testing, production and support for LANTIRN. He describes LANTIRN as a navigation and targeting system which allows the F-15E and F-16C/D aircraft to fly at night 200 feet off the ground at 600 mph. Originally from New York,

Cunningham worked with Professors William Wagner and Donald Sands as a graduate student at UK, under a grant funded by the Atomic Energy Commission (now the Department of Energy).

Michael W. Hawkins,

J.D., Law, '72, was recently elected president of the Cincinnati Bar Association. A partner in the Dinsmore and Shohl law firm, Hawkins has also been named for three straight years as one of the "Best Labor and Employment Attorneys in America" by the publication titled *Best Lawyers in America*.

James W. Middleton, Jr.,

Ph.D., Agricultural Economics, '70, went from UK to the University of Louisville, where he earned an M.D. in family practice in 1977. Now living in Hart County, where he has a private practice and is an active farmer overseeing a large farm operation, Middleton says he is "taking care of a lot of rural people and a lot of rural land." A fellowship recipient while at UK, Middleton worked on research as a student with Professor John Redmon in the Department of Agricultural Economics.

William H. Swatos, Jr.,

M.A., Ph.D., Sociology, '73, also earned an M.Div. from the Episcopal Theological Seminary in Kentucky in 1969. Now serving as editor of the *Sociology of Religion: A Quarterly Review*, he has two new books soon to be published, titled *For Democracy: The Noble Character and Tragic Flaws of the Middle Class*, and *Gender and Religion*. Among the honors Swatos has received are "Distinguished Alumnus," UK Department of Sociology, A World Society Foundation Grant and appointment as a Fulbright Lecturer. A native of New Jersey, he now resides in Silvis, Illinois.

Barbara B. Landreth,

M.S., Library Science, '72, says her true career is as a mother raising two children and that she has used her graduate

continued on page 20

HONORABLE MENTION

education to enrich her family life. Currently, she is working part-time as a reference librarian at West Virginia University's Charles Wise Library. During the '70s, she worked at the University of Louisville Health Science Library and the University of Washington (Seattle) Health Science Library. A Henderson native, Landreth resides in Morgantown, West Virginia.

Larry S. Gaynor,

M.S.C.E., Civil Engineering, '67, is chief of sanitation facilities construction for the U.S. Indian Health Service. Gaynor has served at various Indian reservations in Arizona, Utah, New Mexico, California, Montana, Wisconsin and Minnesota. Currently, he is managing over 1,300 construction projects valued at \$225 million of activity for American Indians as well as Alaska natives. He has also served as technical advisor for five Caribbean Island countries. During his graduate work at UK, Gaynor worked on research projects with Professor Don Wood in civil engineering and received support from a Department of Defense research grant. The Hawesville native resides in Gaithersburg, Maryland.



Captain Larry Gaynor presenting an award to a young Indian artist as part of a health-promotion, disease-prevention initiative

Joseph D. Cantrell,

M.B.A., Business, '69, now resides with his family on the Newport News peninsula in Virginia, where he is president and publisher of the peninsula's newspaper, the *Daily Press*. The Louisville

native has also been executive vice president and general manager of *The Orlando Sentinel* and is chair of the Board of the Virginia Peninsula Economic Development Council.

Robert L. Price,

M.S., Mechanical Engineering, '65, went to work after graduating from UK at Pratt and Whitney Aircraft in West Palm Beach, Florida. During that time he had a tour of duty in the U.S. Army, serving as company commander in the Corps of Engineers with responsibility for atomic demolitions. At Pratt and Whitney he assisted in designing the control systems for the F-14, F-15 and F-16. In 1975 he enrolled in divinity school and began working as a pastor in 1977, continuing his education until he had earned a D.Div. from Southwestern Baptist Theological Seminary. He notes his appreciation for the role his UK advisor, Professor James Funk, played in preparing him for the "real world" and feels that his engineering background has made it easy for him "to communicate with people in the business world."

Evelyn B. Baugh,

M.A., Education, '72, retired in 1991 after 33 years of teaching in Fayette County schools. Among her many honors as a teacher was being listed in *Outstanding Teachers in America* in 1973 and being named Fayette County Teacher of the Year in 1979-1980. She and her husband now live in a rural area of Virginia where they continue to enjoy helping adults who didn't or couldn't take advantage of an education. Baugh says she guesses she is "still teaching reading, writing and arithmetic, but I miss the classroom." Living in Stuart, Virginia also enables Baugh to be near her 96-year-old mother.

Patricia Ward Martin,

M.A., Ed. Psychology and Counseling, '71, J.D., Law, '91, was the first and, to this date, only female warden of a men's prison in Kentucky. During her three-

and-one-half-year tenure as head of the Frankfort prison, the institution was accredited by the American Correctional Association, achieving the highest rating any Kentucky prison has earned. Martin has also served as deputy commissioner of

the Kentucky Department of Corrections. Recently, she returned to UK, earning a law degree. She says that because so many of the prisoners she has worked with were victims of abuse as children, she wants to get into child abuse prevention work to try to address the problem at the front end, rather than after they have become criminals. A native of Paducah, Martin received a Sallie Bingham Scholarship to attend law school. All three of Martin's children have degrees from the University of Kentucky too.

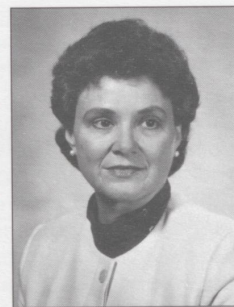
Virginia Bosomworth Otter,

M.A., Patterson School of Diplomacy and International Commerce, '83, is rising quickly in the banking world, as well as



Virginia Bosomworth Otter says her numerous volunteer activities require the same skills she uses in her career. Between

1991 and 1992, Otter was named as an outstanding leader by three organizations in two cities.



Patricia Ward Martin followed her term as the first and, to date, only female warden of a Kentucky prison by earning a law degree at UK in 1991.

HONORABLE MENTION

being an active civic leader, wife and mother. Currently a corporate re-engineering project leader at National City Corporation, she previously held key positions at First National Bank of Louisville and Commerce National Bank of Lexington. In April of 1992, Otter was named Kentucky Jaycee's Outstanding Young Leader; the year before, she was honored as the YWCA's Volunteer of the Year and the Lexington Jaycees Outstanding Young Leader.

Jay Mullen,

M.A., Ph.D., History, '71, resides in his home state of Oregon and is an assistant professor at Southern Oregon State in Ashland. Among his career highlights, he includes his tenure as coach of the Uganda national basketball team during the 1972-73 season, including the '72 Pan African Games. He is also a published poet with "Three Pond River Poems" appearing in the winter 1993 edition of the *Pacific Review*.

Patrick M. Henderson,

M.A., Agricultural Education, '72, counts his success in teaching by the wide range of his accomplished students. He notes that the program he developed for the Breckinridge County Board of Education was named one of the six national winners in the National Vocational Agricultural Technology competition for outstanding programs and the only program in Kentucky to be so named. As a UK graduate student, Henderson studied agricultural economics under Professor Milton Shuffett, doing research on the impact of tobacco leasing on Kentucky farmers.

Sharon Robinson,

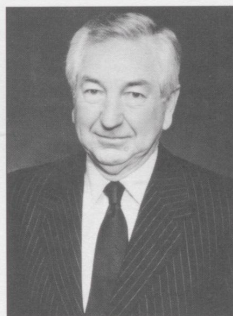
Ed.D., Administration & Supervision, '79, is the director of the National Center for Innovation of the National Education Association. One of her UK professors, Connie Bridge, says Robinson is having a profound influence on school restructuring and the professionalization of teaching.

Paul R. Wagner,

M.A., Communications, '72, won the Academy Award for Best Short Documentary in 1985. Now residing in Charlottesville, Virginia, the Louisville native is a documentary film producer and director. He is currently filming a drama titled "Congress of Wonders" in Kentucky and completing a film titled "Out of Ireland" for PBS. As a UK graduate student, Wagner worked with Professors Leonard Tipton and Lewis Donohew on their research projects.

Joseph A. Boyd,

M.S.E.E., Electrical Engineering, '49, went on from UK to doctoral studies at the University of Michigan, receiving his Ph.D. in 1954. Boyd was elected president of Harris-Intertype Corporation (later known as Harris Corporation) in 1972 and chief executive officer and chairman of the board in 1978. During Boyd's leadership of Harris, the company's annual sales figures grew from \$371 million to \$2.1 billion. Now retired as CEO from Harris, he continues to serve as director and chairman of the executive committee for the company and also as chairman and CEO of Fairchild Space and Defense Corporation in Germantown, Maryland.



Joseph Boyd's retirement as CEO from Harris Corporation was followed by his appointment as CEO of Fairchild Space and Defense Corporation in Germantown, Maryland.

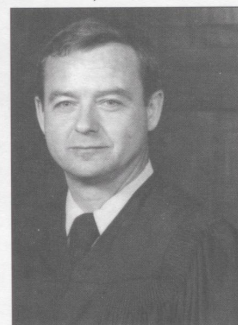
During Boyd's leadership of Harris, the company's annual sales figures grew from \$371 million to \$2.1 billion. Now retired as CEO from Harris, he continues to serve as director and chairman of the executive committee for the company and also as chairman and CEO of Fairchild Space and Defense Corporation in Germantown, Maryland. A resident of Indialantic, Florida, Boyd is a 1993 inductee into the UK College of Engineering Hall of Distinction.

Brenda Lea Hosley,

M.S.N., Mental Health Nursing, '90, is a faculty member of the UK Division of Psychiatric/Mental Health Nursing and was recently selected as a recipient of the YWCA Black Achiever's Award for her work with African-American youth in the Lexington area. One example of her work with and commitment to African American youth is her involvement in the UK Minority College Awareness Program.

John W. Richardson,

J.D., Law, '68, resides in Scottsdale, Arizona, where he serves as a United States immigration judge. Originally from Berea, Richardson served 21 years with the U.S. Army Judge Advocate General's Corps and was director of Senate Affairs for the Secretary of Defense. He retired in 1990 as a colonel and was then appointed to his present position.



Judge John Richardson served as legislative counsel to the Secretary of the Army before his retirement as a colonel and subsequent appointment as a U.S. immigration judge.

Tom Logsdon,

M.S., Mathematics, '62, is a senior member of Rockwell International's technical staff. A resident of Seal Beach, California, the Springfield, Kentucky native helped engineer the Apollo moon flights, Project Skylab, The Echo Balloon and the Novstar Global Positioning System. In June of this year he will be presenting a special short course at Oxford University in England.

continued on page 22

HONORABLE MENTION

C. Shannon Stokes,

Ph.D., Sociology, '70, heads the Department of Agricultural Economics and Rural Sociology at Pennsylvania State University. As a UK graduate student he was an N.D.E.A. Fellow and worked with Professor Thomas R. Ford, sociology, on a U.S. Office of Economic Opportunity research project. Stokes was a visiting professor to National Taiwan University in the early '80s and is currently president-elect of the Rural Sociological Society.

Marianne G. Bange,

M.A., Communications, '72, is a partner in Hygeia Marketing Association in West Caldwell, New Jersey. Earlier in her career she was Product Director for Hoffmann-La Roche at the company headquarters in Basel, Switzerland. In 1987 she co-founded Hygeia Marketing, a health-care marketing research and consulting firm. She reports that the firm has recently opened its first branch office in New Orleans, Louisiana.

Stephen E. Fritz,

Ph.D., History, '72, is president of Hiwassee College in Madisonville, Tennessee. Formerly, Fritz was vice president and acting president of North Carolina Wesleyan College, and from 1970-1984 he was vice president for academic affairs at Pikeville College in Kentucky. Among his career achievements, he cites the establishment of the art gallery at Pikeville College and his leadership in the creation of College Press, the honors program, an art collection, and a radio station at N.C. Wesleyan.

Helen Chamberlin Humphrey,

M.S., Library Science, '65, set up the first library at Westside Elementary School in Harrison County, Kentucky. Now retired and residing in Cynthiana, Humphrey served as head librarian at Westside for 17 years.

Luther Stripling,

M.Mus., Music, '66, a baritone, has won awards for his performances from the John Hay Whitney Foundation, the American Opera Association, and the Metropolitan Opera Association. He has performed in a number of operas around the country and has made appearances with the Atlanta Pops Orchestra, the Atlanta Symphony, the Lexington Philharmonic, and the Minnesota Orchestra. He names Donald Ivey as one of the outstanding professors he had at UK. Stripling is a professor of music at Tarrant County Junior College in Hurst, Texas. He resides in Euless, Texas.



Music professor and vocalist Luther Stripling signs programs for members of the audience following a recent performance.

Rowena Holliday Boehling,

M.A., Classics, recalls UK's Professor Wilbur L. Carr as her greatest teacher and says she is very thankful that she "attended UK and had the wonderful opportunity of being one of his last students before he retired." Early in her career she taught at Bryan Station Senior and Junior High and at the Lexington School before returning to Roanoke, Virginia, where she has taught Latin for the past 20 years. As a graduate student at UK, Boehling was a Fulbright grant recipient and studied at the American Academy of Rome and the Vergilian School in Naples.

Jerry L. Franz,

M.D., Medicine, '71, established the pediatric heart surgery program at Southwest Texas Methodist Hospital, an open-heart surgery program at Nix Hospital in San Antonio, and a cardiac program at Bristol Regional Medical Center in Bristol, Texas. Originally from Indiana, Franz now resides in Bowling Green, Kentucky, where he is a cardiovascular and thoracic surgeon at Greenview Hospital.

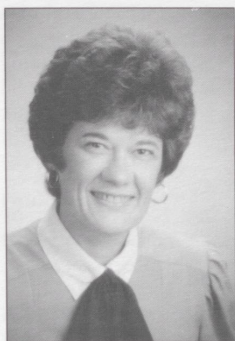
Charles N. Vittitoe,

Ph.D., Physics, '63, received Southern Fellowships Fund support while a graduate student in physics and worked on a high-energy physics research project, sponsored by the National Science Foundation, under Professor Vincent Paul Kenney. Vittitoe is now a Distinguished Member of the technical staff of Sandia National Laboratories in Albuquerque, New Mexico. Due to his research, an incident in Hawaii—the most widely quoted observed damage from a high-altitude nuclear explosion on the island of Oahu—was explained. The brilliant flash turned Hawaii's night into day, with the "spectacular pyrotechnic aftermath" lasting for seven minutes. After 27 years of questions concerning the phenomenon, Vittitoe's analysis established that it was caused by high-altitude electromagnetic pulse (EMP) as well as other forms of EMP.

D. Cheryl Phipps,

Ed.D., Rehabilitation Counseling, '69, is superintendent of the Licking County Board of Mental Retardation and Developmental Disabilities in Newark, Ohio. The Hopkinsville native has held this position since 1984 and has been president of the Ohio Superintendents of County Boards since 1991. Professional honors she has received include being named the YWCA Woman of Achievement.

HONORABLE MENTION



Cheryl Phipps says her most significant current endeavor is working with private industry to bring the concept of Total Quality Management to her agency and to the Licking County community in Ohio.

Bernard M. Jones,

Ph.D., Animal Science, '65, now resides in Reno, Nevada, where he is dean and director of the College of Agriculture at the University of Nevada, Reno. He has had 25 years' experience as a department head, dean, director, or vice president. While a graduate student at UK, the Princeton, Kentucky native worked on several research projects in beef cattle nutrition with Professor Neil Bradley in the Department of Animal Science.

Claudia S. Vester-Hawthorne,

M.A., French Language and Literature, '71, is a major in the United States Army. Now serving as adjutant in Fort Indiantown Gap, Annville, Pennsylvania, Vester-Hawthorne translated news articles from the French language press

ment recipient for Licking County in 1992 and being named Member of the Year in 1988 by the Professional Association for Retardation in Ohio.

while assigned to the News Analysis Branch of the Supreme Headquarters Allied Powers Europe for the Supreme Allied Commander Europe. Her assignments have included serving as an assistant professor of French at West Point and as executive officer for the Public Information Office in Belgium. Vester-Hawthorne will retire this spring after completing 20 years of military service.

C. Brent Vinson,

M.S., Chemical Engineering, '71, worked as a graduate student with Professor Richard Kermode in chemical engineering. Now director of marketing for Hunt-Wesson Foods in Fullerton, California, the Louisville native cites one of his major career achievements as having demonstrated that technical people can run major corporations.

Bernard L. Madison,

M.S., Ph.D., Mathematics, '66, is now dean of the Fulbright College of Arts and Sciences at the University of Arkansas. Originally from Rocky Hill, Kentucky, Madison recalls working as a graduate student on a research project at UK on geometric implications of topological algebra structures with Professor John Selden. One of Madison's major undertakings has been the initiating, directing and concluding of a project involving a national assessment of collegiate mathematics at the National Research Council.

David S. Frost,

M.D., Medicine, '71, completed both undergraduate and graduate degrees at the University of Kentucky. Frost now is a rear admiral in the U.S. Navy, responsible for all of the military health care throughout the Pacific. As U.S. Commander-in-Chief for the Pacific Command, Frost is responsible for an area of about 105 million square miles with just under a million patients, including active duty, dependents and retirees of the



military. Originally from West Virginia, Frost is now stationed in Honolulu.

Rear Admiral David Frost is responsible for the military health care of an area that covers about 52 percent of the earth's surface or about 105 million square miles.

William A. Abell, Jr.,

M.S., Mechanical Engineering, '67, is responsible for the development of the keyboard used on all IBM personal computers (PCs) and which has been copied by the entire PC industry. Serving as manager of developmental engineering for Lexmark International, Inc. in Lexington, Abell resides in Wilmore and is originally from Lebanon, Kentucky.

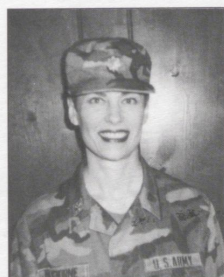
Alice Krekel Kruegel,

Ph.D., Chemistry, '72, heads the largest drug laboratory in the U.S., and probably the largest one in the world. As director of the North East Regional Laboratory, Drug Enforcement Administration in New York City, the Louisville native directs 35 chemists and 15 support staff. As a graduate student at UK, Kruegel worked with Professor Ellis B. Brown on a research project studying the relationship between the structure of organic compounds and their carcinogenic effects.

Jeffrey P. Okeson,

D.M.D., Dentistry, '72, worked as a graduate student at UK with Professor Charles Ellinger on a project that evaluated the success of two different denture construction techniques in patients. After graduation from UK, Okeson served with the U.S. Public Health Service in Phoenix, Arizona. He joined the faculty at UK in 1974 and since then has established the Orofacial Pain Center in the

Major Claudia Vester-Hawthorne will retire this year from the U.S. Army after completing 20 years of military service.



continued on page 24

HONORABLE MENTION

College of Dentistry. As a faculty member, he has also published a textbook, now in its third edition, which is used in two-thirds of the dental schools in the U.S. as well as having been translated into six languages.

Mary Cecile W. Garmon,

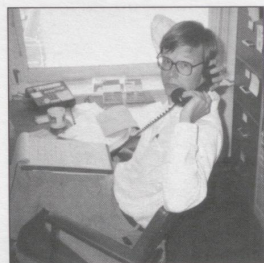
M.A., Spanish, '65, continued her studies after UK, eventually receiving a Ph.D. from Vanderbilt University in 1984. Now as assistant vice president for finance and administration at Western Kentucky University, she is the highest-ranking woman at the institution. She says that she had no formal training in finance or accounting and credits her success to "much hard work and good people to work with."

Peggy A. Stock

(formerly Leiterman), M.A., Ed.D., Education, '69, was appointed president of Colby-Sawyer College in New London, New Hampshire in 1986. Co-educational since 1990, Colby-Sawyer is the oldest women's college in New Hampshire. Before going to Colby-Sawyer, originally as special assistant to the president from 1979-80, Stock was assistant dean for student affairs at Montana State University and president of Midwest Institute for Training and Education in Cincinnati, Ohio.

Stephen B. Bright,

J.D., Law, '75, is described by one of his former UK professors, Todd B. Eberle,



as "a brilliant individual, articulate and inspiring." Bright has been serv-

ing for 11 years as executive director of the Southern Center for Human Rights in Atlanta. An article in the American Bar Association journal says, "In a time when American lawyers enjoy unprecedented prosperity and prestige, Steve chooses to earn an annual salary of \$20,000, taking on exhausting, often heartbreaking, cases that no other lawyers are willing or able to handle." The center that Bright heads represents persons facing the death penalty and prisoners challenging unconstitutional conditions in prisons and jails throughout the South. During this spring semester, Bright has been teaching a course on capital punishment at Yale University as a J. Skelly Wright Fellow in public interest law.

Roland Ficken,

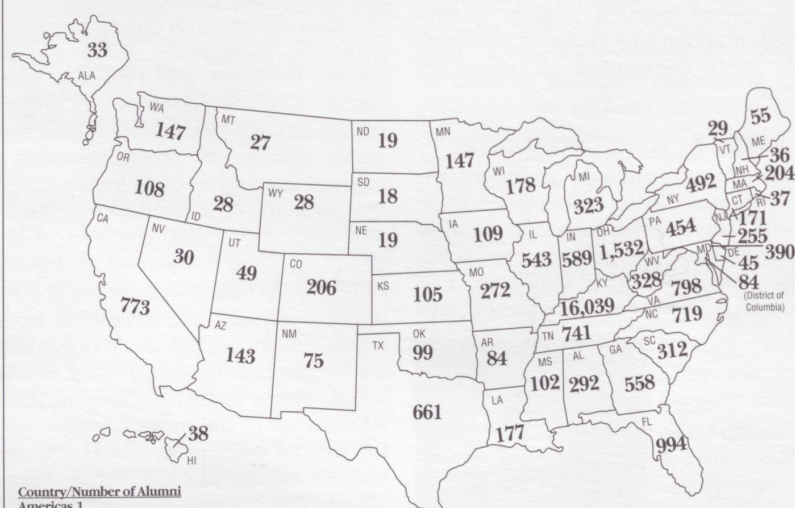
Ph.D., Medical Education, '73, is dean of the University of Alabama's College of Community Health Science in Tuscaloosa, a college which provides medical training for third- and fourth-

year medical students, interns and residents. Before his new appointment as dean in 1991, Ficken was the founding chair of the Department of Behavioral Sciences at UA and later an associate dean.

Melanie Sovine,

Ph.D., Anthropology, '82, is described by UK professor Susan Abbott-Jamieson as "a dynamic person who prefers the sometimes rough-and-tumble action of the development and improvement of politically complicated, socially important community health programs to the more sedate existence of the traditional academic." Sovine has headed the Travelers & Immigrants Aid office in Chicago, Illinois as chief operating officer since 1992. With a staff of 250 and a \$12 million budget, she is responsible for program operations in five areas—primary and mental health care, homeless adult and family services, residential programs, immigrant legalization and political asylum and adult literacy.

Distribution of Alumni with Graduate Degrees by State and Country



Country/Number of Alumni

Americas 1	Canada 18	Indonesia 7	Norway 1	Switzerland 4
Arab Emirates 13	China 3	Iran 3	Panama 1	Thailand 3
Argentina 1	Cyprus 2	Iraq 1	Portugal 1	Turkey 1
Australia 6	Egypt 1	Italy 3	Puerto Rico 16	Taiwan 2
Bahamas 1	England 7	Jamaica 1	Saudi Arabia 1	United States 29,695
Bangladesh 1	France 1	Malaysia 4	Singapore 2	Venezuela 1
Belgium 3	Germany 4	Mexico 1	South Africa 1	Virgin Islands 3
Bermuda 1	Greece 1	Nicaragua 1	South Korea 1	West Africa 1
Bolivia 1	Guam 1		Spain 1	
Brazil 2	India 8	Nigeria 2		

TOTAL 29,930

Information for *Odyssey Magazine*

Outstanding Accomplishments of our Graduate School Alumni

Please type or print

Your Name: _____

If your name was different at the time of your graduation, please indicate that name as well: _____

Address: _____

Phone: [Office] _____ [Home] _____

Hometown: _____

Undergraduate Degree and Year Conferred: _____

Name of Institution Granting Your **Undergraduate** Degree: _____

Year Your UK **Graduate** Degree Awarded: _____

Degree: _____ UK College: _____

UK Department: _____

Additional Graduate Degrees

Degree: _____ Institution: _____

Year Awarded: _____

Degree: _____ Institution: _____

Year Awarded: _____

Professional Experience

Current Position: _____

Name of Company/Institution: _____

Location: _____

Career Highlights: _____

UK Background

Were you a fellowship or scholarship recipient while at UK? ☐ Yes ☐ No

If yes, please indicate the name of the fellowship or scholarship: _____

Were you involved in working on any faculty research projects during your graduate years at UK? ☐ Yes ☐ No

If yes, please complete the following:

Name of faculty member(s) with whom you worked: _____

Department: _____

Brief description of project: _____

Agency, if any, that funded the research: _____

(include additional pages if needed)

-over-

What do you consider your most significant career achievement to date?:
(include additional pages if needed) _____

Any other information you would like us to have: _____

Current Date: _____ Your Signature: _____

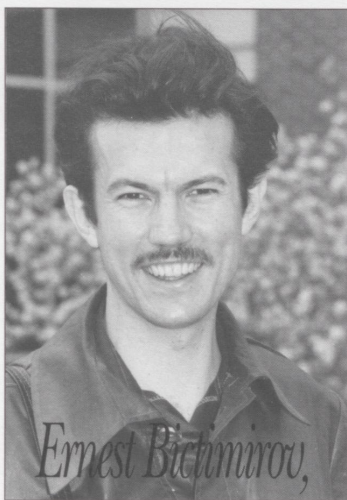
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BRAVO!

Stellar Students Choose UK



a Benjamin Franklin Fellow, was surprised that UK students can choose the classes they want to attend.

How many UK students can rightfully claim to have patented an invention? Ernest Bictimirov can. Bictimirov, from the Republic of Uzbekistan in the former Soviet Union, is now the author of eight patents.

"I just got a letter last month from my brother, who told me I had been awarded an eighth patent," says Bictimirov in his hesitant but fluent English. "All eight have to do with communications systems or digital image processing." Currently a new MBA student in UK's College of Business and Economics, Bictimirov is a graduate of the Tashkent Institute of Technical Creative Work and Patenting.

Bictimirov came to the United States in the fall of 1992 as a Benjamin Franklin Fellow, one of 160 students at the graduate level chosen from an initial pool of over 2,000 applicants. The Benjamin Franklin Fellowship

provides graduate education in the fields of business, economics, public administration and law to qualified citizens of the former Soviet Union. Bictimirov is the only Fellow who was sent to UK.

"I'm interested in the field of business, and Uzbekistan really doesn't have a good business school yet," Bictimirov says. "American business schools may be the best in world, especially to study business administration." Bictimirov plans to earn an MBA degree by the end of 1994, and though his plans beyond that aren't certain, he will probably "go back to use the knowledge I receive here to open a private enterprise in Uzbekistan. It's possible to do that now, and I'm excited by the opportunity."

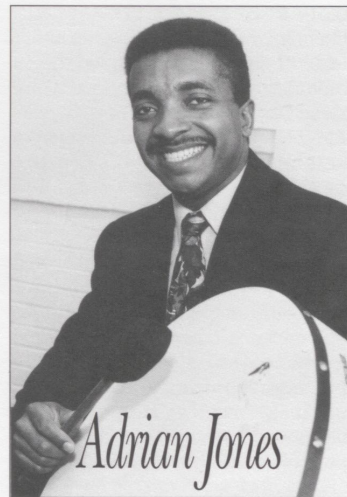
Bictimirov admits to some surprises since landing in Lexington and enrolling at UK. "The biggest surprise came at registration when I found out students can choose the classes they want to attend. At universities back home, you just can't choose like that." He was even more taken aback when he started discussing course grades with other students. "At schools in Uzbekistan everyone's grades are published—everyone knows who the top students are. Here at UK, I started wondering, 'If I have difficulty in a certain course, how will I know who to go to for help?'"

Bictimirov says that although he has been made to feel very comfortable at the university, he is constantly amazed by how few students here have ever heard of his country. "American students don't know very much about other countries, especially the former Soviet Union," he says. "Even though Uzbekistan is one of the biggest Republics, no one has heard of it." Bictimirov pauses, then laughs. "Of course, I must admit I'd never heard of Lexington

before I came here either."

In addition to working toward patenting other inventions in his "spare time," Bictimirov enjoys writing aphorisms, several of which have recently been published in his hometown newspaper. Asked to recite one, he explains that "they don't really translate very well."

Inventions? Aphorisms? Benjamin Franklin would be proud.



is a Phi Beta Kappa with a dual bachelor's degree in music management and Spanish.

"One thing I love about it is its infinite variety," Adrian Jones says, explaining what drew him to study percussion and to work toward a master's degree in music performance at UK. "Once you learn the instruments of one culture," says Jones, whose performance instruments include the xylophone, tympani and drums, "you find an entirely different set of instruments in another. In one region of Africa, there may be 200 to

continued on page 28

300 societies, each with their own instruments."

Jones, 30, came to UK after hearing that music professor James Campbell was starting a percussion program here. "I wanted to be involved with a developing program rather than go someplace where everything was already set in concrete," Jones says.

He has no regrets. "UK is becoming one of the top percussion schools in the country because of the variety of artists coming through here each year," he says. In the past year, top percussionists performing here have included Steve Houghton, the Canadian group Nexus, the Taiwanese group Ju, and Louie Bellson, one of the most influential and most recorded drummers in history.

A Phi Beta Kappa with a 1986 dual bachelor's degree in music management and Spanish from the University of Evansville, Jones also earned a bachelor's degree in music from UK in 1990. In 1989 he founded the 30-member UK Percussion Society and served as its president for two years. The society, which promotes awareness of percussion through performances and clinics, was recognized as the best student organization on campus its first year.

The immediate success of this organization didn't surprise James Campbell in the least. "Adrian defines what it means to be a student leader," says Campbell, an associate professor of music and acting director of the UK band. "He's the first to volunteer and the last to leave a project. Adrian's a great organizer and has the vision and patience to see projects through."

Campbell says that Jones is also an outstanding musician. "He plays so many instruments well," Campbell says, "and his hard work has prepared him well to teach. Adrian could walk into a teaching position right now and be fully prepared. He excels at everything he does."

Is a teaching position in Jones's future? "My goals," he says, "are to become a percussion scholar, teach at the university level, and perform—in that order."



Vicki Hines-Martin, whose Ph.D. work focuses on African-American health care, says she's anxious to give back to her community a little bit of her good fortune.

Vicki Hines-Martin is finding that academic life at UK is better the second time around.

"I started as a freshman at UK in 1969," Hines-Martin recalls, "and discovered I just wasn't ready for college—I couldn't handle it." Feeling isolated was one problem. Hines-Martin says that there "weren't many other blacks on campus then, but the university culture and climate have changed."

She also says that her earlier false start has "worked to my benefit." After leaving the University of Kentucky, Hines-Martin went home to Louisville, where she enrolled at nearby Spalding College, earning a bachelor's degree in nursing and a master's in education. Her intense interest in mental health as it relates to physical health then led her to the University of Cincinnati, where she received another master's degree, this time in psychiatric nursing. Now a Ph.D. candidate in nursing at UK, Hines-Martin jokingly describes herself as a "very old student." Her qualifying exams successfully behind her, she is now completing her dissertation, a project she terms "seriously fun work."

"I entered the Ph.D. program in nursing here because it had a solid reputation, it was within my geographic area (she still makes her home in

Louisville), and it offered the degree I was interested in. What I've enjoyed most is being able to go into depth in the area I'm most interested in, which for me is African-American health care. There's really not a lot of research on that out there."

A recent research proposal of Hines-Martin's, titled "African-American Caregivers and the Chronic Mentally Ill," won an American Nurses' Foundation (ANF) award, a national competition for funding of graduate students in nursing. In this year's competition, 96 proposals were submitted and only 25 funded. Hines-Martin received the maximum amount of funding, \$2,700, for a one-year period.

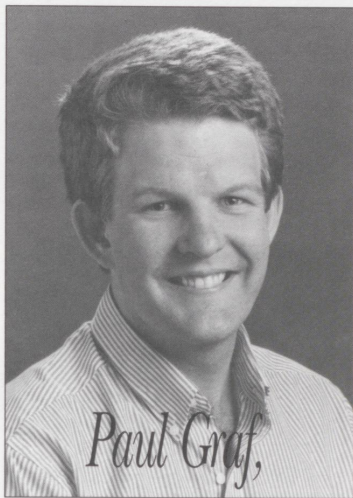
So what is waiting on the horizon for Hines-Martin? What plans does this soon-to-be doctor of nursing have—another Ph.D., perhaps?

"No, no!" she says. "I love teaching, so I hope to do that, along with clinical research and work in the community. I'm very interested in giving back to the community a little bit of the good fortune I've had."

Whatever path Hines-Martin takes, nursing professor Gretchen LaGodna believes she will be a success. "One of the things that's wonderful about Vicki, that's really unique, is the integration of her research, clinical practice, teaching, and her sense of social and civic responsibility," says LaGodna, Hines-Martin's advisor and one of her professors. "And her involvement in community affairs pulls it all together in a very real way."

Electrical engineer Paul Graf's curiosity about how business managers make decisions led him to switch circuits into the field of business administration. The son of an electrical design draftsman, Graf has a bachelor's and a master's degree in electrical engineering from the University of Louisville, where he earned high honors in both programs.

"The jobs I've had have basically been pretty technical," Graf says. "I became more and more interested about how people in the management chain make their decisions—how they motivate their employees and so forth." Graf, who is currently "about halfway



who has two degrees in electrical engineering, is currently in UK's MBA program as a Blazer/Massie Ashland Oil Scholar.

through" UK's MBA program, is a Blazer/Massie Ashland Oil Scholar.

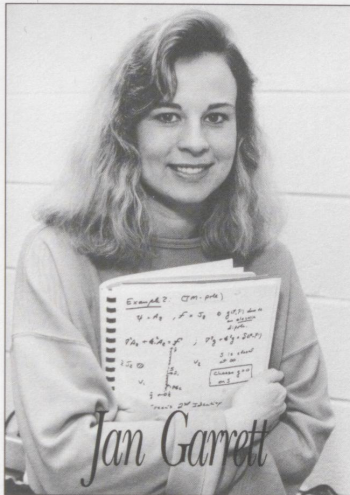
Graf moved from Louisville to Lexington in 1985 and since that time has worked at IBM and LexMark in Lexington, where he is involved in the design, test and manufacture of analog and digital electronic circuits. Still a part-time employee there, he was one of a group of IBM engineers who invented what is now a U.S.-patented DC-to-DC converter, a device that converts DC power to a more easily controlled form of DC power for use with computers.

Off-campus Graf is associate director of the Bluegrass Council of the National Association of Investment Clubs and acting vice president of the University of Louisville Alumni Association in Lexington. Though he is a basketball fan, he admits he "can't get enough softball"; Graf has been known to play in two or three softball leagues during the same season.

"One thing I enjoy about my studies now," Graf says, "is that I'm a lot more in touch with people. It seems to me the best business administrators have good analytical minds and strong backgrounds in the liberal arts."

Graf's long-term goal is to be in an executive position in the electrical

engineering field, preferably in the Bluegrass region so that he and his wife Paula, an accountant, can stay near their families in Louisville.



says that when she first began working in the Ph.D. program in electromagnetic compatibility at UK, her learning curve went straight up.

For Jan Garrett, the initial spark of interest that led her to a career in electrical engineering came from an assignment in a high school English class. "This was Honors English," Garrett recalls, "and we had to pick some topic to write about in depth. Partly because my dad is an electrical engineer, I did my paper on laser reflectivity of different materials that are put on missiles and planes." In working with several electrical engineers on this project, Garrett says she became "absolutely intrigued by the field."

She earned a B.S. (from the University of Florida) and an M.S. degree (from Purdue University) in electrical engineering before going to work in 1989 at IBM in Rochester, Minnesota. It was here at IBM that UK's Clayton Paul and Garrett crossed paths.

"I was giving a course on electromagnetic compatibility (EMC) to her group," says Paul, a professor of electrical engineering. "After the course,

we discussed the possibility of her studying with me here at UK; so I suppose you could say I recruited her." EMC concerns the design of digital systems so that they will not cause interference with other electronic systems and will comply with governmental regulations on electromagnetic emissions.

"Dr. Paul is known throughout the world for EMC work," Garrett says. "Lots of schools have an electromagnetics program, but UK is the only university where you can study electromagnetic compatibility. After talking with Dr. Paul in Rochester, I called him up and said, 'Are you interested in having a graduate student?' He said, 'yes.'"

Garrett is currently enrolled in the Ph.D. program and has been selected by IBM to receive a Resident Study Fellowship. This fellowship provides all expenses paid for two years' study and, Paul says, is a "prestigious award, demonstrating the importance of EMC to IBM."

In talking about her work so far at UK, Garrett is effusive. "It's been incredible. When I first got here I felt like my learning curve went straight up in the air. I'd never spent so much time focused on electromagnetics. In just a short time, there's been a dramatic increase in my knowledge."

She credits this gain, in part, to the fact that UK is a smaller university than she has experienced before. "Here [in contrast to the University of Florida and Purdue], you get a lot more time with your professors—a lot of one-on-one time. That's particularly important at the graduate level, I think, because I'm here for intensive research work."

"I love learning," she adds, "and I couldn't be doing this anywhere else."

KIOSK

Students Create Visual History of WWI

How often do college students share their research papers with family and friends? Probably rarely, if ever. But a group of UK history majors are showing off their research project with pride this spring. It's a unique visual history of UK during World War I—a video production called “Wildcats at War.”

“The whole purpose was to look at a different dimension of history, to deal with visual history,” says UK history professor Raymond F. Betts. The video was a project for Betts’ course in historical research and methodology.

The ambitious undertaking—a first for the teacher as well as his students—was an exciting venture into collaborative learning. Inspired in



A video focusing on UK during World War I was created by (left to right) Brian Barker, Charles Koch, Michelle Peck Williams, Shay Emmons, and (not pictured) Chris Clay and David King.

part by the senior thesis written by a recent Gaines Fellow on UK and WWI, the video will now be refined and used in Betts’ freshman history classes. Copies will also be provided for UK alumni and the M.I. King Library.

Senior Michelle Peck Williams, of Bybee, and Shay Emmons Jr., a junior from Georgetown, were part of the team that researched, wrote and filmed the 10-minute video last fall. Other students involved in the project were Brian Barker, Charles Koch, David King and Chris Clay.

The group found some surprises as they perused reams of material for the film. “I was surprised at some of the classes,” says Michelle.

“Automechanics and horseshoeing were taught as one class. But even more startling was how much the military took over UK.”

“We all saw how, in very short order, the campus could be changed to a military unit,” says Shay.

Male students who weren’t in the service had to lead a spartan lifestyle alongside recruits, and most classes were canceled as UK became a military training center. Many young men simply went home to help their parents harvest crops.

Assembling the nearly 100 photographs and drawings from UK’s large pictorial collection of WWI was often a daunting task for the research team. Two small booklets produced by the university as keepsakes for students who became soldiers—“Over Here” and “Going Forward”—supplied many of the images. Students also used old editions of *The Kernel*, along with yearbooks and other historical books and photographs from UK’s special collections.

The students managed to turn up many jewels of life on campus during the WWI era: photos of young women in home economics classes

holding up a flag they made with 500 hand-stitched stars, each representing a UK student at war; soldiers pushing a truck out of a mudhole; recruits picnicking with friends on the campus grounds.

For the students and future audiences of the video, this visual evidence of the past “enriches and embellishes history, creating a new dimension,” says Betts.

A photo of a young man flashed on the screen, UK’s first casualty of WWI, was much more striking than merely reading his name, says Shay. “When you can see his face and how he looks a lot like the rest of us, it’s more meaningful,” he says.

Students are used to working with the verbal approach to history, but much of historical evidence is visual, Betts says. “That’s especially the case when you get into the 19th and 20th centuries with the printing press, the camera, television, and computer graphics,” he says. “The extent of the material has increased and the role of the material in forming our cultural values, habits and perceptions has intensified. So any student of contemporary history has to have a good eye.”

—Sharon Reynolds

Trading Places: UK-Vladimir Exchange Program

Kathryn McNiel will always remember waiting in line for an hour to buy flour in a Russian store.

Alexander Sokhin will never forget the sophisticated computer labs he found in America.

McNiel, a Russian studies and linguistics major at UK, and Sokhin,

KIOSK

a computer science major at Vladimir Polytechnic Institute in Russia, traded worlds by taking part in their schools' exchange program. McNiel spent the fall 1992 semester in Vladimir; Sokhin spent the entire 1992-93 school year in Lexington.

For McNiel, a 20-year-old Lexington sophomore, it was a chance to practice her Russian and to test herself in a foreign culture. For Sokhin, a 25-year-old engineer who has returned to college for a second degree, it was an opportunity to visit the home state of his American friends and to study computer science in a more technologically advanced setting.

The UK-Vladimir exchange program began in the 1991-92 school year with a \$35,000 grant from the United States Information Agency. The program is continuing with \$30,000 annual grants for 1992-93 and 1993-94.

"There's no doubt we'll be applying for another renewal," says Roger Anderson, chairman of the Russian and Eastern Studies Department and exchange director. "It is one of the really bright stars at UK for internationalization of the campus."

While four or five UK students like McNiel study in Vladimir, an equal number of Vladimir students like Sokhin immerse themselves in American life at the Lexington campus. The Vladimir students prefer to stay an entire school year, an approach two UK students will follow in 1993-94.

The federal grant covers all transportation expenses for the UK and Vladimir students, including trips to Washington, D.C. for the Russians and treks to Moscow, St. Petersburg and other cities for the Americans. The UK students pay their normal tuition and room and board fees, and those who have financial aid



Taking part in the UK-Vladimir exchange program, Kathryn McNiel, from Lexington, and Alexander Sokhin, from Vladimir, traded worlds in 1992.

continue receiving it while abroad.

McNiel already was considering a career as a Russian translator before she visited Russia. Her experience there gave her the confidence that she could be successful in that career and that she could live a few years at a time in Russia if her work required it.

Vladimir devotes one wing of its technical school to students visiting from America and other countries. McNiel and three other UK students took their classes together, studying literature, history and art and music appreciation.

They learned just as much outside the classroom. "In our dorm room," McNiel says laughing, "we had hot water four times the whole semester, from August to December." As it grew colder, McNiel and her friends began visiting Russian friends' homes to bathe in hot water.

Each morning she ate breakfast—usually a hard-boiled egg and a piece of bread—in the dorm dining room. After four hours of class, she and her

friends spent their afternoons doing laundry by hand, spreading plastic bags on the floor to catch the dripping water. They also spent their afternoons shopping for non-dorm food. "You just go from store to store," McNiel says. At night they often had parties, listening to music and sipping Kool-Aid, which they slowly chilled in their iceless refrigerator.

Two-hour trips to Moscow included a stop at McDonald's, Pizza Hut or Baskin-Robbins. "Cheeseburgers and apple pies travel well and are not too bad cold," McNiel says, explaining that the Americans bought extras to take back to their dorm.

McDonald's is popular with Russians on both sides of the fast-food counter, McNiel explains. "A job there at McDonald's is prestigious because the pay is good."

She was impressed with the country's public transportation system ("It's crowded but efficient") but saddened by the prejudice she found. "The Russians have stereotypes against minority and ethnic groups," McNiel says. "We had students from the Middle East and Africa in our dorm, but the Russians didn't want to talk to them."

Another discovery: "The people are very poor, but they know how to survive," McNiel says. That skill will be important as the former Soviet Union tries to move ahead. "Some things are the same, but a lot is unsettled," McNiel says. "In the old system you were guaranteed a job. Now no one really knows what their future is."

Exchange student Sokhin shares in this uncertainty, saying that one disadvantage of his American visit was the difficulty of keeping up with the news back home. "There are many changes in Russia now," he

continued on page 32

says. "I worry about that. I have gotten some letters from my Russian friends and I'm glad that everything is OK in my university."

Sokhin, an electrical engineer, balanced his computer classes at UK with English composition, American history and intermediate karate. He enjoyed parties and trips with American friends, including snow skiing in Indiana and visiting Washington, D.C.

When he goes home, Sokhin will tell his friends and relatives that they have at least one misconception about Americans. "Most people in Russia think Americans have everything and do nothing. I understand here if you want something you have to work. Nothing will come without any work."

During his trip to Washington, D.C., Sokhin found many contrasts to Lexington. "We saw people there who don't have homes," he says. "You would walk on one street and everything was fine. Then you turn the corner and see these people."

Although he enjoyed his visit to the American capital, Sokhin preferred Central Kentucky. "I like Lexington more," he says. "It reminds me of my town. It's the same size. It's a university town, the same like my town."

—Connie Holman

UK Sociologist Wins National Award for Book on KKK Women

"One of the rewarding things about doing research is how it can continually surprise you."

Kathleen Blee, an associate professor of sociology at UK, makes this observation in the context of having recently published *Women of the Klan: Racism and Gender in the 1920s*, which has been named an

"Outstanding Book on the Subject of Human Rights in the United States." The award was announced in January by the Gustavas Myers Center for the Study of Human Rights, which offers annual awards for scholarship on the subject of intolerance in the U.S.

Blee says she is pleased by the recent fanfare surrounding the book, which was also nominated for a Pulitzer Prize in 1992, but explains that she "stumbled onto this topic by pure accident."

"About eight years ago, I was doing work in the New York Public Library on women in left-wing movements, and I came across a brochure put out by The Women's Klan in the 1920s. That sparked my curiosity, so I started digging. I wanted to know why women joined, how many members there were, what their effect was on the history of the times."

Blee says that though it was no secret that women were part of the Klan, historians had previously assumed they functioned as an auxiliary organization, "serving hot dogs and lemonade at meetings, and so forth." What Blee discovered, in this first in-depth study of the role of women in the Ku Klux Klan during the first part of this century, is that far from being a support group, the Women's Klan was a separate organization and, in fact, sometimes found itself in contention with the male Klan.

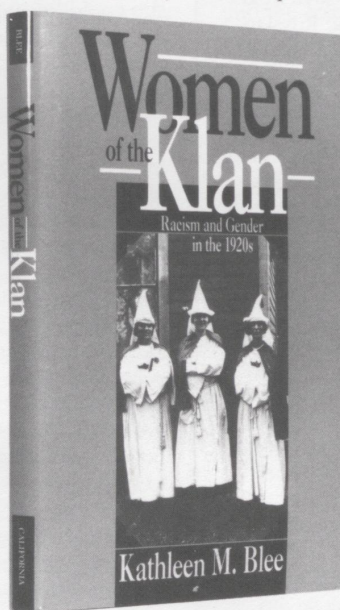
"They had the

same racist, anti-Catholic views as the men but were quite supportive of women's rights, unlike the men of the Klan." Blee says that one of the most surprising findings in her research was that women in the Klan drew heavily from women's suffrage organizations. "A large number of women were involved in the suffrage movement primarily because they wanted to counteract the fact that African-American men now had the vote," Blee explains. "They joined suffrage for racist reasons, not for reasons of equality." Blee adds that this also shows how movements can be progressive and reactionary at the same time.

Another surprising finding, says Blee, who has been a UK faculty member since 1981, was the size of the women's Klan. Its ranks swelled to several hundred thousand in the 1920s, making it one of largest women's political groups in this century. The group wielded significant power, especially in states such

as Indiana and Oklahoma where the Klan was firmly planted. Klan women in these states were active in organizing boycotts against black, Catholic and Jewish-owned businesses.

"What might surprise some readers is that the Klan in the 1920s appealed to very ordinary people in very ordinary places—solid, God-fearing, middle-class citizens. The idea that racism can take hold only among underprivileged, marginalized people just isn't true."



Blee is currently completing another book, this time in collaboration with UK sociologist Dwight Billings. The book's working title is *Families, Farms, and Feuds in the Cumberland Mountains*, and will chronicle the development of poverty and violence in Clay County, Kentucky.

—Jeff Worley

Banking on Tobacco and Thoroughbreds

What's going on in the Bluegrass?

This is what Farm Credit Services of Mid-America, which is in the business of lending money, wanted to know. And Mid-America, which operates in Indiana, Kentucky, Ohio, and Tennessee, recently spent \$29,500 for a Lexington Area Market Study in order to find out.

"The Bluegrass is such an anomaly compared to Farm Credit Service's usual lending opportunities," says David Freshwater, an associate professor of agricultural economics at UK who headed the study. "They needed to figure out recent developments in the burley tobacco market, the thoroughbred industry, and agricultural credit markets in the region.

"We looked at trends in those three areas in the Bluegrass," Freshwater says. "The results were interesting, though there was nothing earth-shattering. Tobacco is still the area's leading crop, for example, but revenue from thoroughbred sales is considerably higher. We found that a lot of banks that had been lending to the thoroughbred industry aren't as interested in lending now because of a decline in the industry."

One facet of the overall study,

Freshwater explains, examined the "inverse relationship" between conditions in the thoroughbred industry and tobacco allotment rental rates. "A big chunk of land in this area is horse pasture," Freshwater says. He explains that when horse prices were high, landowners weren't interested in growing tobacco themselves so the rental price for burley allotments was far lower in the Bluegrass than in other parts of the state. "But as thoroughbred prices tumbled, breeders became less interested in leasing out their tobacco quota, especially since tobacco prices were going up."

One conclusion drawn from the study is that tobacco should remain strong in the Bluegrass region. "Even with major negative impacts (such as tripling the excise tax on cigarettes) on the tobacco industry, tobacco receipts in Central Kentucky will remain a major source of income through the mid-1990s," says Freshwater.

The thoroughbred industry, he says, isn't faring as well. He says that industry problems are most visible in the Bluegrass because of its concentration of breeding establishments, but that the problem is national in scope. "In fact, the Bluegrass may actually be under less pressure because of its status as the dominant center of the industry," Freshwater says. "And Kentucky-bred horses have actually maintained or increased their share of the industry in the last five years."

In his study of the area's agricultural credit markets, Freshwater discovered some major differences between the loan policies of large and small lending institutions. "Larger regional banks, simply because of their size, need to develop standardized procedures, to streamline their operations," says Freshwater, formerly a senior economist for the Joint Economic Committee of Congress in Washing-

ton. "But with a farm loan, every case is unique. As a result, if large national banks dominate the commercial banking system, including in rural areas, they are less likely to pay attention to agriculture. If smaller banks continue to operate in rural areas, they probably will pay more attention to agricultural lending because for them it will be an important market."

Freshwater says UK hopes to persuade Mid-America officials to fund follow-up studies on issues such as managing data. Freshwater characterizes this work as "a nice mutuality of interests that benefits both the university and Mid-America."

—Connie Holman

Listening for Cancer

Ultrasound technology someday might change the way cancer is detected, replacing more costly imaging and perhaps reducing the need for invasive biopsies.

Kevin Donohue, an assistant professor of electrical engineering at UK, is involved in a multifaceted medical ultrasound project with researchers at Drexel University and Thomas Jefferson Hospital, both in Philadelphia. Before coming to UK in 1991, Donohue was a visiting assistant professor at Drexel for three years.

The researchers are focusing on detection of breast, liver and prostate cancer by using ultrasound to note differences in malignant and non-malignant tissues. So far, they have collected ultrasound data on 30 livers, 15 breasts and 18 prostates of patients at Thomas Jefferson Hospital. Their long-range goal is to collect and analyze over 100 cases a year, including those of healthy

continued on page 34

persons.

Medical ultrasound employs frequencies in the range of 20 million cycles per second. Donohue compares the technology to a tuning fork: when the ultrasound hits tissue in the human body, the tissue rings. The varying strengths of echoes are recorded and a computer then reconstructs an image which clinicians can study, looking for possibly cancerous tissue and tumors.

"We're focusing more on the tissue microstructures, how the cells and connective tissue fit together and how malignant cells may disrupt this structure," Donohue says. The research is complicated by the fundamental differences in the tissue structures of the breast, liver and prostate.

"Breast tissue is irregular," Donohue says. "It has ducts, fibers, glands and fats." It also changes monthly.

"Liver tissue is very homogenous with small regular veins," Donohue explains. But liver tissue changes as a person ages. By comparison, the prostate has a more glandular tissue structure and typically contains many benign tumors in older men.

The \$3 million, three-year study will end in August of this year. The research team, including an investigator from Pennsylvania State University, has applied for a \$5 million, five-year grant from the National Institutes of Health. Donohue's work at UK would total \$260,000.

"If we can use ultrasound in cancer detection, the result will be increased cancer screening," Donohue says, noting that breast and prostate cancer are among the leading forms of cancer. "Ultrasound may give us a better view

than X-ray, although right now X-ray is the standard technique."

Replacing X-ray techniques in cancer detection would mean fewer patients being exposed to ionizing radiation, Donohue says. "We'd like to replace biopsies because of their cost and biopsies may cause problems; if there is a malignancy, a biopsy may aggravate it."

—Connie Holman

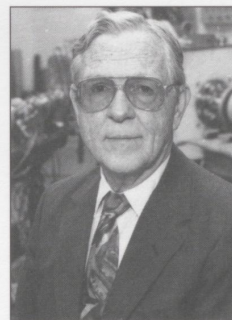
McEllistrem Wins Distinguished Scientist Award

Marcus McEllistrem, professor of physics and astronomy at the University of Kentucky, is the recipient of the 1992 Distinguished College/University Scientist Award, which is given annually by the Kentucky Academy of Science.

"This was a very happy surprise—I feel deeply honored," says McEllistrem, who joined the UK Department of Physics and Astronomy in 1957. "It's especially meaningful because it was a vote from my colleagues."

During his career, McEllistrem has been given many awards and honors by his colleagues: University Research Professor at UK; Distinguished Professor of the College of Arts and Sciences of UK; Program Officer of the National Science Foundation; chair of the UK University Senate; and Fellow of the American Physical Society.

McEllistrem, who is recognized as a world leader in neutron scattering reactions and their interpretation, says that he continues to be excited by the various research projects he's involved in. "When I started doing research, I was working largely with pieces—a piece of this and piece of that. After all this time, I



Marcus McEllistrem joined the UK Department of Physics and Astronomy in 1957.

can begin to synthesize. When I do something new now, I can put it into a context that's much more complete."

In addition to his work in the lab, McEllistrem also teaches graduate students and undergraduates.

"Teaching is an incredible challenge," he says. "It's important to determine the intellectual problem areas for students in past semesters and keep looking for new ways to present those ideas so that they're less of a problem for students now. Teaching is a constant communication challenge."

"The Kentucky Academy of Science is happy to have the opportunity to recognize such a distinguished scientist as Dr. McEllistrem," says Charles Boehms, president of the Academy. "His contributions to the academic and the scientific world bring honor to him, his university and his academy."

"Both as a scientist and as a person Marc has been one of our most distinguished faculty members for a very long time," adds Louis Swift, dean of University Studies at UK. "Behind his good sense of humor lies a deep devotion to the advancement of science and to the welfare of the university as a whole. He richly deserves this award."

UPDATE

The Rodney Dangerfield of Legumes

by Jeff Worley

Increasing Respect for the Humble Soybean

In its many uses, the soybean is like the elusive Waldo in the "Where's Waldo?" puzzles. It appears somewhere in the crowd, but is always tough to spot.

You could look for hours at your local supermarket or hardware store and not find an item with the word soybean listed on the ingredients label, though the oil from this lowly bean is found in a wide array of edible and industrial products—from cooking oil, Hamburger Helper and candy bars to paint, linoleum and rubber fabrics.

You never know where a new usage for the soybean will crop up. One relatively new product is, in fact, right at your fingertips. All of the words, photographs and illustrations in *ODYSSEY* are printed using soy ink, slightly more expensive than petroleum-based ink, but much more environmentally responsible—easier to de-ink for recycling and free from organic compounds that evaporate and pollute the air.

For over 20 years, University of Kentucky researcher Dennis Egli has been working to better understand the soybean—its physiology and its producibility. A professor of agronomy, Egli came to UK in 1969, and his work was



Dennis Egli, whose soybean research was featured in the premier issue of ODYSSEY, says that "maybe the average American family in 10 or 20 years will sit down to dinner and eat soybeans as naturally as they eat lima beans now."

featured in *ODYSSEY*'s premier issue in the spring of 1982. At that time, he was primarily involved with studying different varieties of soybeans, isolating and observing in exhaustive detail the physiological factors that determine seed yield—such things as nitrogen supply, node structure, seed growth characteristics, flower and pod characteristics.

Has Egli's research focus shifted in the past decade?

"I don't think my focus has changed much," he says. "We're still working to try to understand how the plant goes about producing yields so that we can hopefully modify this process to make the plant more efficient." Egli explains it's very important that the soybean farmer become more efficient because there is not only local competition from other crops, but also international competition from other countries producing and exporting soybeans, particularly Brazil and Argentina.

Since 35 to 40 percent of the U.S. soybean crop is exported, primarily as bean which is then processed in the exporting country, it's essential for American farmers to stay competitive.

In Kentucky, soybean farming continues to be lucrative.

continued on page 36

In 1991 soybean production in the state was valued at \$211 million, compared to \$289 million for corn, the top grain crop in the state. For the last quarter of a century in Kentucky, the soybean has been second only to tobacco in delivering dollars to the farmer's pocket.

Egli says that although his primary focus hasn't shifted, with an approximately \$21,000 grant from the Kentucky Soybean Promotion Board he has recently been working on what might be called a spatial crop problem. His most recent project dealt with the spacing of individual soybean plants within rows and between rows in order to see if the yield goes up. Instead of leaving a lot of space between rows, the traditional planting pattern, Egli and several graduate students who worked alongside him on this project tried a different pattern—equidistant spacing of plants.

"We were pleased with the results—the equidistant planting generated higher yields than row planting," Egli says, adding, "but we didn't know why. Why would this different arrangement increase production?"

In examining these more productive plants, Egli found the answer. "Greater yield, we found, is associated with the plant having more nodes (the places on a soybean stem where leaves are born). Now we think that the fact a plant has more nodes somehow allows more seeds

to be set and is therefore giving us the higher yield," Egli explains. This finding may lead to new planting recommendations for soybean farmers.

"Dennis Egli has been very instrumental in determining what plant populations will give the best yields," says Carlton Earhart, executive director of the Kentucky Soybean Promotion Board. "He's been a real leader in this respect. His research has been very well received by the soybean producers, helping them to invest their time and money in the right ways."

Earhart adds that because of the work of researchers like Egli, new uses of soybean products, unimaginable just a few years ago, may become commonplace.

"Here are two words," Earhart says, "you're going to be hearing a lot in the near future: soy diesel. Transit buses in St. Louis are testing this soy-diesel blend now. Some buses in Cincinnati will be using it soon. And we're going to bring an industrial plant to Kentucky!" Earhart adds with uncontrolled enthusiasm. He explains that soy diesel is made by adding sodium hydroxide to soybean oil. The glycerides settle to the bottom and the soap suds rise to the top. The liquid in between is what he calls "the knocking agent" that "performs just like petroleum fossil."

"Who knows what the future will bring for the soybean," says Egli, who admits that with its relative lack of respect by the American public—relative to green beans and lima beans, for

example—the soybean is the Rodney Dangerfield of legumes.

"Maybe the average American family in 10 or 20 years will sit down to dinner and eat soybeans just as naturally at they eat lima beans now," Egli says. "And as food science researchers continue to work with soybean food such as tofu, trying to process out a lot of the beany taste, maybe tofu will become a lot more acceptable to the American palate."

For now, however, Egli is content to continue trying to build a better soybean. ♦



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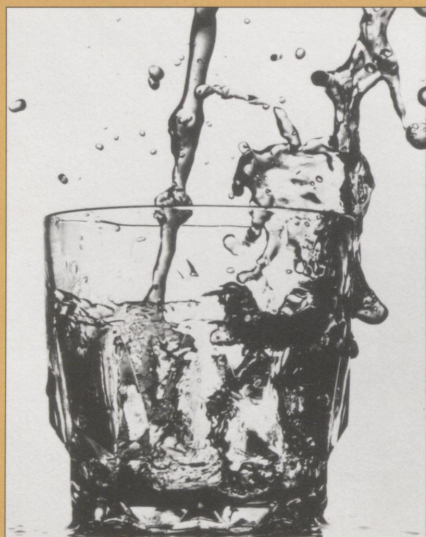
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