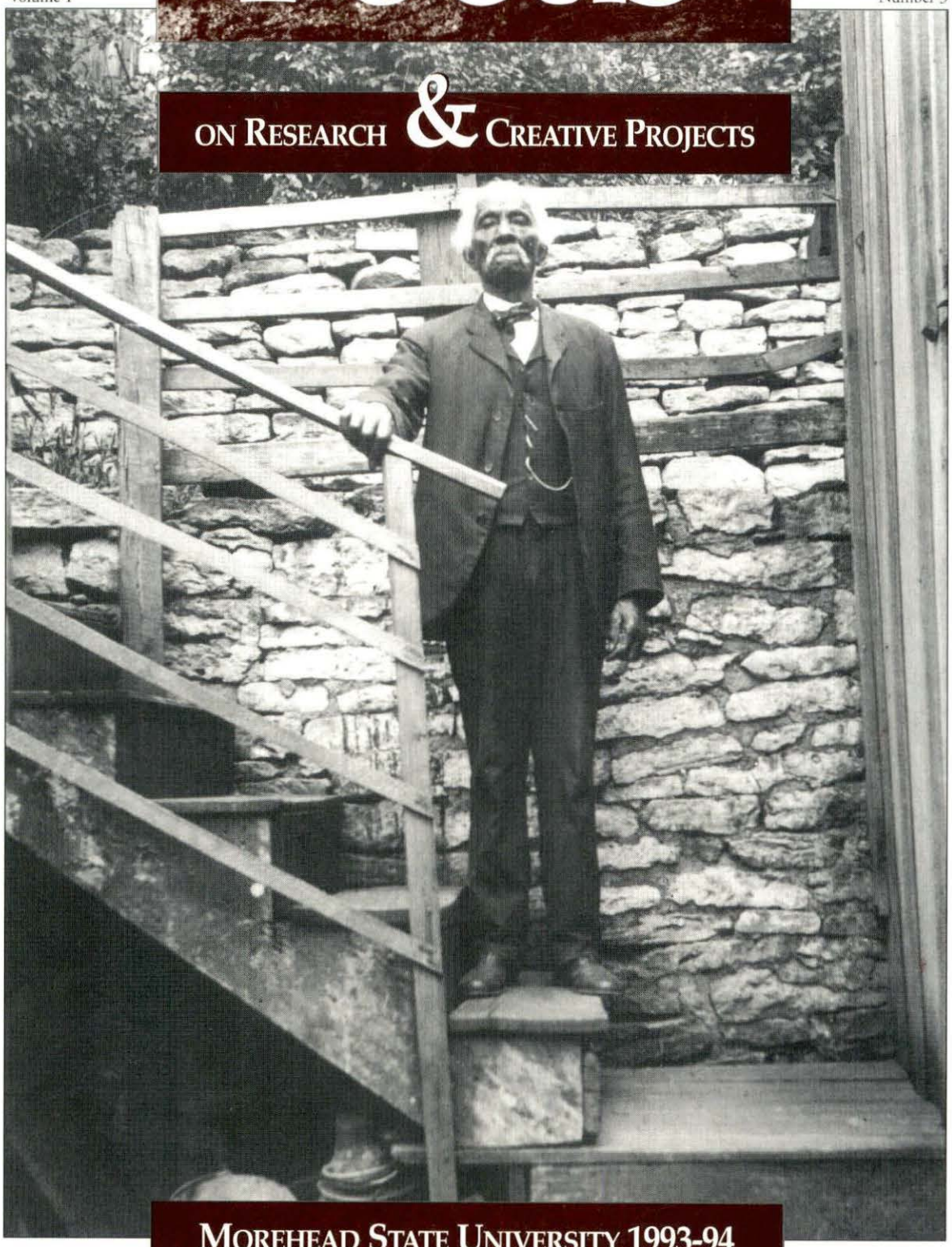
Focus

Volume 1 Number 3

ON RESEARCH & CREATIVE PROJECTS



MOREHEAD STATE UNIVERSITY 1993-94

Table of Contents

Focus —a point to which something converges or from which something diverges–illustrates the ideals at Morehead State University for bringing the best research together and encouraging new efforts in distinctly different areas. The goal of *Focus* is to recognize faculty and professional staff involvement in sponsored research and creative projects and to illustrate diversity in the University's mission of teaching, research and service to the people of Eastern Kentucky. Through the combination of teaching with research, scholarship and creative activities, an environment in which knowledge may be discovered, integrated, and disseminated to educate students is created. *Focus* is intended to illustrate the breadth of research within the University and thus describes only a few of the ongoing projects underway in a variety of areas.

Focus is published annually by the MSU Office of Publications and Printing Services in conjunction with the Division of Academic Affairs, Office of Research, Grants and Contracts, and the Research and Creative Productions Committee. Opinions expressed in this magazine do not necessarily reflect the opinions or official views of Morehead State University. Text from *Focus* may be reprinted when credit is acknowledged. *Focus* is printed with state funds KRS57.375. Morehead State University is an equal opportunity educational institution.

EDITOR Mickey Morgan
ASSOCIATE EDITOR Rebecca Bailey
GRAPHIC DESIGNER Larry D. Shute
CHIEF PHOTOGRAPHER Tim Holbrook
CONTRIBUTING PHOTOGRAPHER Mickey Morgan

Vol. I, No. 3, 1993-94

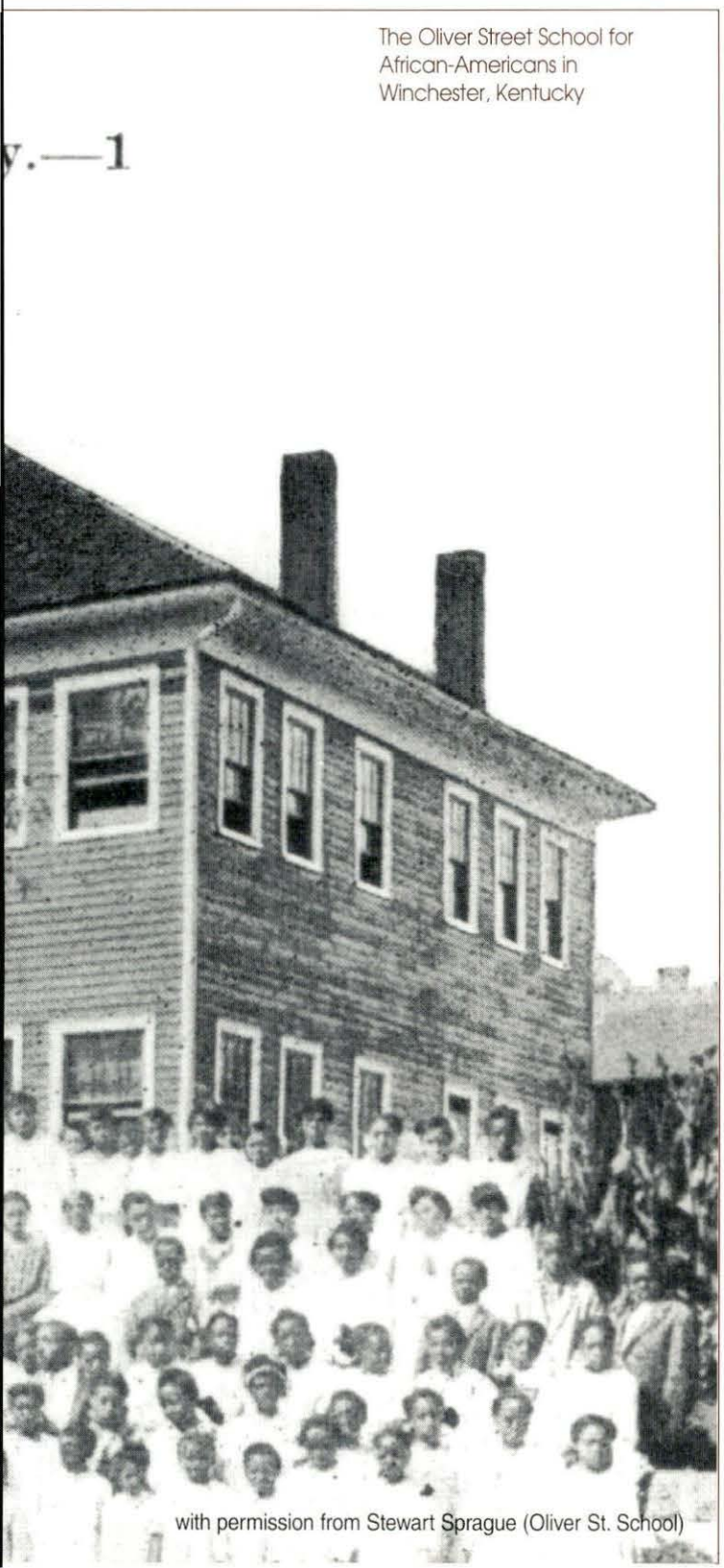
COVER: "Uncle Billy Marshall of Ripley, Ohio" (with permission from the Ohio Historical Society)

Tracking African-American History

Eastern Kentucky in the Post-Civil War Era

by Mickey Morgan

"A new Civil War History" is being written—one that examines the effects of the War on the common soldier and on the home, as opposed to the grand gestures of generals, mass movements of troops in battle and political events of national significance. Dr. Stuart Seely Sprague, professor of history at Morehead State University, is a longtime expositor of this differing vantage point of the powerful conflict that gripped the United States more than a century ago. His research methods take into account the microcosm to piece together the macrocosm.



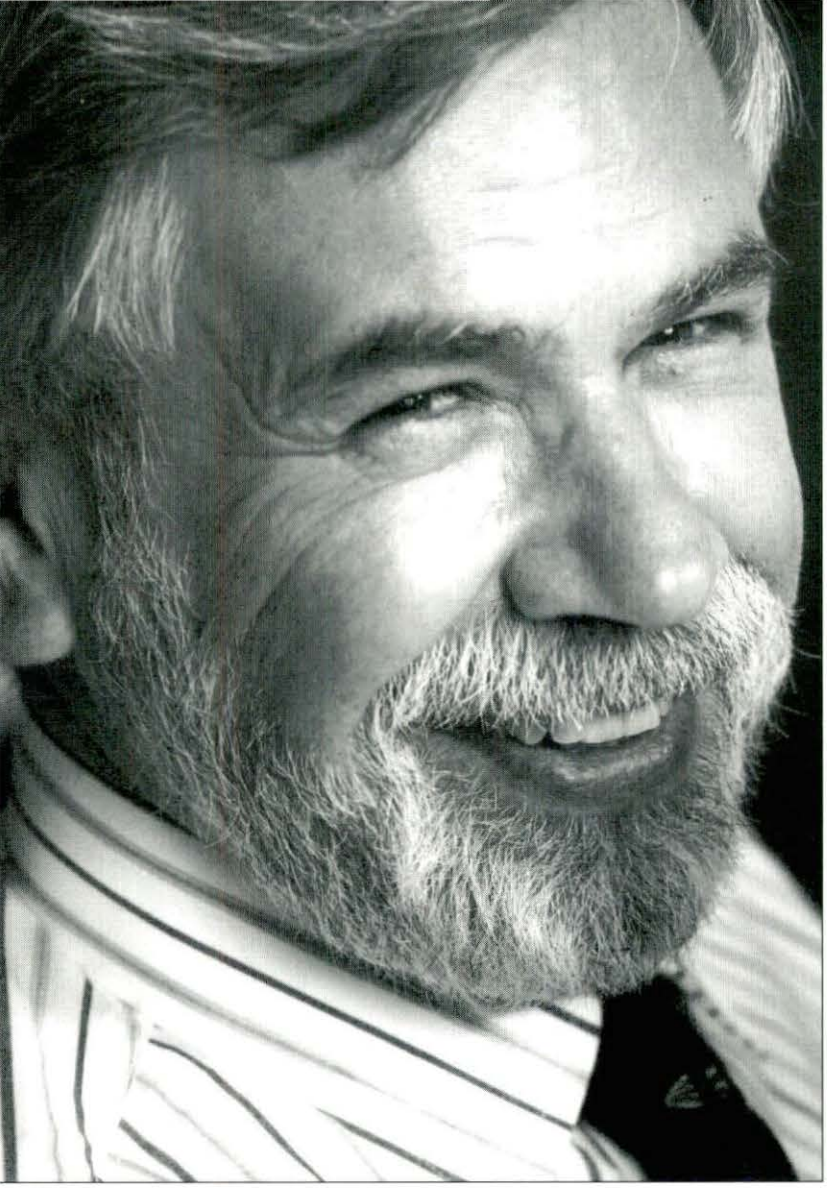
The Oliver Street School for African-Americans in Winchester, Kentucky

with permission from Stewart Sprague (Oliver St. School)

The shortest distance between two points is a straight line, but Dr. Sprague has not had the luxury of such mathematical precision in approaching his research goal. The satisfaction of scholarly work lies for Dr. Sprague in drawing a map of the past by examining previously ignored sources. For Sprague, it is the tedium of piling through tax lists, pension records, newspaper accounts and daybooks oftentimes located far from the actual place of the historical event. What was the condition of the black soldier after his struggle for national and personal emancipation? This is Dr. Sprague's key question. The "old" Civil War history elaborates on political and military events, but neglects communal and individual change. It could be said that the "old" history is one of only whites. Dr. Sprague addresses this aspect of history at the familial level and from the black perspective and finds greater responsiveness from his students as a result.

Dr. Sprague chose the under-researched state of Kentucky and an under-represented culture for his work: African-Americans participating in the Civil War whose homes had been in the counties of Eastern Kentucky. Already the author of several books about Kentucky (such as *Eastern Kentucky: A Pictorial History* and *Kentuckians in Illinois*), Dr. Sprague has brought his expertise of the state to tighter focus by exploring the changes effected in the African-American community by enlistment throughout Eastern Kentucky of approximately 4000 men of color.

Dr. Sprague did not yet have his Ph.D. in 1968 when he came to Morehead to teach but had received both his bachelor's and master's degrees from Yale. He completed his dissertation—"Senator John Brown of Kentucky 1757-1837: A Political Biography"—and received his doctoral degree from New York University by 1972. His nearly 30 years of teaching in Eastern Kentucky prepared him for the "major objective" of his current project: to complete research on a trilogy entitled *Kentucky and*



Dr. Stuart Seely Sprague has been piecing together the history of the under-researched state of Kentucky for 30 years.

the Civil War and Reconstruction Eras, 1861-1877. The first volume, *Divided We Stand, Kentucky 1861-1862*, is nearly ready for publication. Volumes two and three are tentatively titled "United We Fall: The Decline of Kentucky, 1863-1865," and "Reconstruction: The Aftermath of the Civil War: Kentucky 1865-1877."

Existing literature detailing Kentucky's Civil War history is slim: "Though the bibliography of the Civil War is massive . . . the Kentucky dimension has been relatively slight." For works dealing with African-Americans during the War and after, Dr. Sprague describes the available information as truly scant. Previously published work determines MSU as being a prime contributor: *Black Liberation in Kentucky: Emancipation and Freedom, 1862-1884*, by former MSU Professor Victor Howard (1983); *A History of Blacks in Kentucky: From Slavery to Segregation, 1760-1891*, by former MSU historian Marion Lucas (1992); and current Professor of History Dr. John Kleber's *Kentucky Encyclopedia* add to Dr. Sprague's steady stream of writings on "Appalachia's invisible minority."

Several of his endeavors have been generously funded in past years by way of research grants from MSU. His most recent MSU-funded project, "Kentucky 1864-1877," serves to continue the longterm project and, specifically, has allowed Dr. Sprague to travel to three out-of-state repositories of material. At the Baker Library in Harvard's Business School, Dr. Sprague examined the "remarkable Dun Credit Ledgers (the firm is now Dun & Bradstreet, the well-known credit rating company) which contain in summary form detailed information of firms small and large arranged by county within state and includes the entire range of years in which I am interested." Selecting Eastern Kentucky counties, Dr. Sprague ascertained war damage in Augusta, Bowling Green, Cynthiana and others suffering onslaughts during the War.

The grant also enabled him to travel to the Southeast Regional Office of National Archives on the outskirts of Atlanta. The Archives contained "federal lawsuits that were tried before Bland Ballard . . . Almost every suit between a white and a black during Reconstruction in Kentucky was transferred into his jurisdiction. No historian has delved into these sources which are crucial to understanding the contestation of rights between the races during Reconstruction."

Finally, Dr. Sprague visited the National Archives in Washington, D.C., another "under-utilized mother lode of information that contains an enormous amount of material relevant to my study." Company daybooks became precise means of tracking movements of African-American regiments. County of birth and names of masters allowed him to identify men who had pension records–"a source in which I have pioneered," he claims. In order to receive a pension, a soldier had to be completely identified as to family, marriages and activities since being discharged. As such, the documents enabled Dr. Sprague to locate those from his particular area of study and then to follow their genealogies and

family histories. "They tell you things you wouldn't believe!" exclaimed the historian.

At the time of the Civil War, Kentucky ranked third in the number of slave owners. "In Harlan County, a man owned 50 slaves," claims Dr. Sprague. This had been determined from scrutiny of tax lists. Dr. Sprague recognized the need for unearthing knowledge about the black community in the reconstruction era and seems to have set up a prototypical method for other historians by his geographical limitation to Maysville, Kentucky, in Mason County. He found an easy collaboration with Jerry Gore, director of minority student affairs at MSU, who had a longtime personal interest in the presence of the Underground Railroad in Maysville. Gore, an African-American, was born and raised in Maysville and had drawn his own genealogy back to Joseph Dunlap, a soldier in the 13th United States Heavy Artillery in the Civil War. Well before Dr. Sprague began work on family lineages in the Maysville area, Gore had been conducting video interviews of older members of the black community.

Since the O.J. Simpson verdict of "not guilty" was passed down for the murders of Nicole Simpson and Ronald Goldman, racial tension in the U.S. has increased ten-fold. Dr. Sprague's work has correspondingly increased in relevance and importance. The recovered history of African-Americans in a tiny spot on the entire spread of this nation has validated a small community and increased understanding—and perhaps forgiveness—between the races.

And in the future? While in Atlanta, Dr. Sprague came across federal income tax lists for Louisville which fired his interest in researching the impact of the War on that city. "The key collection in this project will be the Dun Credit ledgers at the Harvard Business School." His scholarly meanderings continue with unflagging interest to slowly accumulate substantial material that pushes the gaze of history to a more personal and meaningful level.

Aunt Rhoda Jones (with permission of the Ohio Historical Society)

HYSTERIA,
THE ENGLISH MALADY

Dr. Glen Colburn investigates 18th-century medicine and the development of the novel

by Rebecca Bailey

The Nightmare, (painted by Henry Fuseli in the 18th century, evokes both the melancholy and hysteria that was characteristic of English society in the 1700 s.)

No cheerful breeze this sullen region knows,
The dreaded East is all the wind that blows.
Here in a grotto, shelter'd close from air,
And screen'd in shades from day's detested glare,
She sighs for ever on her pensive bed,
Pain at the side, and Megrim at her head.

These lines from Alexander Pope's "The Rape of the Lock" are part of his description of his imaginary Cave of Spleen–where all are melancholic, splenetic, suffering from vapours, hypochondria, or hysteria.

"The English Malady" is an all-encompassing term referring to a significant element of the 18th-century world from which the English novel arose—the medical condition known as hysteria. Dr. C. Glen Colburn, assistant professor of English, is researching the similarities between medical discourse on hysteria and the narrative techniques of novels during this period.

Dr. Colburn was awarded a 1994 grant from the National Endowment for the Humanities to attend a summer seminar for college teachers, "Social Change in Early Modern Britain and the Rise of the Novel," in which he was able to further research this idea.

Dr. Colburn's interest in the subject began three summers ago during his continuing studies of 18th-century British literature. He kept seeing allusions to "vapours," "spleen," and "hysteria." This poorly-defined condition was so prevalent in England that by this period it had become known as the "English Malady."

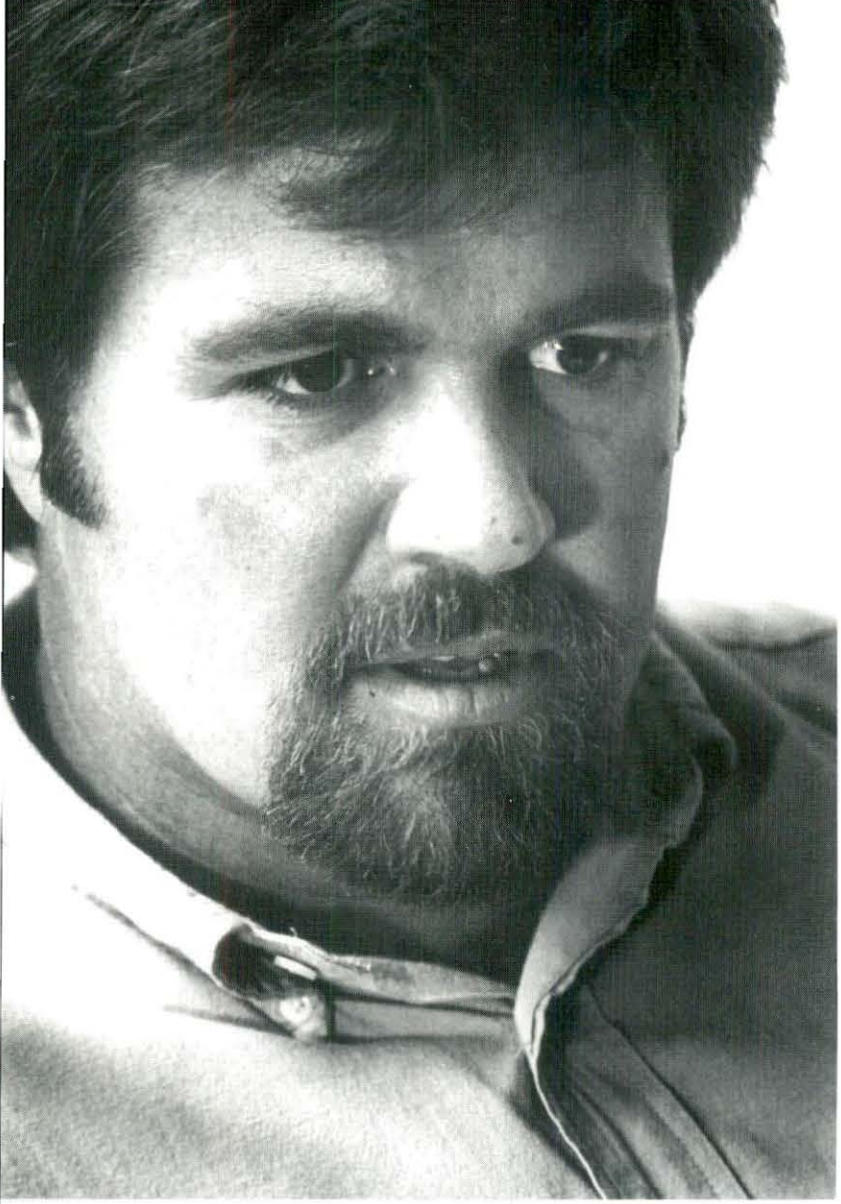
A 1993 MSU Summer Fellowship enabled Dr. Colburn to read medical texts of the 18th century at the University of Chicago library. "I was looking for evidence that medical theories about hysteria were gender- and class-biased. As I read the treatises, however, I also began making connections I had not anticipated between medical writing about hysteria and the novel," he explains.

Physicians were an important part of the society from which the novel arose. The 18th century was called the Age of Enlightenment, and science, as rational and logical, was considered the key to progress. (This idea comes from Peter Gay's 2-volume history, *The Enlightenment.*) Medicine was considered the most important science. "The medical profession was preeminently a gentlemanly one in the 18th century," Dr. Colburn says. "Roy Porter has written numerous studies of the profession. Physicians had university educations and were trained in the 'polite' as well as the hard sciences. The medical profession included poets (Sir Richard Blackmore, Samuel Garth), novelists (Tobias Smollett), essayists (John Arbuthnot), and classical scholars (William Battie). Samuel Richardson regularly corresponded with the most popular nerve doctor of the 18th century, George Cheyne. It is no surprise, then, that doctors and disease figure prominently in 18th-century fiction."

One of the characteristics of hysteria (the term Dr. Colburn uses to refer to all aspects and names of this condition) was that it can imitate other diseases. It had no specific distinguishing characteristics. Very often it manifested itself in shortness of breath, accelerated heart beat, fever, apoplexy, fainting and intestinal problems. "Vapours" seemed to be restricted to women of leisure; the condition in men was referred to as "hypochondria" and was believed to be caused by too much study and lack of physical exertion.

By mid-century, as physicians attempted to pinpoint a reason for this condition, hysteria was attributed to the rise in the consumption of luxuries by women—tea, coffee, confections, staying out late at the theatre. This suggests a connection between social changes (including the rise of the leisure class) and ensuing lifestyle judgments, Dr. Colburn believes. "Of course men also indulged in luxuries; men sought to blame women for luxury and yet not condemn the practices themselves."

Hysteria had become so prominent a condition that it evolved to a defining characteristic of the English. "Poets such as the Countess of Winchilsea and Matthew Green wrote poems about 'spleen,' Pope immortalized 'the Cave of Spleen,' and many memorable characters in 18th-century fiction either experienced or pretended to experience some form of hysteria: Roxana, Pamela, Clarissa, Lady Western, Amelia, Matt Bramble, Tristram Shandy. Authors did not



Dr. Glen Colburn continues to examine connections between medical and literary narratives.

simply write about it; many of them suffered from it or a closely related disorder, most notably Richardson, Johnson, Hume and Boswell. Though hysteria was considered primarily a female disease, writers noted that men were increasingly susceptible to it, and all physicians agreed that it affected only men of leisure or study. Thus, anxiety about hysteria may have indirectly expressed anxiety about changing gender roles, the 'feminization' of literature, or changing relations among the social classes. Men subconsciously feared their own feminization as they became more civilized and adopted more 'female' characteristics and habits. This is one reason men (novelists, poets, playwrights, medical doctors) wrote so much about hysteria."

This connection is made in Pope's "The Rape of the Lock," when a supplicant addresses the Goddess of Spleen:

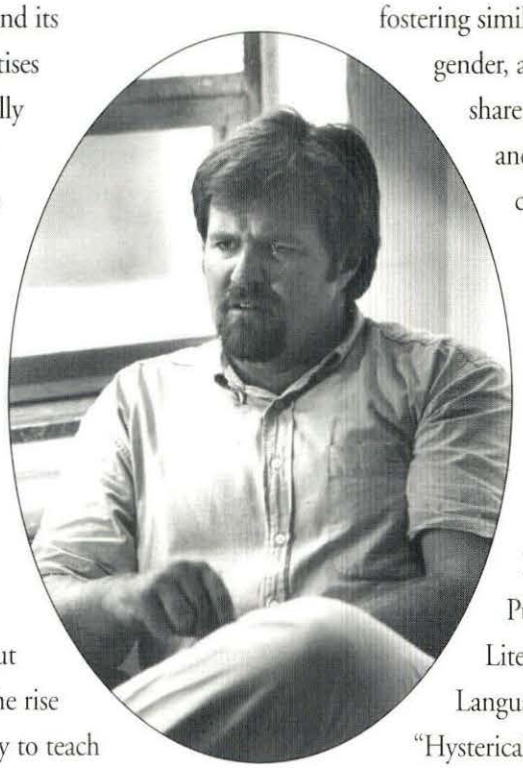
> Hail, wayward Queen!
> Who rule the sex from fifty to fifteen:
> Parent of vapours and of female wit,
> Who give th' hysteric, or poetic fit,
> On various tempers act by various ways,
> Make some take physic, others scribble plays . . .

In the 18th century, some treatments were surprisingly modern. Dr. George Cheyne, who wrote a book called *The English Malady* (1733), recommended a change in diet from meat and wine to milk, water, and vegetables (a shockingly lower-class diet), and exercise such as horseback riding and strolling in one's garden (both restrictively upper-class diversions). Other medical treatments included listening to music, marriage for young women (hysteria in women was thought to be linked to too little sex, and in men to too much), and the inevitable "quack" treatments, such as drinking a solution of steel filings to "steel" the nerves. Another quack treatment was the use of suffumigating powders. According to an advertising pamphlet of 1670, the patient put this powder into a dish containing a hot coal, which was then put under a chair with a hole in it. The patient would sit naked over the hole so the patient would "receive [the smoke] up the fundament."

In literature, hysteria led to a rise in sentimentalism (the pairing of extreme emotion with true virtue and honor), with delicacy valued as a sign of refinement. Examples include Samuel Richardson's *Clarissa*, Henry Fielding's *Amelia*, Laurence Sterne's *Tristram Shandy* and *A Sentimental Journey* , and Frances Burney's novels. To a degree, this is also evidenced in Jane Austen's novels—although she reacts against the development of sentimentality, she does pay attention to the emotional states of her heroines.

Medicine, the novel, and English society were all

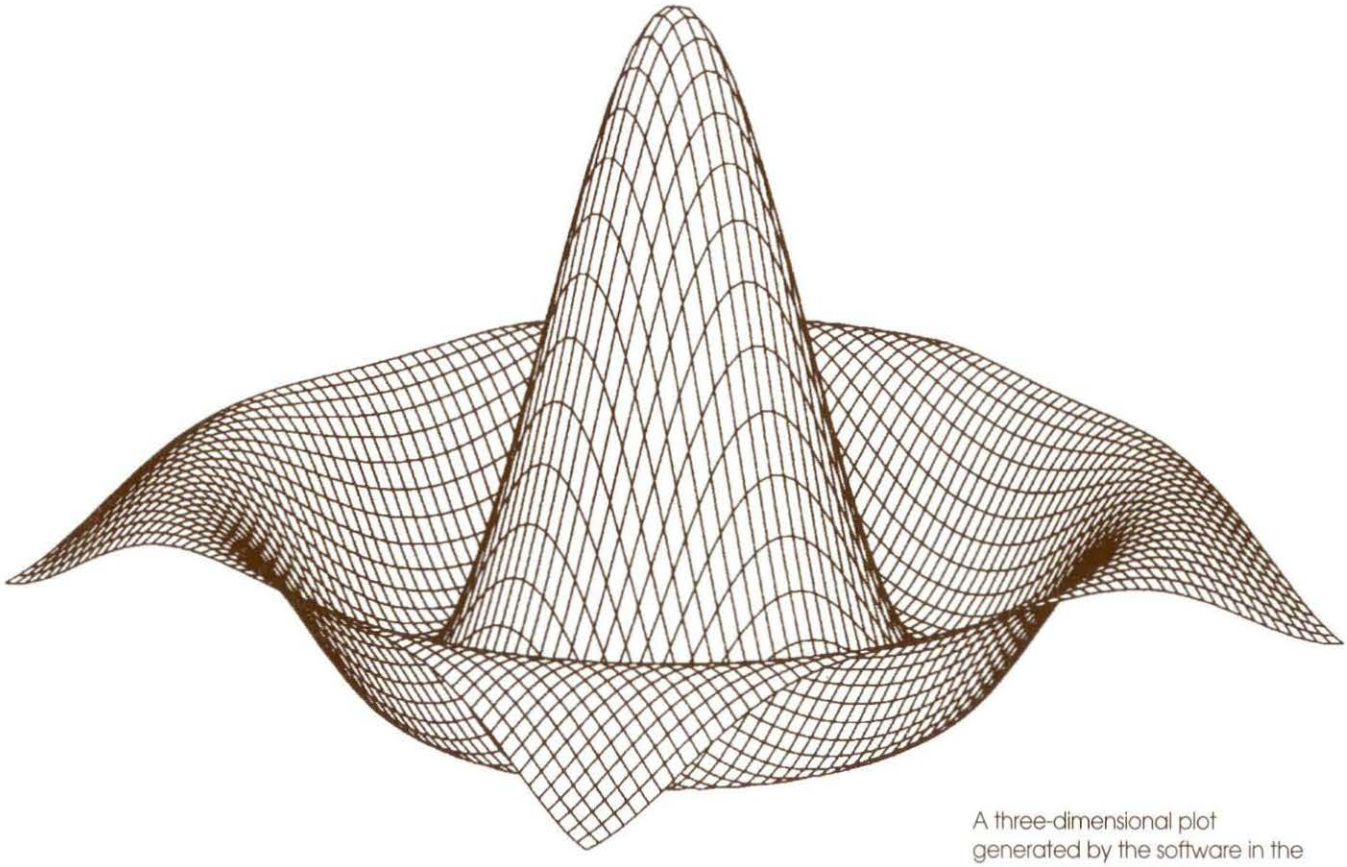
deeply influenced by recent developments in science and epistemology which promoted a mechanistic view of human beings, with corresponding mechanistic ideals for social and political institutions. "However one conceives of the novel in relation to these paradigm shifts, it is clear that the shifts were important to the novel and its readers. My reading of the medical treatises thus far has suggested to me in an equally clear way that medical writing adopted the same kinds of narrative strategies as novels did to articulate and respond to the new conceptions of self and society. And if 18th-century reactions to the changes might be characterized as 'hysterical,' then treatises on hysteria may offer insights into the assumptions and self-perceptions of the period."



Dr. Colburn sums up the connection between hysteria (the self out of control) with medical treatises and the rise of the novel: "Novels were written to try to teach readers to be individuals (self-policing, self-sustaining). Society was changing—the individual could, for the first time in history, through his own efforts change his social class. The economic system was changing to capitalism, where the focus is on the self, and religion was changing, becoming more secularized, with a greater flexibility in making one's own decisions. This leads to a sense that you make yourself, and to a greater sense of individual autonomy. These changes and ensuing responsibilities could have seemed overwhelming to those who had the leisure to consider such things, and this might have been a factor in creating hysteria.

"I have read enough to formulate some speculations: that we gain new insights into both medical and novelistic discourses by setting aside the distinctions we normally draw between them; that the novel is in some sense generically 'hysterical'; that medical treatises and novels of the period are responding to and fostering similar assumptions about human nature, gender, and social class; that physicians and novelists share similar concerns about their professions and are, in fact, seeking in similar ways to create a greater sense of professionalism for the activities."

Dr. Colburn has given several presentations of this topic: "Medicine and Aesthetics in Eighteenth-Century England," at the Midwest American Society for Eighteenth-Century Studies in October 1994; "Hysteria and Closets: Exposure, Containment, and Satiric Purpose in Eighteenth-Century English Literature," at the South Atlantic Modern Language Association in November 1994; "Hysterical Polemics: Medical Redefinitions of Reality in Eighteenth-Century England," at the American Society for Eighteenth-Century Studies in April 1995; and "Boswell's *The Hypochondriack* and the Problem of Subjectivity in Eighteenth-Century Britain," at the Midwest American Society for Eighteenth-Century Studies in October 1995. An article entitled "'Struggling Manfully' through Henry Fielding's *Amelia*: Hysteria, Medicine, and the Eighteenth-Century English Novel," is forthcoming in Volume 26 of *Studies in Eighteenth-Century Culture* (Summer 1996).



A three-dimensional plot generated by the software in the new mathematics lab

THE *Visual* BEAUTY OF MATHEMATICS

MSU faculty lead the way in innovative computer instruction

by Rebecca Bailey

"Our students are often underprepared or simply bored with the same old material and methods. We need to move to the future and provide our students with the tools technology has made available for creative learning."

This shared belief is behind the dedication of five MSU mathematics faculty who secured funding from the National Science Foundation to open a Mathematical Instructional/Explorations Laboratory in Lappin Hall. Joyce H. Saxon, assistant professor, Dr. Lloyd Jaisingh, professor, Dr. Daniel Seth, assistant professor, Dr. Robert Lindahl, professor, and Dr. Rodger Hammons, professor and department chair, have worked together to create a laboratory designed for introductory-level mathematics courses which is revolutionizing mathematics instruction at Morehead State University.

The Department of Mathematical Sciences received funding to develop and implement the model laboratory to improve the quality of undergraduate mathematics instruction and to improve student understanding of basic principles, thereby increasing retention rates and student grades in introductory-level mathematics courses. Students in this innovative networked laboratory, with 30 state-of-the-art microcomputers, are experiencing college algebra, plane trigonometry, introductory statistics, precalculus, analytic geometry, and calculus I with a depth of understanding that can only be achieved through dynamic instruction and participation in the process of exploration and discovery.

The laboratory experience is improving and enhancing mathematics instruction for both majors and non-majors of mathematics and science, and includes students who will become scientists, teachers, business persons and government leaders as well as literate citizens. The math department expects that over 2,000 students will enroll in one or more of the introductory-level courses during the 30-month project (funding began July 1, 1994). Every effort has been made to address the national need to develop a greater interest in mathematics in under-represented groups, including females. The project is also serving as an instructional model for pre-service teachers throughout the state and will enable the Department of Mathematical Sciences to support the goals of the Kentucky Educational Reform Act.

The six target courses are required for majors and non-majors in several programs of study. Saxon and her colleagues found that of 2,778 students in 80 sections of mathematics classes offered in the fall of 1993, 2,430 students in 59 of these sections were seeking to fulfill requirements for other programs, to satisfy general education requirements, or to develop the skills necessary for college success. This illustrates that the laboratory serves not only students in the mathematics department, but students within the entire University.

"The introductory-level courses in mathematics should enable students to see the vitality of mathematics, to build confidence in their mathematics ability, to develop understanding of the basic principles of mathematics, and to communicate the process and analysis," says project director Saxon. "The computer is the tool that makes it possible for students to reach these goals."

The use of computers allows instructors to enable their students to interact with and explore the material in ways that have never before been possible. The traditional method of mathematics instruction is "chalk/talk-paper/pencil," a mode where the instructor is often the only one actively participating in the learning process. Therefore much of mathematics was left obscure due to the constraints of paper and pencil. Now students use software programs such as Derive, Matlab, Minitab and Converge, plus electronic lecture notes to help them understand both the concepts and the visual beauty of mathematics.

Introductory Statistics (Math 123) has been totally redesigned. Dr. Jaisingh says that students conduct original research projects and statistically analyze that information. An example is a class project in which students have been monitoring several of the parking lots on campus, and recording the number of legally and illegally parked cars within certain hours. The students plan to write up their results and submit them to the *Trail Blazer* for publication. Dr. Jaisingh finds that students come back to the lab to use the Minitab software for classes other than math, such as psychology, sociology or biology.

Writing is an important part of what goes on in the mathematics laboratory. Writing activities increase a student's ability to communicate mathematically. Students often work cooperatively on directed laboratory explorations, and write about conjectures, processes and observations.

Students are encouraged to work in small groups as well as on their own. During laboratory explorations, students generate collections of equations or functions, make conjectures, and analyze. The software's graphic capabilities further enable students to view problems and concepts geometrically and dimensionally. The illustration included in this article is representative of how students are able to visualize and understand concepts in this nontraditional method. The theory is that without the drudgery of endless computations (the downfall of many students of mathematics), now performed by the software, students will have more time to learn the principles and theories. Many students, especially nontraditionals, have had no previous experience with computers, and working with other students helps them more quickly lose their intimidation.

Although the five mathematics faculty have not yet begun analyzing the results of student use of the lab, they do know that students are more excited about mathematics and that the retention rate has increased. Pre-laboratory and post-laboratory problem-solving examples indicate that students are experiencing a higher level of learning and greater mastery of mathematical concepts.

Saxon and Drs. Jaisingh, Seth, Lindahl, and Hammons are also excited, both about the changes they see in the students and about the changes they have seen in themselves as educators. Many of the new textbooks are written concerning the use of software, and the faculty is aware of the necessity of making a smooth transition between math and computers. They may have to first give mini-lectures or demonstrations in keyboarding or word processing so the students will be able to make full use of the computers' capabilities. A book of explorations for college algebra using Derive has been written by Dr. Jaisingh; Drs. Seth and Jaisingh are writing a book for precalculus using Derive and Matlab; and Drs. Jaisingh and Lindahl are writing a Minitab explorations for statistics.

According to Dr. Lindahl, class redevelopment is often easier with general education courses since the curriculum in these courses is more flexible. Introductory statistics, a general education class, has been completely redesigned to include small group investigations using computers. Other courses such as calculus I are in the process of reform, with consideration given to concepts that must be mastered before going on to calculus II. Though all of the calculus classes are not taught in the laboratory, Dr. Lindahl says the use of computer technology is being implemented to enhance the understanding of fundamental concepts.

The five mathematics professionals in charge of this project bring varied yet complimentary backgrounds to the task.

Saxon earned the undergraduate degree in mathematics and English and the master's degree in secondary education (mathematics) at Morehead State University, and has done doctoral work toward a Ph.D. in measurements at Southern Illinois University in Carbondale. Recently she has made presentations to the Kentucky Association of Developmental Educators, the Kentucky Council of Teachers of Mathematics, the Kentucky Academy of Science and the meeting of the Growth and Research Organization for Women. In addition, she has secured grant funding for three additional mathematics education projects since the early 1990s.

Dr. Jaisingh earned the undergraduate degree in mathematics and physics at the University of Guyana in South America, the master's degree in mathematics and statistics at Tennessee Tech University, and the Ph.D. in industrial engineering at Texas Tech University. His international teaching experiences have involved the World Health Organization at the University of Guyana; he was teacher and principal of the Evening Institute in the Turks and Caicos Islands, British West Indies; he taught at Tennessee Tech and Texas Tech before coming to MSU in 1985. His publications include journal articles as well as textbooks.

Dr. Seth also earned his Ph.D at Texas Tech University, with undergraduate studies in mathematics at Warren Wilson College in Swannonoa, North Carolina, and graduate study at Western Kentucky University. He has taught at WKU, Texas Tech University and California State University at

From left are, standing, Dr. Robert Lindahl, Dr. Rodger Hammons, Joyce Saxon, Dr. Lloyd Jaisingh (seated) and Dr. Daniel Seth (seated in front) in the new Mathematical Instructional/Explorations Laboratory in the recently remodeled wing of Lappin Hall.

Fullerton. Additional related experiences include two years (and additional summers) working at Los Alamos National Laboratory, USDOE, in New Mexico, one year as a visiting scientist at The Institute of Mathematical Sciences in Madras, India, and three years as a postdoctoral fellow at USDOE's Ames Laboratory in Iowa. (See page 14 for more specific information on Dr. Seth's research.)

Dr. Lindahl came to MSU in 1970, after having been assistant professor of mathematics at Pennsylvania State University. He earned his Ph.D. in mathematics at the University of Oregon. Recent professional activities include presentations at the International Technology for Collegiate Teaching in Mathematics meetings, the STATE National Conference on Technology in Education in Houston and the Kentucky MAA meeting; he has participated in workshop panels focusing on the graphing calculator at Addison Wesley Publishers.

Dr. Hammons' mathematics degrees were earned at Transylvania University (A.B.) and the University of Kentucky (M.S. and Ph.D.). He has been at MSU since 1971 and has been department chair since 1987. He has participated in many conferences and workshops, and has reviewed the textbook *For All Practical Purposes: Introduction to Contemporary Mathematics* for W.H. Freeman Company. He has studied and implemented the hand calculator and the computer as pedagogical tools in mathematics courses including general mathematics, mathematics for business and economics, analytic geometry and calculus I, differential equations and topics in the mathematics curriculum. This included designing and writing computer programs to enhance student learning of various concepts in these courses.

"This lab is a catalyst for other projects and grants within the department," says Dr. Hammons. The department plans to host a conference this spring to provide a forum for state colleagues to share effective uses of technology. They have plans to seek funding for future mini-workshops.

Currently high school students have had very little experience with mathematical software with the exception of graphing calculators which are also used within the mathematics department. The availability and use of technology is expected to increase. Nationwide on both the high school and collegiate levels, educators have not yet come to a consensus about how to best use this new technology. They are looking for the optimal mix of the most effective methods of technology implementation and other reform ideas. The mathematics faculty of Morehead State University is making an important contribution toward reaching that goal.

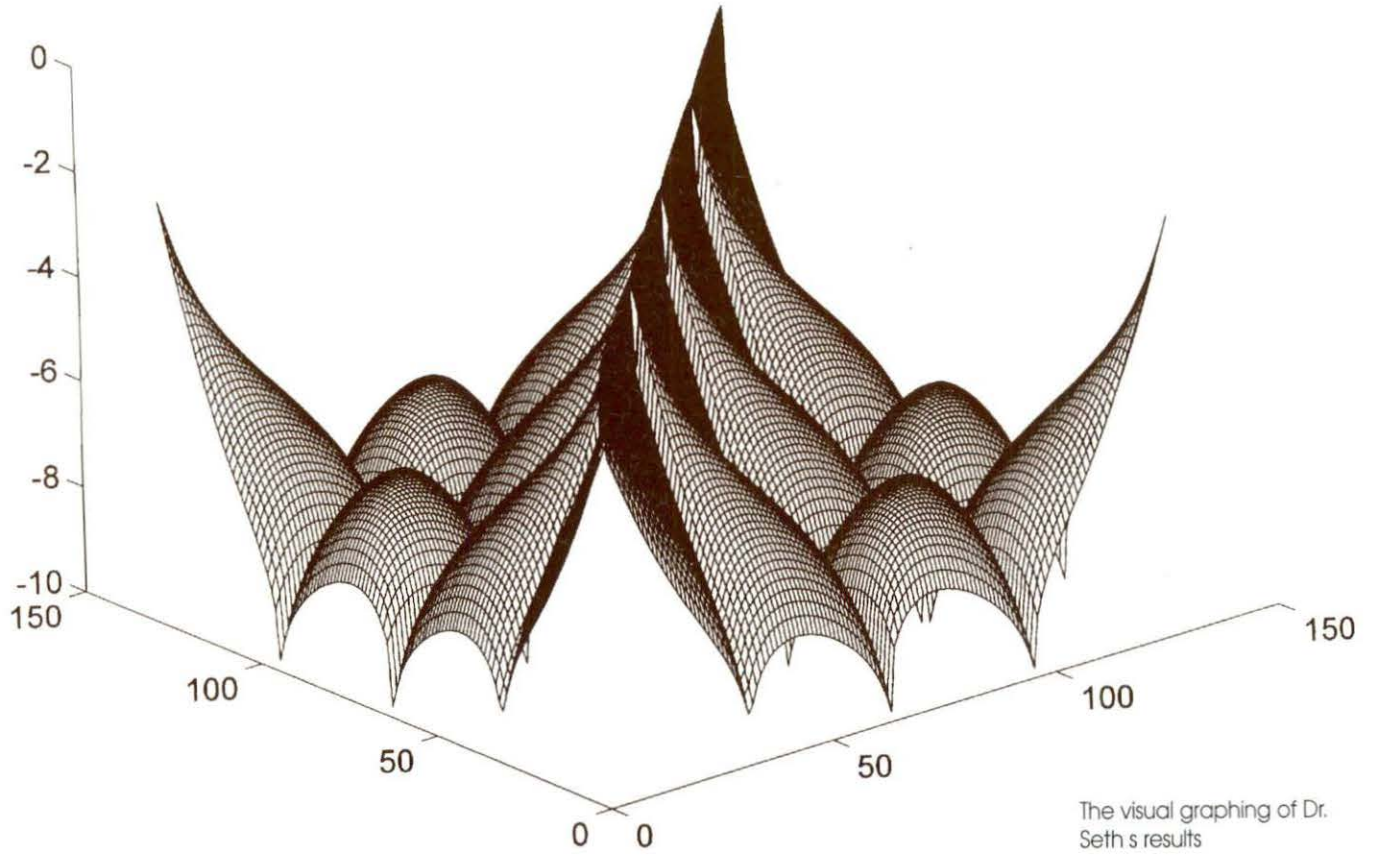
Math Reaching to the Physical World?

Dr. Daniel Seth receives grant to work physics problems on the computer

by Mickey Morgan

If asked what he does all day, Dr. Daniel Seth would say he "comes up with new sets of equations," or he "cranks out computer codes . . . Every computer has some operating language." Dr. Seth, assistant professor of mathematics at MSU, could be said to be turning computer languages into numbers. He describes himself as an applied mathematician, one who solves problems from physics.

To explain his highly-technical research done under the auspices of the Kentucky National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR), Dr. Seth was quick to mention an introduction written by senior physics major, Keith Roe, as a primer for the material. "The first step . . . was to translate principal investigator Dr. Daniel Seth's computer code written in the

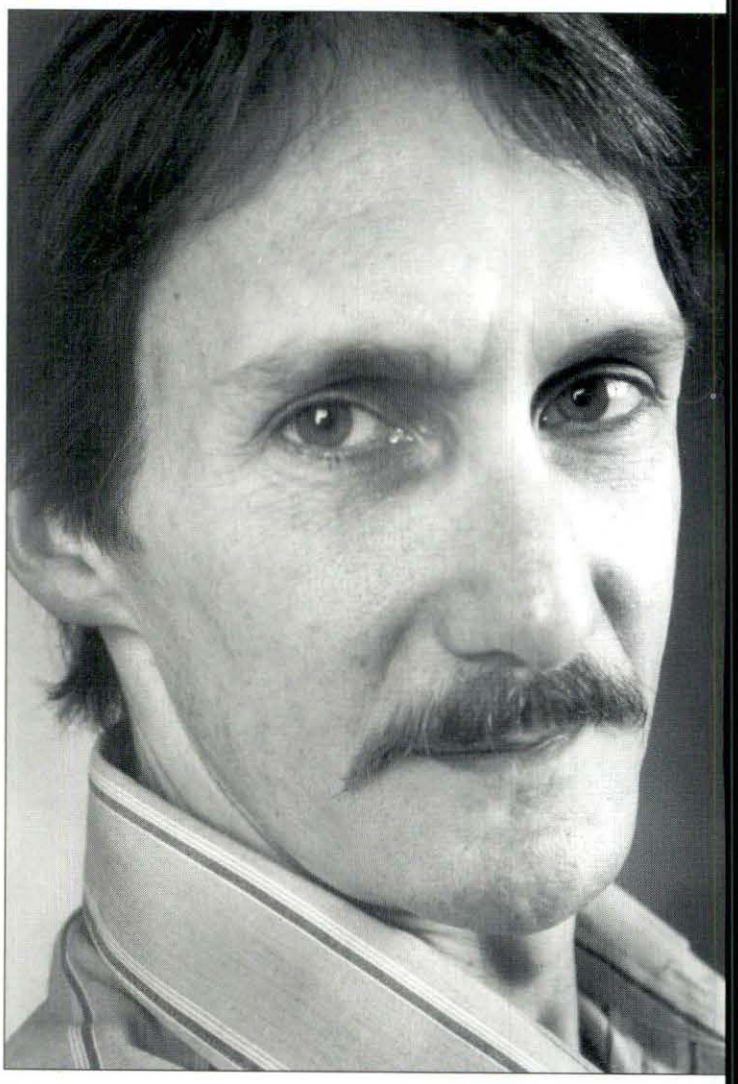


The visual graphing of Dr. Seth s results

fortran language to one written in the C language. C is rumored to be a superior computer language for scientific computing on a parallel machine."

Dr. Seth plots the movement possibilities or path of a particle entering "any old slab of [two dimensional] material"—whether to go straight through, to reflect, to turn right or left. He calls these lines of direction "outcomes," and tries to find what he terms "transition operators," so named because they describe the particle transition from one physical state into another physical state. In Roe's words, "This program is designed in general to calculate matrices describing the resulting probabilities for the path of a particle travelling through a two-dimensional slab of material most easily visualized as an infinite square column. It is a square in the *xy* plane and extends infinitely in the *z* direction. A particle enters one of the four faces of the column and then eventually exits one of these. These four possible outcomes are described as transmission, reflection, left and right turn results." An equation is derived that describes the path of each particle, whose solution may be visualized on the *x-y-z* graph. Four smaller regions are joined together by merging the equations describing their individual probabilities, which when combined with the equations of other probabilities from other regions begins to build a pattern of the possible outcomes. The more times a computer is fed the data from an equation and the size of the region is doubled, in other words, the more complex the problem, the more time that the computer takes to run it. Ideally, Dr. Seth would like to run the problems on a "super computer: the current fastest, top of the line [computer] capable of running more complex problems. The CRAY is the current super computer." Dr. Seth was able to gain access to the University of Kentucky's Convex-HP workstation cluster which enabled him to take the initial equation to greater doubling complexity.

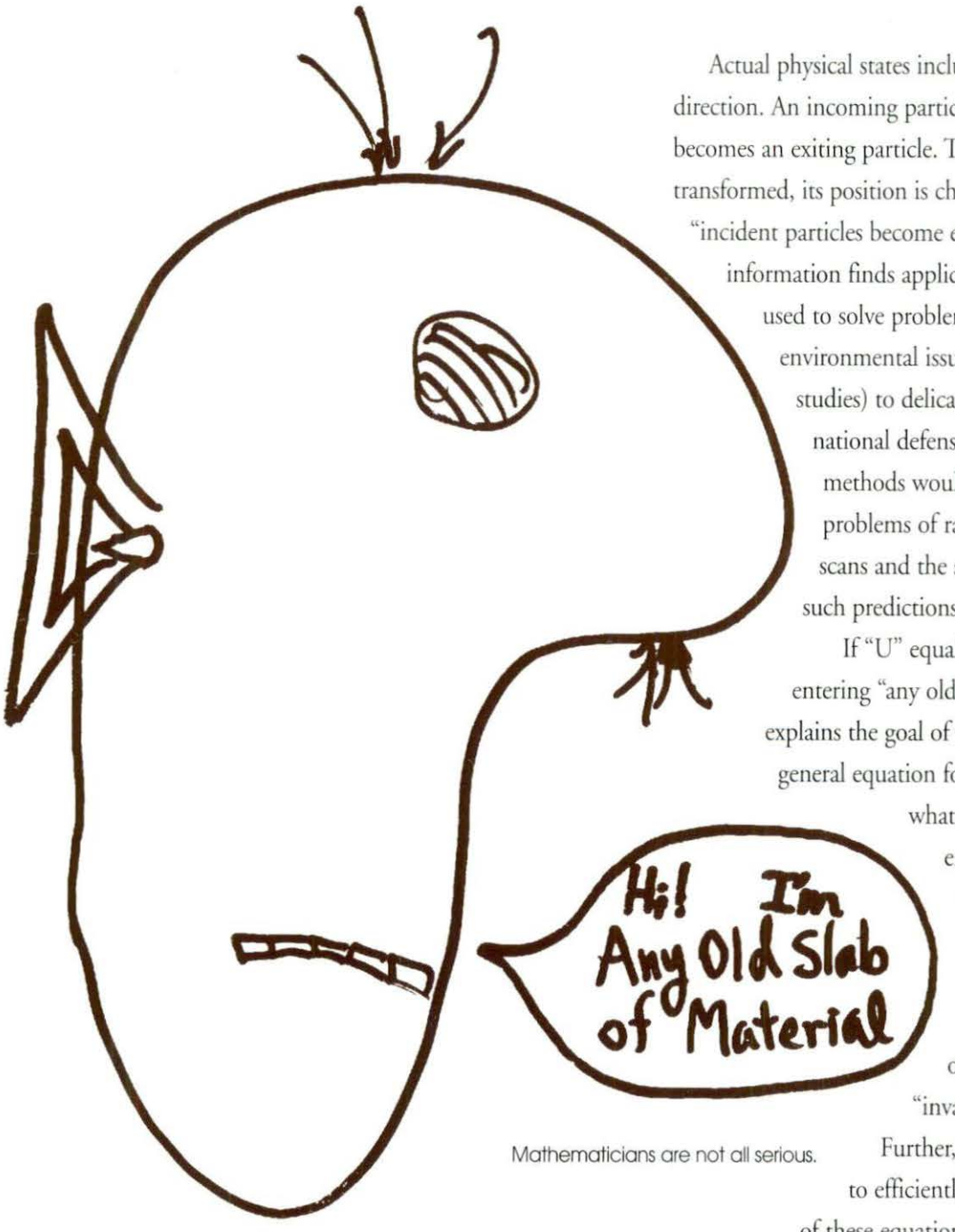
Dr. Seth speaks of the difference between the "pure mathematicians" who try to prove that certain properties may be true. What is the family of solutions; the whole realm of possible solutions? They work in an absolute world with "closed form solutions."



Dr. Daniel Seth s primary focus is transport theory: how particles travel through a material.

An applied mathetician, such as he, tends to work on a class of problems in the physical world that can't be solved exactly, so approximate solutions must be sought. "In the real world, most models of equations are not exact or solvable . . . [we] take into account factors in the environment and the randomness of occurrence."

So Dr. Seth solves physics problems on the computer. Of what use is this? Initially Dr. Seth became interested in "atmospheric radiation," the manner in which particles of light (photons) scatter, suffer collisions, lose energy, and bend with the earth's gravity. Transport theory is thus the main problem he works on: the study of how particles travel through a material. An immediately understandable



Mathematicians are not all serious.

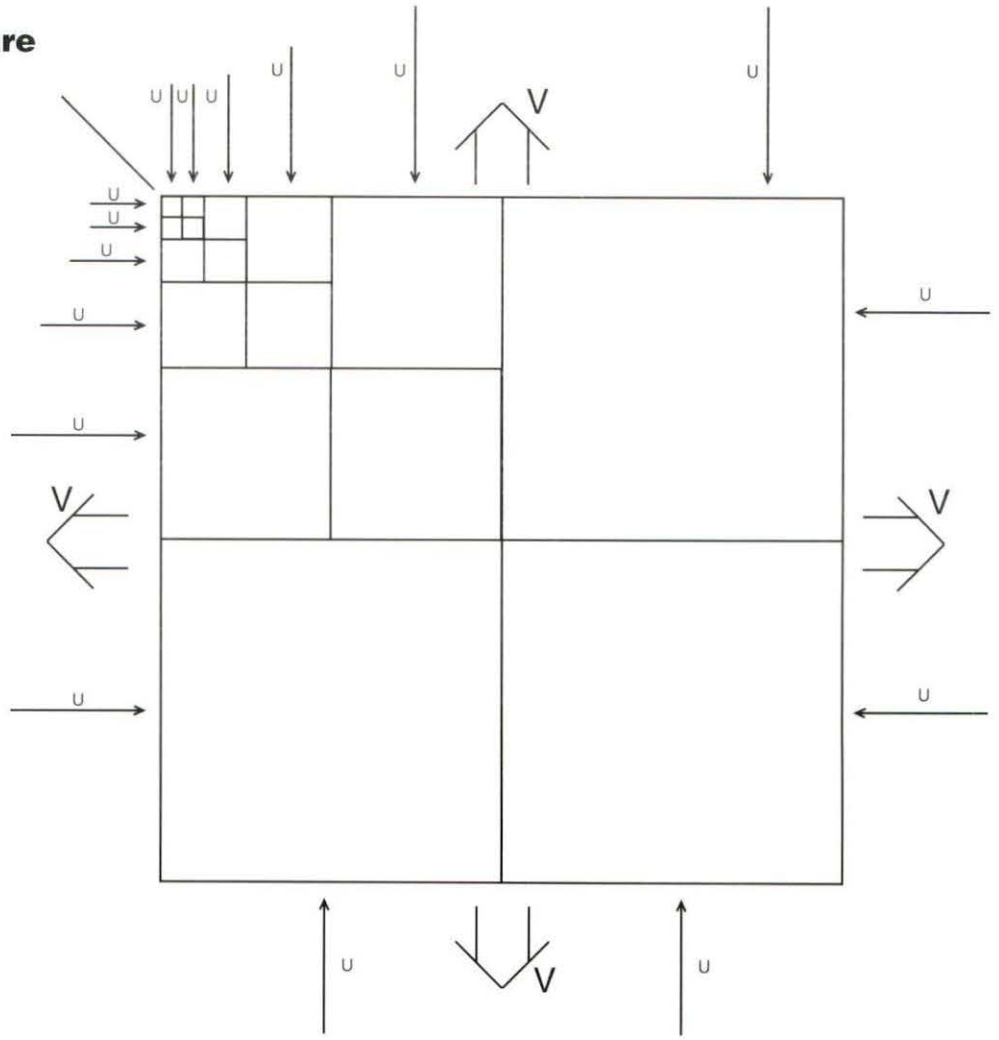
application of the value of his work is in solving the problem of how to keep radioactive particles from getting through the wall of a nuclear reactor—to suffer collisions and hence to lose energy and not exit the wall. "Background radiation is always present," claims Dr. Seth. "Nuclear engineers try to design reactors so that the radiation that gets out is less than background radiation. This did not happen at Cherynobl. They were not as careful; they used an old reactor–they didn't care enough."

Actual physical states include energy, position and direction. An incoming particle changes its physical state as it becomes an exiting particle. The particle's energy is transformed, its position is changed, its direction rerouted—"incident particles become exiting particles. This information finds application in operational computers used to solve problems in areas ranging from environmental issues (waste cleanup, atmospheric studies) to delicate topics (space research, national defense). . . . invariant imbedding methods would be applicable for various problems of radiation safety physics." CAT scans and the study of cancer benefit from such predictions of particle change.

If "U" equals the input of a particle entering "any old slab of material," then Dr. Seth explains the goal of the project: to write down a general equation for all U entering, that predicts what comes out of the slab due to U entering, knowing what comes in. Dr. Seth writes down the equation that describes the path of the incoming to the outgoing (the transition operator). This he calls the "invariant imbedding problem. Further, [he planned] to develop codes to efficiently compute numerical solutions of these equations on high performance computing machines." What is unusual about Dr. Seth's work is that in the past the problem has been approached only in one-dimensional space; he has pondered "the solution of two-dimensional transport problems by invariant imbedding methods."

Hopes for the future are that the same theory could be eventually applied to problems in three dimensions; the development of ever-more powerful computers points in this direction.

Fundamental Square



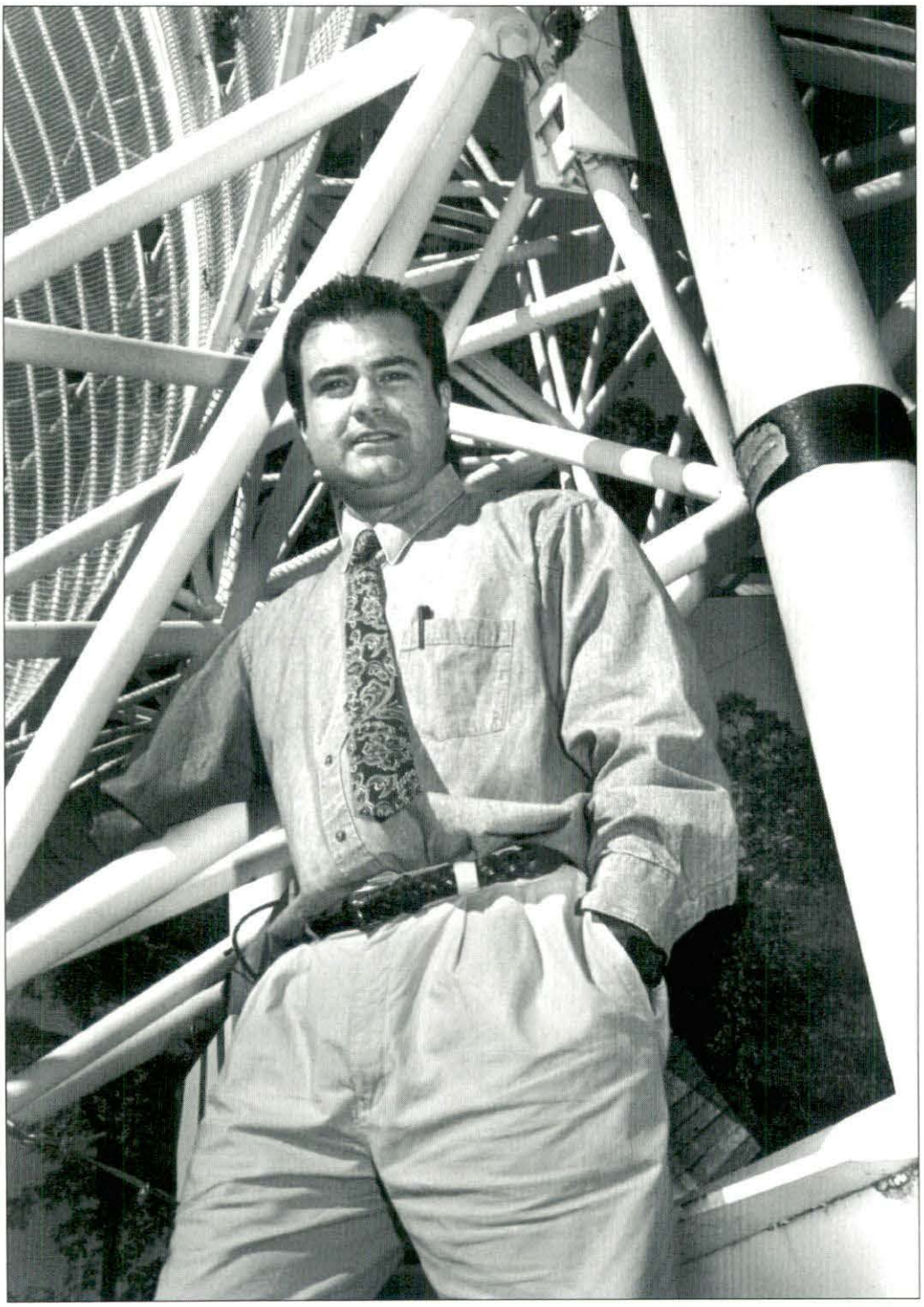
"Any old slab of material" after five doublings (32hx32h, 25hx25h.)

Dr. Seth has been teaching at MSU since 1991. He received his bachelor's degree in mathematics and education from Warren Wilson College in 1977, his master of science degree in mathematics from Western Kentucky University in 1979 and his doctorate in mathematics from Texas Tech University in 1987. He was a postdoctoral fellow in Applied Mathematics at the Ames Laboratory USDOE in Ames, Iowa, for three years and spent a total of two and a half years at the Los Alamos National Laboratory USDOE in Los Alamos, New Mexico. Finally, Dr. Seth has received two National Science Foundation grants for travel to India for a total of five months as a Visiting Scientist at the Institute for Mathematical Sciences in Madras. While there he visited the Health Safety Group, the Indira Ghandi Atomic Research Centre, the Computational Physics Group, and the Bhabba Atomic Research Centre.

THE MILKY WAY AND BEYOND

Dr. Benjamin Malphrus and Dr. Andrew Martin are MSU's first NASA JOVE researchers

by Rebecca Bailey



Dr. Benjamin Malphrus new book, *The History of Radio Astronomy and the National Radio Astronomy Observatory*, will be published in January 1996 by Krieger Publishing in Florida. Dr. Malphrus is shown with the Morehead Radio Telescope.

How many of us have not at some time in our lives stood silently beneath the night sky, and dreamed? Dreamed, quietly looking up, of the black expanse so deep above our heads that we cannot begin to comprehend the distance? Dreamed of counting the cool white stars, of discovering galaxies, of reaching light-years distant to find the universe's secrets? Dreamed of space, and telescopes, of walking on the moon, of peering into the Milky Way and galaxies beyond? For most of us, these dreams remain dreams, to ponder on clear summer nights. But for some, dreams become reality and so our comprehension of the universe, and our place in it, expands.

Two MSU faculty members, Dr. Benjamin Malphrus, associate professor of science, and Dr. Andrew Martin, assistant professor of mathematics, are among those researchers whose work extends far beyond the realm of our blue planet. The National Aeronautics and Space Administration (NASA) appointed the two as 1994 NASA/University JOint VEnture in Research (JOVE) Associates. The three-year appointment provided not only funds and release time for enhanced research opportunities for Drs. Malphrus and Martin but also provided scholarships and stipends for student researchers.

In general, this is what they have brought to Morehead State University as NASA/JOVE Research Associates: research initiatives in astrophysics; integration of astronomy and aerospace topics into existing science and math courses; development of new courses (such as principles of radio astronomy); independent study and directed research opportunities for students; teacher training workshops/institutes in astronomy and space science; University seminars and symposia; and classroom visits and public lectures.

What's missing from this list?

Excitement. Dr. Malphrus and Dr. Martin are infectiously excited not only about their own expanded research opportunities, but about the new and innovative opportunities afforded students and the University through this first-ever association with NASA.

Although they received the grant jointly, Dr. Malphrus and Dr. Martin are investigating separate topics and providing different astronomical experiences for their scholarship students. The projects are focused on galactic and extragalactic research.

A galaxy is an association of interstellar gas and dust and typically one hundred billion stars. There are three types of galaxies classified according to the pattern of arrangement of the stars within the galaxy: spiral, irregular and elliptical. Our own Milky Way galaxy is a spiral galaxy. The light we see from stars and galaxies is the light which left them long ago. For example, a galaxy one hundred and twenty million light-years away appears to us as it did one hundred and twenty million years ago in the past when the light we are seeing now left that galaxy. (In general, a light-year is the distance traveled by light in one year—some six thousand billion miles.)

Dr. Malphrus, whose National Science Foundation grant brought the Morehead Radio Telescope (MRT) to campus, is continuing his research in radio frequency astrophysics. (Radio telescopes examine electromagnetic radiation produced by radio waves and microwaves, the longest wavelengths.) More specifically, he is interested in extragalactic research (those galaxies outside the Milky Way) and how these galaxies gravitationally interact. He works with international researchers he "met" through the Internet; independently they had developed the same theories and have pooled their energies and knowledge to work as a team.

Dr. Malphrus and his colleagues theorized galaxies could either merge or interact gravitationally; pieces could be removed from existing galaxies and then develop into new galaxies. No one had ever seen galaxy formation until now. Using high resolution atomic hydrogen observations taken with the Very Large Array telescope operated by the National Radio Astronomy Observatory and the Hubble Space Telescope, the team found a protogalaxy, NGC 5291-B, formed by the gravitational removal of material from another galaxy. The disturbed galaxy Seashell, they were able to determine, had been acted upon gravitationally and distorted. Pieces of it were pulled apart, one of which is forming NGC 5291-B. Dr. Malphrus' team is thus the first in the history of science to see galaxy formation, and they are in the process of

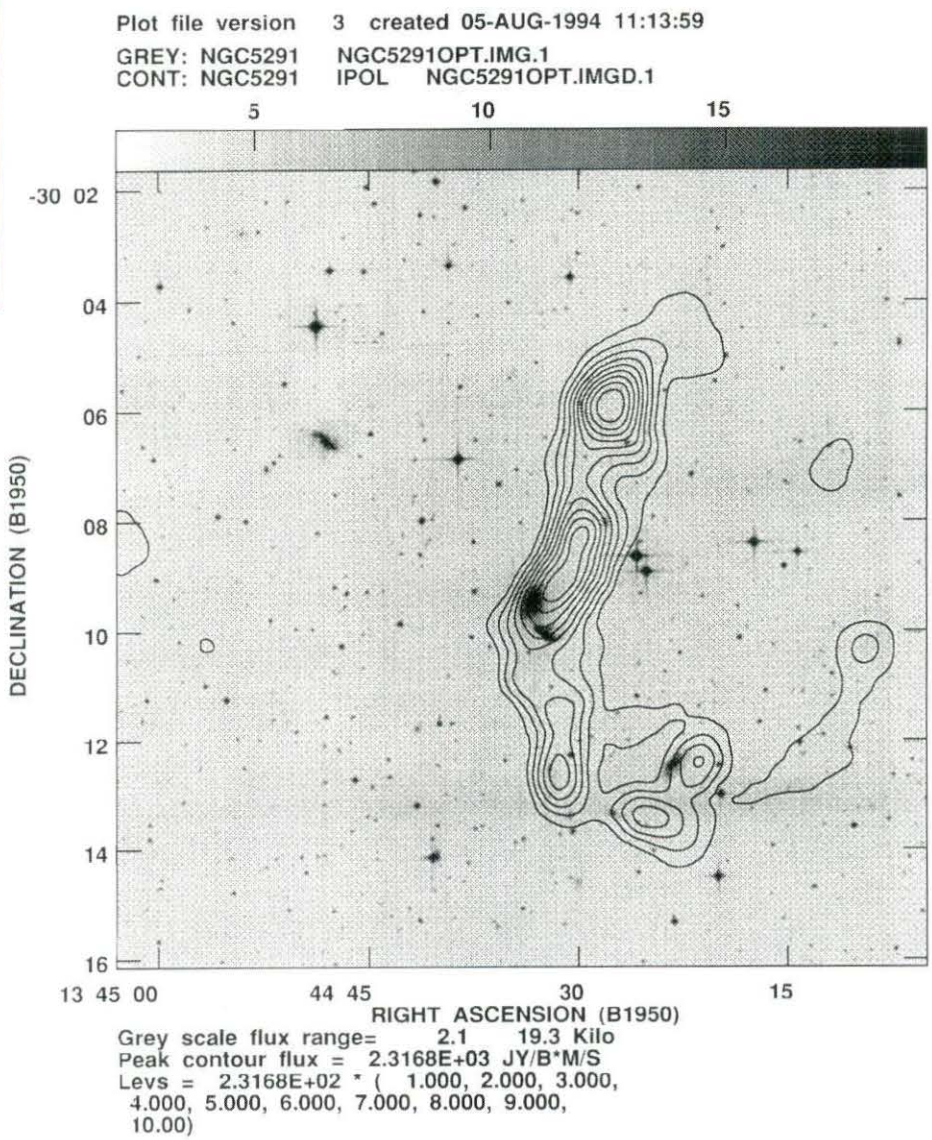
drafting articles to share the information about this important and exciting find.

"It is an extremely exciting time to do research in astrophysics—the discovery rate in the past few years has been fantastic," says Dr. Malphrus, who has worked previously at the National Radio Astronomy Observatory in Green Bank, West Virginia.

Dr. Martin, a mathematician whose area of specialization is set theory, sees his involvement with the program primarily as a means of bringing opportunities for original research to his scholarship students, and enhancing the image of Morehead State University through its association with NASA.

Dr. Martin and his student researchers are studying gamma ray astronomy. Gamma rays, at the highest end of the electromagnetic spectrum, allow researchers to look directly into the center of the Milky Way galaxy; what is in the center of the Milky Way galaxy has never been exactly determined. "Most gamma rays don't reach the earth," explains Dr. Martin, "which is good for the earth but bad for astronomy." According to a NASA fact sheet, "Through gamma ray observations we may witness the birth of elements and deaths of stars, gain clues into the mysteries of quasars, pulsars, neutron stars and peer into the space/time precipice of a black hole." When these great amounts of energy are released, gamma rays are produced, and are the only source of information about some events.

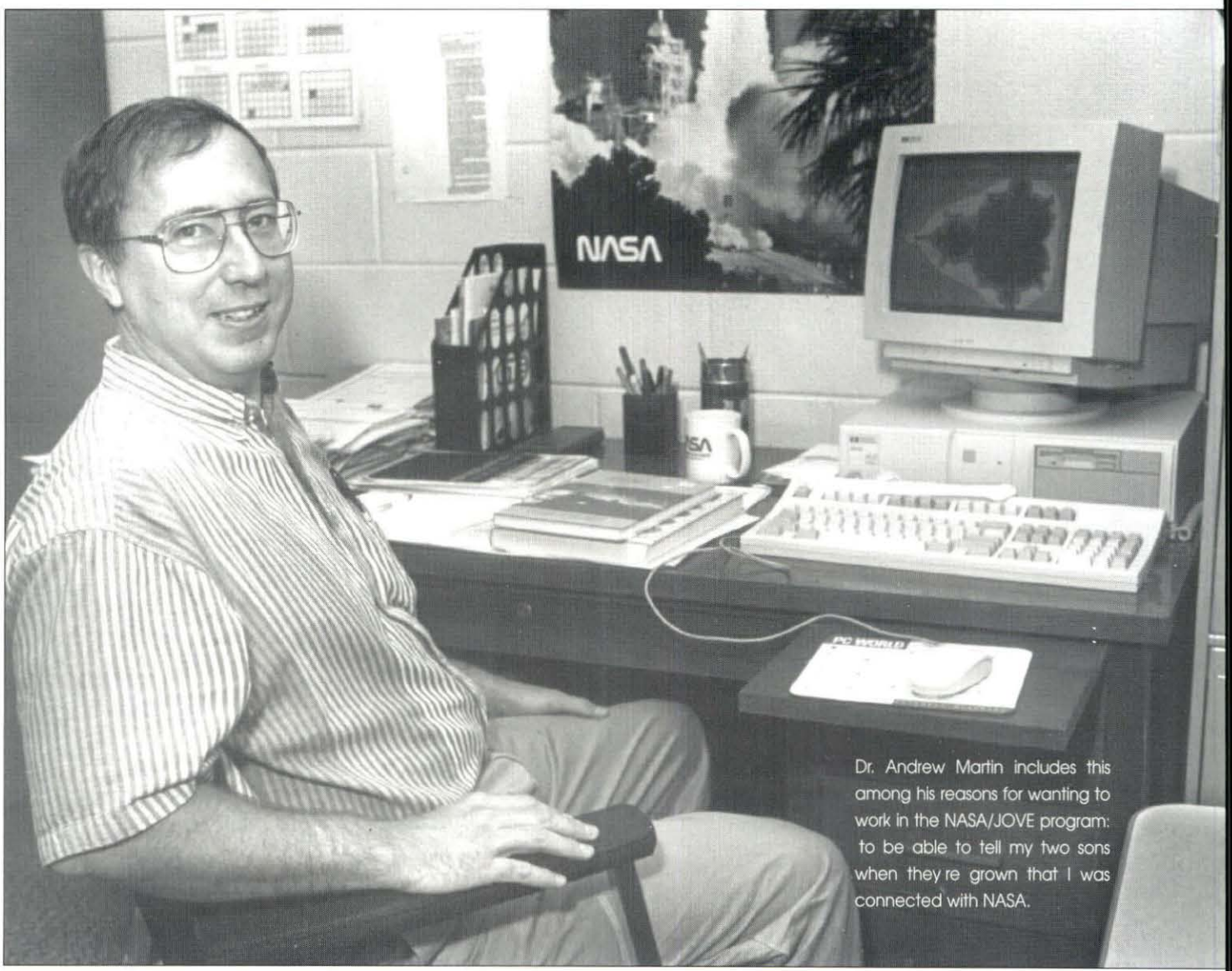
The northernmost set of circular contour lines encloses the galaxy whose formation Dr. Malphrus and his colleagues have been watching. The galaxy, NGC 5291-B, is 56.6 megaparsecs from the earth, approximately 108,672 quadrillion miles or 184,516,00 light-years, away.



One way gamma ray photons are produced is through the dramatic annihilation of electrons through contact with their anti-matter twins, positrons. Dr. Martin's project is to determine the source of positrons whose annihilation produces the strong .511 MeV line in the spectrum at the center of the Milky Way. This astronomical problem has close ties with the orthopositronium lifetime puzzle, a current focus of physics research. Dr. Martin's students search the World Wide Web for all relevant data, which now points to 1E 1740.7-2942 ("The Great Annihilator") as the source of the positrons. Dr. Martin's students gave a presentation of their research at the annual meeting of the Kentucky Academy of Science meeting in November.

MSU's NASA scholarships are currently awarded to Travis Hoyt, Viju Hullur, Phillip Hitchcock, Daniel Todd Griffith, Shawn Bradley and Junmei Pan.

While both believe that NASA is well pleased by their work, Dr. Martin and Dr. Malphrus are working toward long term goals for the science programs at MSU, one of which is the eventual development of an astronomy minor. With the Morehead Radio Telescope coming on-line in the near future, they are optimistic that this University will attract even more students and scholars to study and investigate the beauties and the mysteries of the universe.

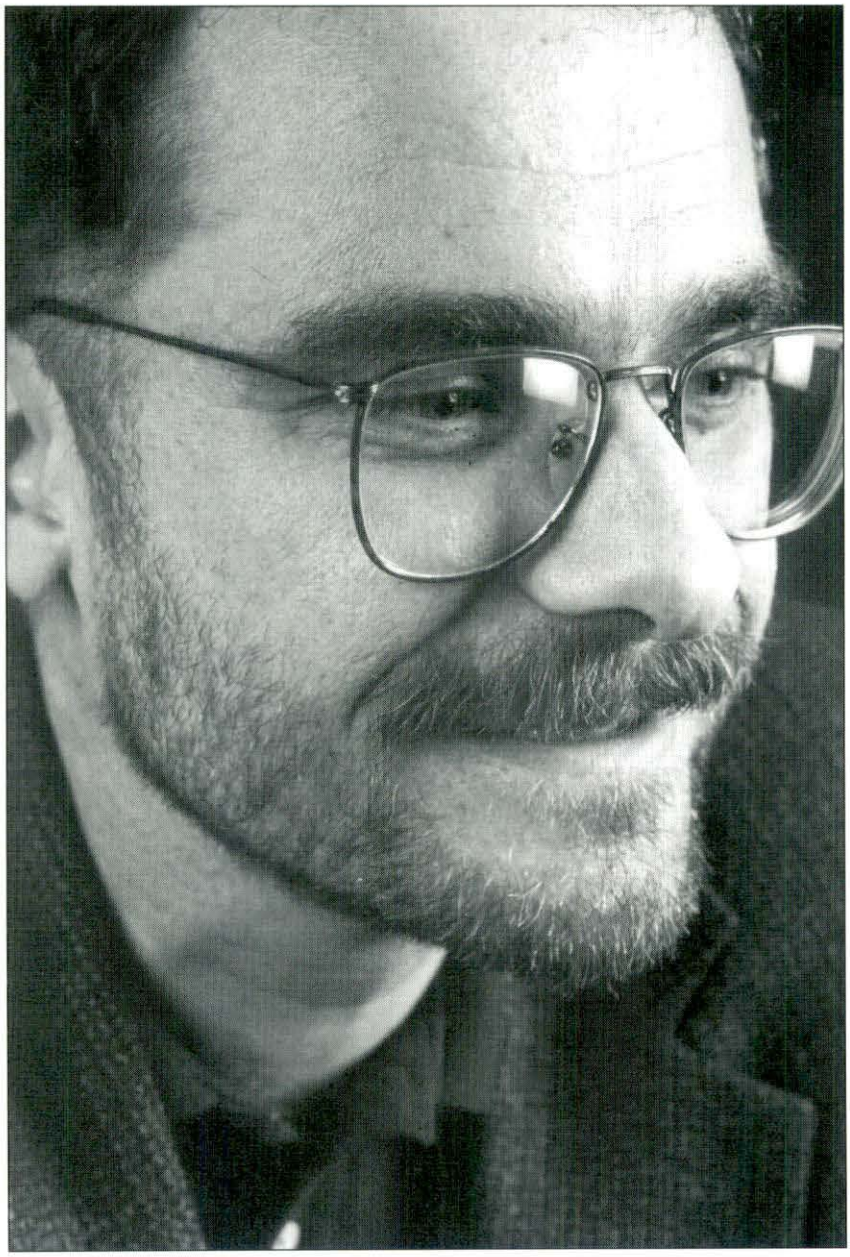


Dr. Andrew Martin includes this among his reasons for wanting to work in the NASA/JOVE program: to be able to tell my two sons when they're grown that I was connected with NASA.

See the Forest at a Glance

Dr. Ron Mitchelson makes information about Kentucky's forest resources more accessible

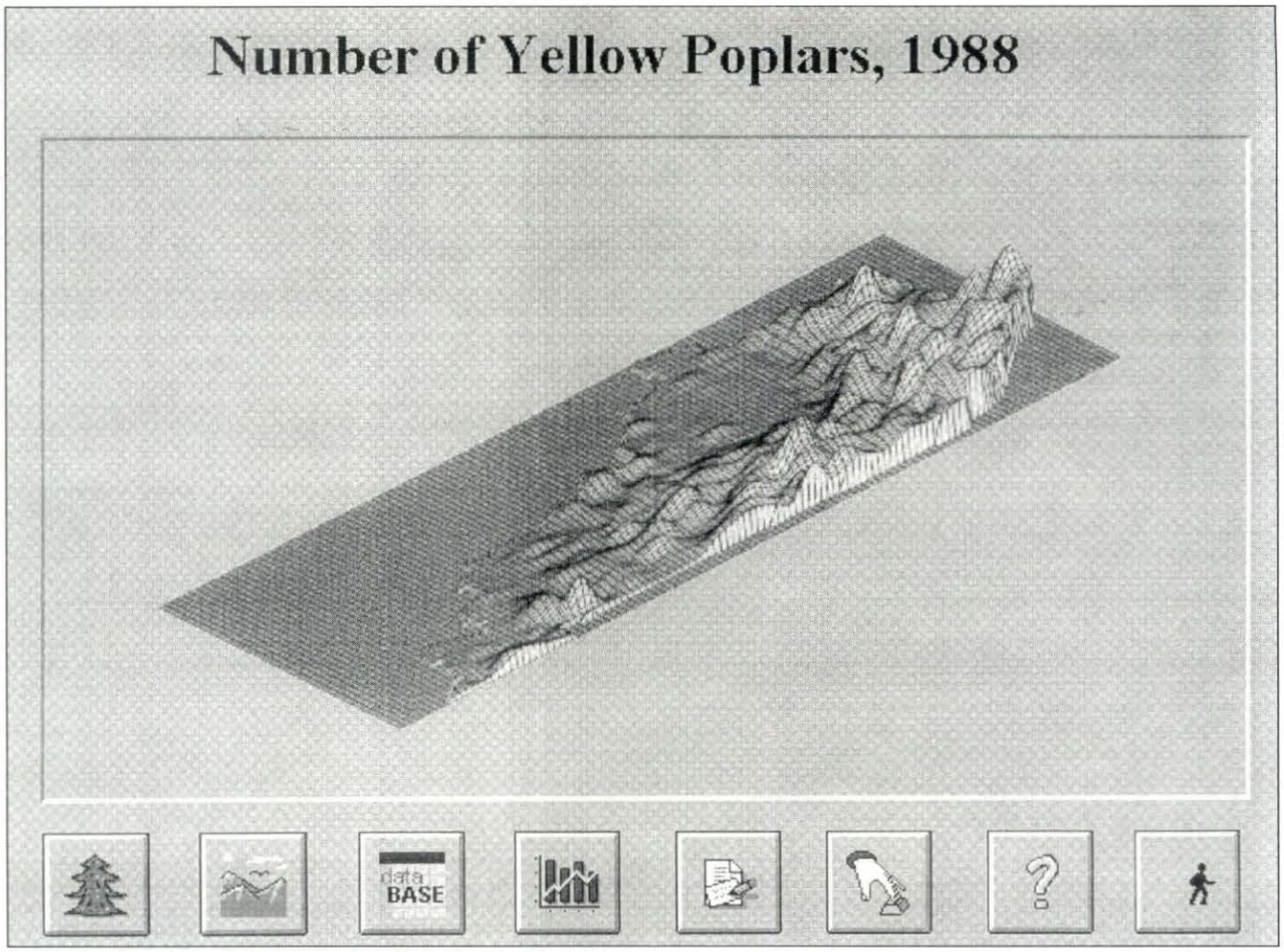
by Mickey Morgan



Dr. Ron Mitchelson s work will better enable the regulating of forest lands.

Sophisticated forestry management. Informed decision making. What do these phrases mean to Dr. Ronald L. Mitchelson, chair of the Department of Geography, Government, and History? It means developing Kentucky's wood resource industry from its current primary (raw timber) business to secondary (production of wood products) business thereby increasing employment but at the same time "maintaining sustainable development" of the trees. It means having the fundamental information of an ongoing and reliable inventory of the state's available trees. Dr. Mitchelson has provided the Kentucky Division of Forestry with an updated version of that inventory—the difference between the manner of presentation of the former inventory (done in 1987 by the U.S. Forest Service) and his current one is radical. With Dr. Mitchelson as project director, the Morehead State University Hardwood Institute applied to and received from the Kentucky Division of Forestry the funds for a grant entitled "Rural Development–Strengthening Rural Economies."

Kentucky ranks fifth in the nation for the production of sawn lumber–in 1990 the state produced 752 million board feet of lumber. "That's a lot of trees!" exclaims Dr. Mitchelson. With 12 million acres of commercial forest (47% of the state's land area), logging is a prime vocation for 5000 people in 568 sawmills. He explains that many raw logs are exported to surrounding states and to Asian locations, but



Screen image from the user friendly GIS

the actual amount is not monitored. "There is a lot of pressure on the forest." As a result, the forest is being depleted at a rate we are not even aware of, creating disharmony in the ecological system. "Our job is to supply objective information as to the rapid growth in cutting–the dangerous depletion will become clear with the facts."

The basic issue that Dr. Mitchelson is contending with is sustainability–ongoing and renewable resources. "Since the coal resource is not renewable, and with technology improving to produce more coal with less employment, the forest resource is becoming increasingly important to the economic future of the region."

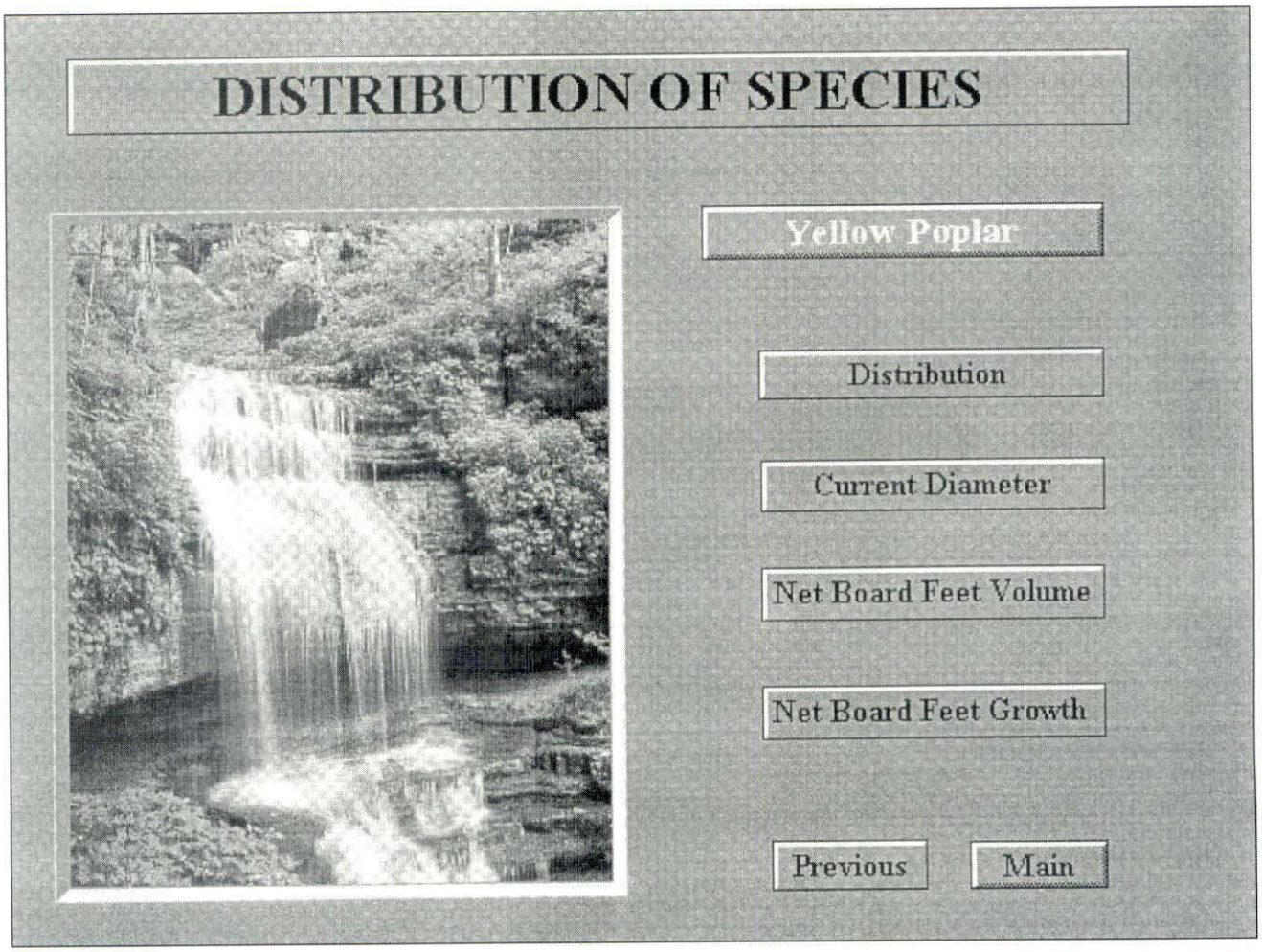
Dr. Mitchelson's best argument for being funded to create his database is the infrequency and fallibility of the information currently in use. Every 13 years the U.S. Forest Service takes a census of trees. Three thousand sample acre plots are examined for species, size and other relevant factors. The last census was taken in 1987, the next will be in the year 2000; and, according to Dr. Mitchelson, the U.S. Forest Service will take an additional five years to compile the information so that it is usable to individual states. But . . . Kentucky could undergo such rapid change in forest depletion that 13 years could be too long to be of much help. Abuse of the forest is increasingly possible. Businesses from other states, attracted to the density of forest lands, especially in Eastern Kentucky, can open factories in nearby counties and literally strip the land, not paying attention to the size or species of a tree. One particular out-of-state-owned factory in an Eastern Kentucky county was hungry for poplars and wasn't concerned about taking young trees. In fact, its home state was running out of poplar.

Several questions need to be addressed in order to "make sound decisions with regard to economic development and potential industrial sites" to begin to remedy this possible abuse, says Dr. Mitchelson: What kinds of trees exist and what are their sizes? How much sawn lumber and wood waste is produced? What and how many species of life are endangered? How much of the land is protected forest land? Where do wild river habitats exist? "Presently, all of this information exists and is used," claims Dr. Mitchelson. "However, there is a need to organize this information within an integrated system designed explicitly to provide updated and accurate estimates all in a timely fashion."

The geographer describes the Kentucky Division of Forestry as being politically in a tight spot: businesses and subsequent jobs could develop in an area of Kentucky where unemployment is high, yet an unmanaged system of allocating the forests to attracted businesses could result in an eventual end to forestry as a resource. Sustainability is the key issue, Dr. Mitchelson believes, and it can only begin with the Division of Forestry's easy access to Kentucky's rapidly changing landscape. Only then can sustainable, harmonious management of this key resource be maintained.

Dr. Mitchelson's project has created "a user-friendly geographic information system (GIS) that contains the key layers of information needed" to answer these questions. "It is most important to monitor the change in the distribution of size classes that results directly from forest growth. It is possible to relate these rates of growth to harvesting methods." Dr. Yu Luo, assistant professor of geography, is responsible for the program design of the system. Other team members include Dr. Timothy Pitts, assistant professor of geography, who did the statistical analyses; Kevin Calhoun of the Center for Community and Economic Development served as research associate; and Bob Bauer, formerly with CCED, was professional forester.

Dr. Mitchelson believes that the information will have a strong impact on policy-making as the state considers the regulating of forest lands. "The GIS will provide incentives for good management." He describes the loggers themselves as having difficult and dangerous lives and thus lacking the motivation to be highly selective in their choices of trees; they do whatever is necessary to bring in a full shipment of logs. It will be difficult, additionally, for the state to regulate land in private ownership; the forest could be damaged as poor people do what is necessary to make a living. Unmonitored logging results in erosion, which results in poor stream quality. One county could then be pitted against another for its intrusion on their resources. "The concern is well-placed, but the state is in a bad situation. Possibly, it could provide a



Screen image from the user friendly GIS

financial incentive to private owners to get them to do their work in more ecologically sustainable ways."

With the continuous sophistication of the use of computers to compile information and make it accessible in geography, Dr. Mitchelson, as chair of his department, is interested in hiring the computer-oriented geographer. The National Science Foundation recently gave the department $50,000 for a computer lab: future students will be more prepared for the job market with Dr. Mitchelson's emphasis.

Tech Prep Consortium Creates Knowing Ninth Graders

Drs. Marilyn Sampley and Sue Luckey collaborate to develop stronger curricula

by Mickey Morgan

Dr. Sue Luckey (left) and Dr. Marilyn Sampley have found an easy collaborative spirit between them.

The primary goal of the project, "Tech Prep Consortium Serving Eastern Kentucky," is to prepare high school students for post-secondary education, to keep them there through graduation with an associate degree, and to prepare both high school and post-secondary students for viable careers. Previously, that process had been randomly organized; students guessed at necessary curricula for particular careers and student retention was based on few concrete efforts.

Funded by the Federal Government through State Departments, MSU's Tech Prep Consortium is currently in its third year. The first year was for planning, the second and third years were for implementation of the program. Members of the Consortium are Morehead State University, Rowan County Senior High School, Bath County High School and Rowan County Vocational-Technical School. Reassessed annually, the program will hopefully continue beyond a third year.

How many of us have not at some time in our lives stood silently beneath the night sky, and dreamed? Dreamed, quietly looking up, of the black expanse so deep above our heads that we cannot begin to comprehend the distance? Dreamed of counting the cool white stars, of discovering galaxies, of reaching light-years distant to find the universe's secrets? Dreamed of space, and telescopes, of walking on the moon, of peering into the Milky Way and galaxies beyond? For most of us, these dreams remain dreams, to ponder on clear summer nights. But for some, dreams become reality and so our comprehension of the universe, and our place in it, expands.

Two MSU faculty members, Dr. Benjamin Malphrus, associate professor of science, and Dr. Andrew Martin, assistant professor of mathematics, are among those researchers whose work extends far beyond the realm of our blue planet. The National Aeronautics and Space Administration (NASA) appointed the two as 1994 NASA/University JOint VEnture in Research (JOVE) Associates. The three-year appointment provided not only funds and release time for enhanced research opportunities for Drs. Malphrus and Martin but also provided scholarships and stipends for student researchers.

In general, this is what they have brought to Morehead State University as NASA/JOVE Research Associates: research initiatives in astrophysics; integration of astronomy and aerospace topics into existing science and math courses; development of new courses (such as principles of radio astronomy); independent study and directed research opportunities for students; teacher training workshops/institutes in astronomy and space science; University seminars and symposia; and classroom visits and public lectures.

What's missing from this list?

Excitement. Dr. Malphrus and Dr. Martin are infectiously excited not only about their own expanded research opportunities, but about the new and innovative opportunities afforded students and the University through this first-ever association with NASA.

Although they received the grant jointly, Dr. Malphrus and Dr. Martin are investigating separate topics and providing different astronomical experiences for their scholarship students. The projects are focused on galactic and extragalactic research.

A galaxy is an association of interstellar gas and dust and typically one hundred billion stars. There are three types of galaxies classified according to the pattern of arrangement of the stars within the galaxy: spiral, irregular and elliptical. Our own Milky Way galaxy is a spiral galaxy. The light we see from stars and galaxies is the light which left them long ago. For example, a galaxy one hundred and twenty million light-years away appears to us as it did one hundred and twenty million years ago in the past when the light we are seeing now left that galaxy. (In general, a light-year is the distance traveled by light in one year—some six thousand billion miles.)

Dr. Malphrus, whose National Science Foundation grant brought the Morehead Radio Telescope (MRT) to campus, is continuing his research in radio frequency astrophysics. (Radio telescopes examine electromagnetic radiation produced by radio waves and microwaves, the longest wavelengths.) More specifically, he is interested in extragalactic research (those galaxies outside the Milky Way) and how these galaxies gravitationally interact. He works with international researchers he "met" through the Internet; independently they had developed the same theories and have pooled their energies and knowledge to work as a team.

Dr. Malphrus and his colleagues theorized galaxies could either merge or interact gravitationally; pieces could be removed from existing galaxies and then develop into new galaxies. No one had ever seen galaxy formation until now. Using high resolution atomic hydrogen observations taken with the Very Large Array telescope operated by the National Radio Astronomy Observatory and the Hubble Space Telescope, the team found a protogalaxy, NGC 5291-B, formed by the gravitational removal of material from another galaxy. The disturbed galaxy Seashell, they were able to determine, had been acted upon gravitationally and distorted. Pieces of it were pulled apart, one of which is forming NGC 5291-B. Dr. Malphrus' team is thus the first in the history of science to see galaxy formation, and they are in the process of

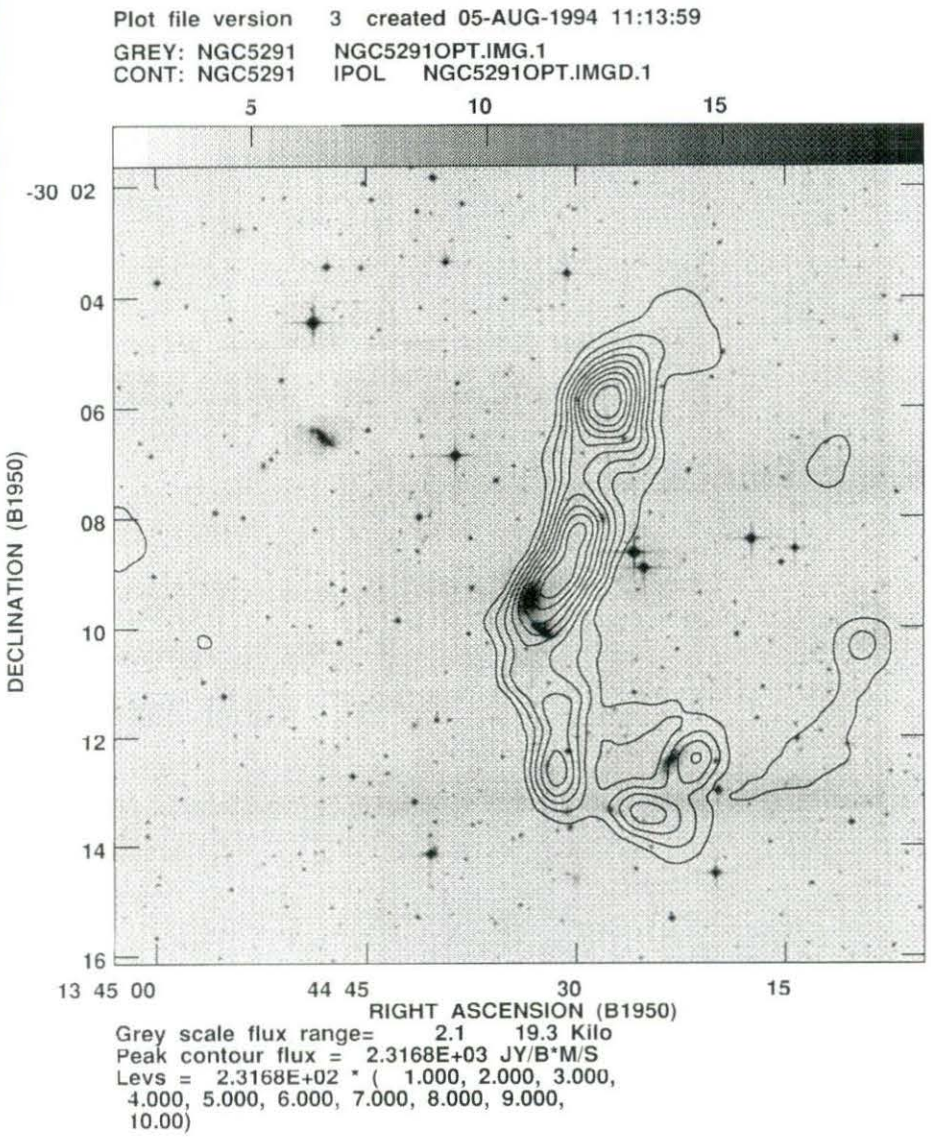
drafting articles to share the information about this important and exciting find.

"It is an extremely exciting time to do research in astrophysics—the discovery rate in the past few years has been fantastic," says Dr. Malphrus, who has worked previously at the National Radio Astronomy Observatory in Green Bank, West Virginia.

Dr. Martin, a mathematician whose area of specialization is set theory, sees his involvement with the program primarily as a means of bringing opportunities for original research to his scholarship students, and enhancing the image of Morehead State University through its association with NASA.

Dr. Martin and his student researchers are studying gamma ray astronomy. Gamma rays, at the highest end of the electromagnetic spectrum, allow researchers to look directly into the center of the Milky Way galaxy; what is in the center of the Milky Way galaxy has never been exactly determined. "Most gamma rays don't reach the earth," explains Dr. Martin, "which is good for the earth but bad for astronomy." According to a NASA fact sheet, "Through gamma ray observations we may witness the birth of elements and deaths of stars, gain clues into the mysteries of quasars, pulsars, neutron stars and peer into the space/time precipice of a black hole." When these great amounts of energy are released, gamma rays are produced, and are the only source of information about some events.

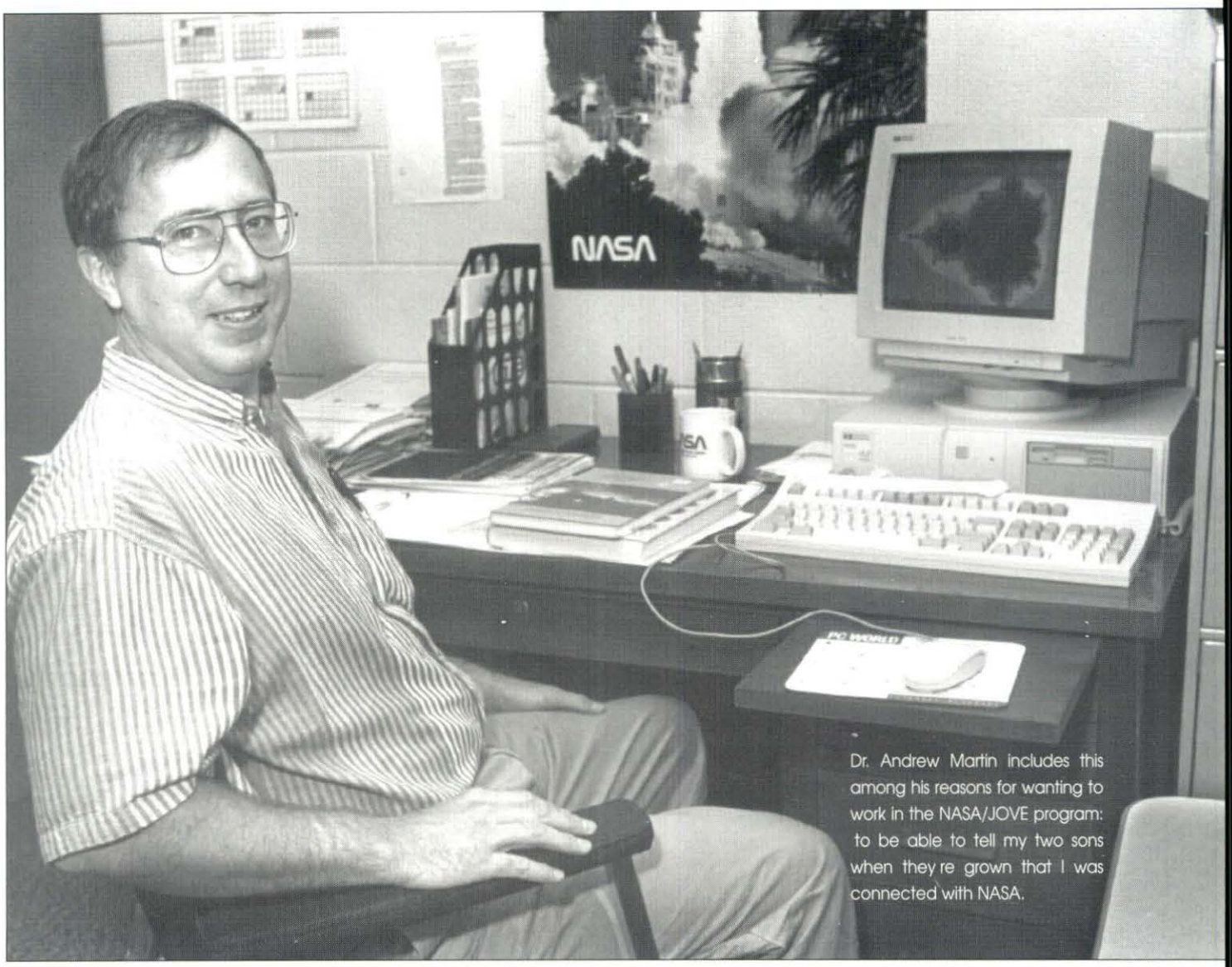
The northernmost set of circular contour lines encloses the galaxy whose formation Dr. Malphrus and his colleagues have been watching. The galaxy, NGC 5291-B, is 56.6 megaparsecs from the earth, approximately 108,672 quadrillion miles or 184,516,00 light-years, away.



One way gamma ray photons are produced is through the dramatic annihilation of electrons through contact with their anti-matter twins, positrons. Dr. Martin's project is to determine the source of positrons whose annihilation produces the strong .511 MeV line in the spectrum at the center of the Milky Way. This astronomical problem has close ties with the orthopositronium lifetime puzzle, a current focus of physics research. Dr. Martin's students search the World Wide Web for all relevant data, which now points to 1E 1740.7-2942 ("The Great Annihilator") as the source of the positrons. Dr. Martin's students gave a presentation of their research at the annual meeting of the Kentucky Academy of Science meeting in November.

MSU's NASA scholarships are currently awarded to Travis Hoyt, Viju Hullur, Phillip Hitchcock, Daniel Todd Griffith, Shawn Bradley and Junmei Pan.

While both believe that NASA is well pleased by their work, Dr. Martin and Dr. Malphrus are working toward long term goals for the science programs at MSU, one of which is the eventual development of an astronomy minor. With the Morehead Radio Telescope coming on-line in the near future, they are optimistic that this University will attract even more students and scholars to study and investigate the beauties and the mysteries of the universe.

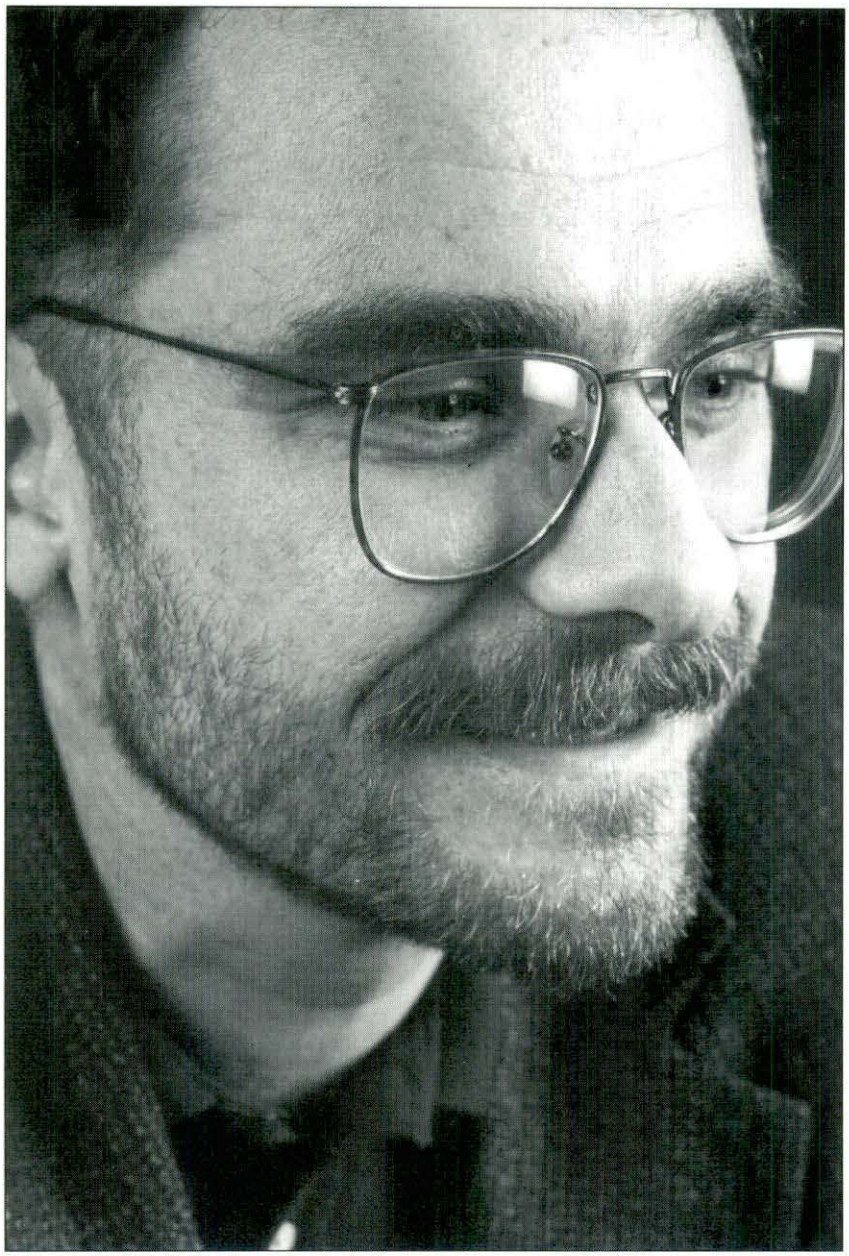


Dr. Andrew Martin includes this among his reasons for wanting to work in the NASA/JOVE program: to be able to tell my two sons when they re grown that I was connected with NASA.

See the Forest at a Glance

Dr. Ron Mitchelson makes information about Kentucky's forest resources more accessible

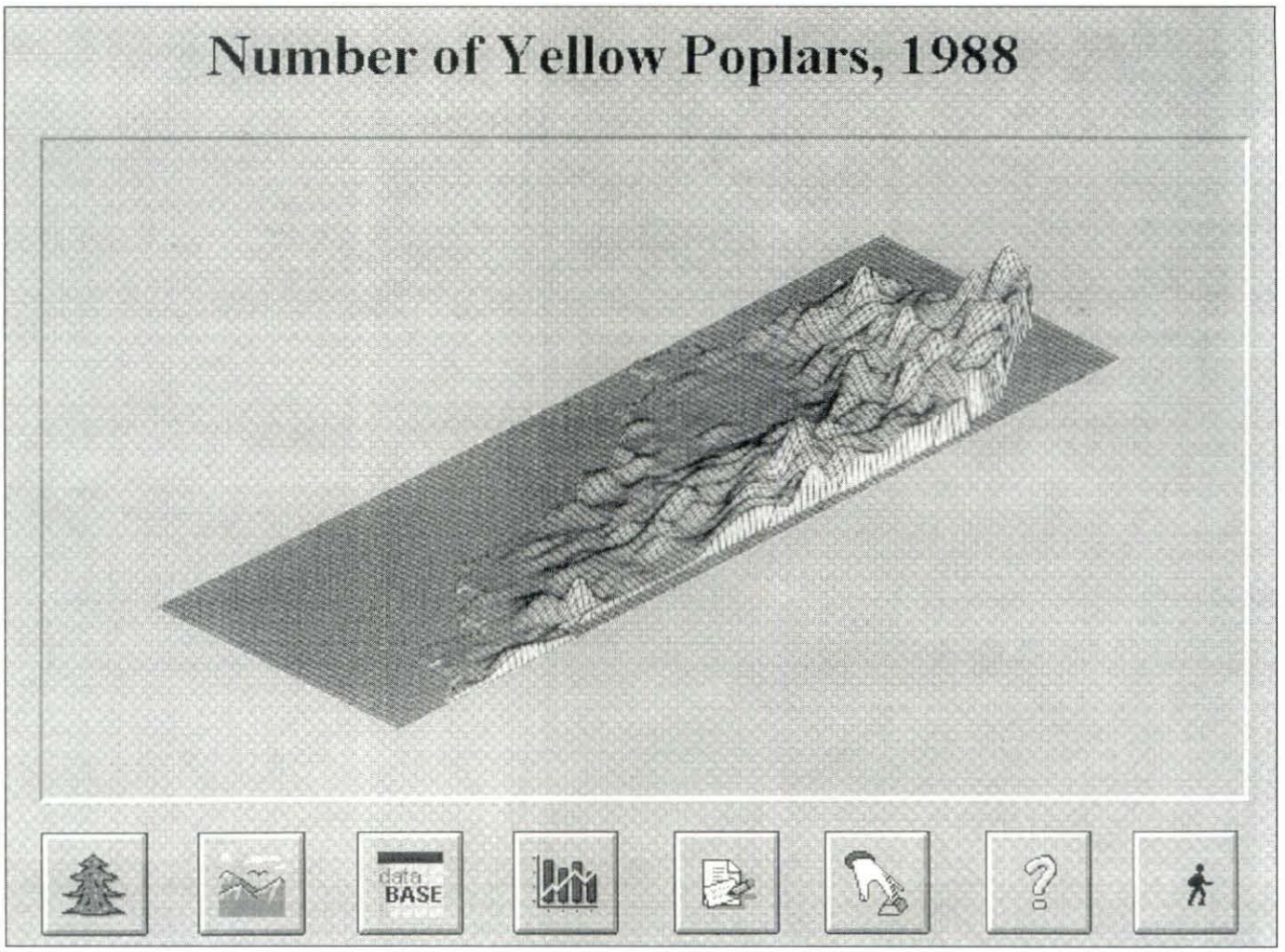
by Mickey Morgan



Dr. Ron Mitchelson s work will better enable the regulating of forest lands.

Sophisticated forestry management. Informed decision making. What do these phrases mean to Dr. Ronald L. Mitchelson, chair of the Department of Geography, Government, and History? It means developing Kentucky's wood resource industry from its current primary (raw timber) business to secondary (production of wood products) business thereby increasing employment but at the same time "maintaining sustainable development" of the trees. It means having the fundamental information of an ongoing and reliable inventory of the state's available trees. Dr. Mitchelson has provided the Kentucky Division of Forestry with an updated version of that inventory—the difference between the manner of presentation of the former inventory (done in 1987 by the U.S. Forest Service) and his current one is radical. With Dr. Mitchelson as project director, the Morehead State University Hardwood Institute applied to and received from the Kentucky Division of Forestry the funds for a grant entitled "Rural Development–Strengthening Rural Economies."

Kentucky ranks fifth in the nation for the production of sawn lumber–in 1990 the state produced 752 million board feet of lumber. "That's a lot of trees!" exclaims Dr. Mitchelson. With 12 million acres of commercial forest (47% of the state's land area), logging is a prime vocation for 5000 people in 568 sawmills. He explains that many raw logs are exported to surrounding states and to Asian locations, but



Screen image from the user friendly GIS

the actual amount is not monitored. "There is a lot of pressure on the forest." As a result, the forest is being depleted at a rate we are not even aware of, creating disharmony in the ecological system. "Our job is to supply objective information as to the rapid growth in cutting–the dangerous depletion will become clear with the facts."

The basic issue that Dr. Mitchelson is contending with is sustainability–ongoing and renewable resources. "Since the coal resource is not renewable, and with technology improving to produce more coal with less employment, the forest resource is becoming increasingly important to the economic future of the region."

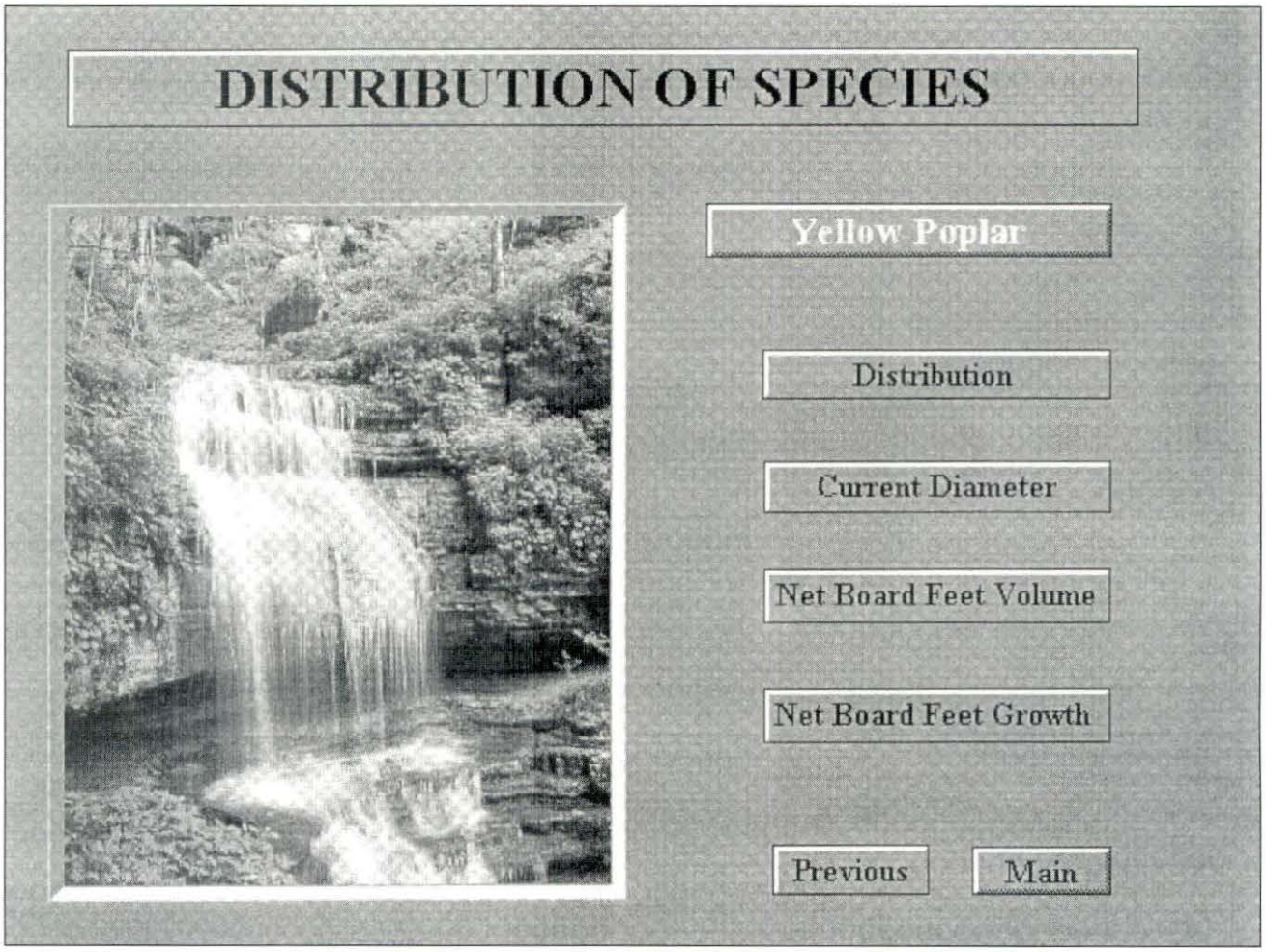
Dr. Mitchelson's best argument for being funded to create his database is the infrequency and fallibility of the information currently in use. Every 13 years the U.S. Forest Service takes a census of trees. Three thousand sample acre plots are examined for species, size and other relevant factors. The last census was taken in 1987, the next will be in the year 2000; and, according to Dr. Mitchelson, the U.S. Forest Service will take an additional five years to compile the information so that it is usable to individual states. But . . . Kentucky could undergo such rapid change in forest depletion that 13 years could be too long to be of much help. Abuse of the forest is increasingly possible. Businesses from other states, attracted to the density of forest lands, especially in Eastern Kentucky, can open factories in nearby counties and literally strip the land, not paying attention to the size or species of a tree. One particular out-of-state-owned factory in an Eastern Kentucky county was hungry for poplars and wasn't concerned about taking young trees. In fact, its home state was running out of poplar.

Several questions need to be addressed in order to "make sound decisions with regard to economic development and potential industrial sites" to begin to remedy this possible abuse, says Dr. Mitchelson: What kinds of trees exist and what are their sizes? How much sawn lumber and wood waste is produced? What and how many species of life are endangered? How much of the land is protected forest land? Where do wild river habitats exist? "Presently, all of this information exists and is used," claims Dr. Mitchelson. "However, there is a need to organize this information within an integrated system designed explicitly to provide updated and accurate estimates all in a timely fashion."

The geographer describes the Kentucky Division of Forestry as being politically in a tight spot: businesses and subsequent jobs could develop in an area of Kentucky where unemployment is high, yet an unmanaged system of allocating the forests to attracted businesses could result in an eventual end to forestry as a resource. Sustainability is the key issue, Dr. Mitchelson believes, and it can only begin with the Division of Forestry's easy access to Kentucky's rapidly changing landscape. Only then can sustainable, harmonious management of this key resource be maintained.

Dr. Mitchelson's project has created "a user-friendly geographic information system (GIS) that contains the key layers of information needed" to answer these questions. "It is most important to monitor the change in the distribution of size classes that results directly from forest growth. It is possible to relate these rates of growth to harvesting methods." Dr. Yu Luo, assistant professor of geography, is responsible for the program design of the system. Other team members include Dr. Timothy Pitts, assistant professor of geography, who did the statistical analyses; Kevin Calhoun of the Center for Community and Economic Development served as research associate; and Bob Bauer, formerly with CCED, was professional forester.

Dr. Mitchelson believes that the information will have a strong impact on policy-making as the state considers the regulating of forest lands. "The GIS will provide incentives for good management." He describes the loggers themselves as having difficult and dangerous lives and thus lacking the motivation to be highly selective in their choices of trees; they do whatever is necessary to bring in a full shipment of logs. It will be difficult, additionally, for the state to regulate land in private ownership; the forest could be damaged as poor people do what is necessary to make a living. Unmonitored logging results in erosion, which results in poor stream quality. One county could then be pitted against another for its intrusion on their resources. "The concern is well-placed, but the state is in a bad situation. Possibly, it could provide a



Screen image from the user friendly GIS

financial incentive to private owners to get them to do their work in more ecologically sustainable ways."

With the continuous sophistication of the use of computers to compile information and make it accessible in geography, Dr. Mitchelson, as chair of his department, is interested in hiring the computer-oriented geographer. The National Science Foundation recently gave the department $50,000 for a computer lab: future students will be more prepared for the job market with Dr. Mitchelson's emphasis.

Tech Prep Consortium Creates Knowing Ninth Graders

Drs. Marilyn Sampley and Sue Luckey collaborate to develop stronger curricula

by Mickey Morgan

Dr. Sue Luckey (left) and Dr. Marilyn Sampley have found an easy collaborative spirit between them.

The primary goal of the project, "Tech Prep Consortium Serving Eastern Kentucky," is to prepare high school students for post-secondary education, to keep them there through graduation with an associate degree, and to prepare both high school and post-secondary students for viable careers. Previously, that process had been randomly organized; students guessed at necessary curricula for particular careers and student retention was based on few concrete efforts.

Funded by the Federal Government through State Departments, MSU's Tech Prep Consortium is currently in its third year. The first year was for planning, the second and third years were for implementation of the program. Members of the Consortium are Morehead State University, Rowan County Senior High School, Bath County High School and Rowan County Vocational-Technical School. Reassessed annually, the program will hopefully continue beyond a third year.

Tech Prep gives meaning in the tangible world to students not accustomed to applying what they learn in school to the efforts they make in the job world. The project provides an Individual Graduation Plan (IGP) for every student at the eighth grade level, outlining the requirements for a particular profession or career pathway.

By involving teachers, guidance counselors, principals, members of the business community, and the University, the project integrates this expertise and then advises the student to follow a particular track of courses specially designed to gain the knowledge required for that career.

The schools involved in the program no longer foster teaching disconnected from practice but encourage application of concepts to tangible tasks. Students emerge from high school prepared technologically for the demands of post-secondary work.

As co-directors of Tech Prep, Dr. Marilyn Sampley, chair of Human Sciences, and Dr. Sue Luckey, professor of Business Education, have coordinated "articulation agreements" between Morehead State University and more than 40 high schools in Central and Eastern Kentucky. By designing sophisticated career guidance programs for a full range of careers, Dr. Sampley and Dr. Luckey have established good working relationships between faculty in these schools and the University.

Counseling a student as early as the eighth grade, the co-directors of the project advise guidance counselors about course offerings and career requirements. For example, an eighth grader wanting to pursue a career in accounting will be guided into appropriate classes from the freshman through the senior year of high school. All of these college preparatory classes are taught in an applied manner, integrating both academic and vocational education. Previous students without such meticulous guidance have come to MSU unprepared for technological sophistication; as a result, the drop-out rate has been too high. Drs. Sampley and Luckey have high hopes that their project will foster not only recruitment for MSU, but will build retention and lead students through to graduation and successful careers.

Dr. Luckey stresses how relevant the program is to current advances in education: "The Kentucky Education Reform Act (KERA) dovetails with the Tech Prep program in that the state requires schools to have a pre-college curricula. With the advent of technology, most programs require high level math and science courses."

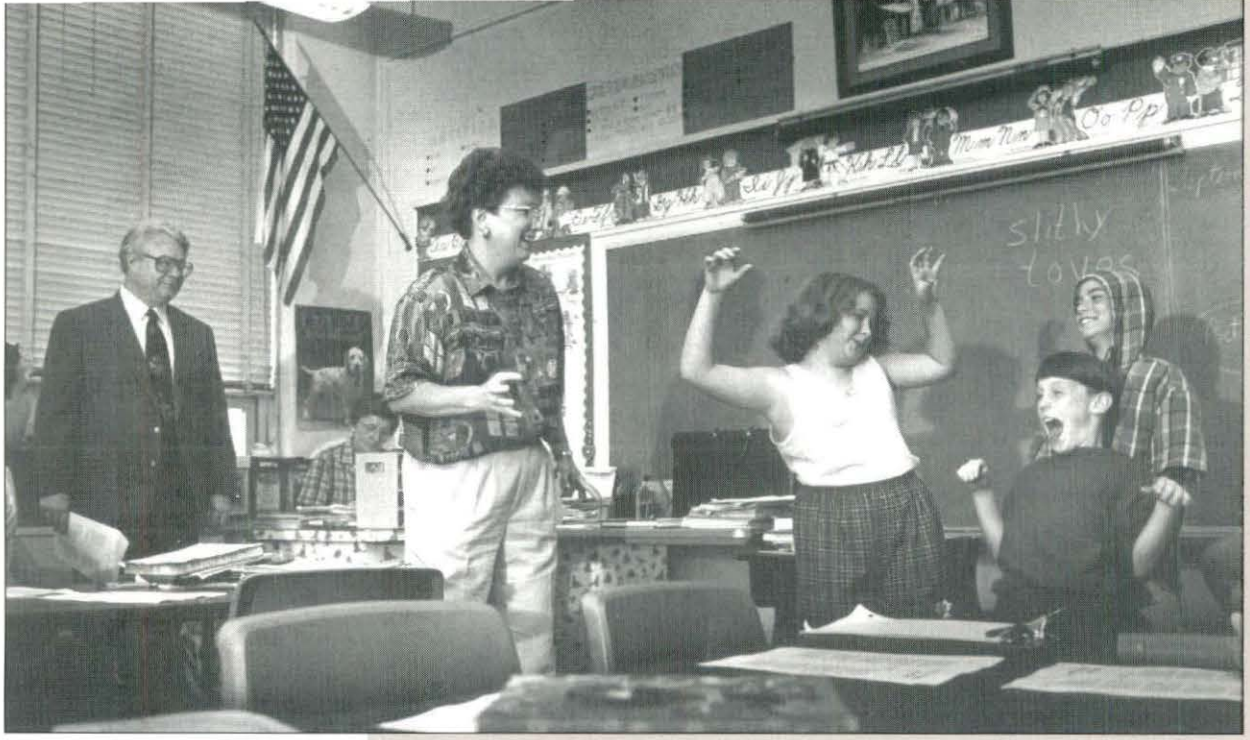
The co-directors describe the purpose of the project as two-fold: "first, to provide individual graduation plans for students to begin at the ninth grade level; and second, to provide for faculty development, encouraging faculty to teach all classes in an active learning and critical thinking manner–to involve students in applying learning in tangible ways."

The strength of the program seems to be due to the integration of academic and vocational subject matter in producing educated graduates who can readily apply what they have learned to job performance. An example of this interdisciplinary approach was coordinated by Lee County High School. Their physics, math, and industrial education teachers pooled their knowledge and presented the eclectic mix to excited students who constructed a scaled model of the St. Louis arch, "The Gateway to the West."

At Floyd County High School, a similar example involved the integration of home economics and business teachers by helping students develop their own catering business. And, impressively, "several schools have established banks where students borrow money and set up checking accounts." Local banks are brought in to advise this entrepreneurial experience.

Tech Prep is a national program established by the Carl Perkins Act of 1990 to promote vocational education. The Act was reauthorized in 1995 and continues to provide the undergirding for the program. Drs. Sampley and Luckey attend conferences and workshops to assist in implementing the program in Eastern Kentucky.

"Our major goal for 1995-96 is to establish high expectations and standards for students in both academic and vocational classes. By the year 2000, our goal is to increase the mathematics, science, and communication achievement of students in general and vocational studies to the national average of all students." Dr. Sampley and Dr. Luckey seem well on their way to achieving success in their efforts.



Kathryn Mincey encourages classmates to enact Lewis Carroll s Jabberwocky.

Poetry: A Child's Friendly World

Kathryn Mincey and Dr. Glenn Rogers introduce the sometimes-alien form to elementary-school children in an approachable manner

by Mickey Morgan

"How can you go somewhere and never move? . . . A book!" Kathryn Mincey, assistant professor of English at Morehead State University, moves adroitly into the space and attention of a class of fourth graders at Morehead Elementary School. She literally darts among the desks to punctuate the riddle she has used to announce her presence. All eyes go to her. A few hands shoot up. And Mincey, with Dr. Glenn Rogers, a member of her project team, begin yet another episode of "Exploring and Creating Poetry with Children."

Funded in the 1992-93 academic year as a pilot project entitled "Poetry in Elementary Whole Language Learning," the program was so successful that Mincey and her project team returned in 1994 to the Witter Bynner Foundation for Poetry, Inc., to request continuing funding "to expand the uses, appreciation, and writing of poetry by both teachers and students." Unable to locate support for the 1993-94 academic year, Mincey and Dr. Rogers, MSU professor of English, held professional development workshops and published relevant material in professional journals; both presented papers at professional conferences.

Having received her bachelor's degree in 1973 and master's degree in 1974, both in English, from MSU, and completed her doctoral course work in Literary Criticism from the University of Kentucky in 1980, Mincey has taught at Morehead State for over 11 years. Colleague Dr. Rogers received his bachelor's degree from Centre College in 1963, his master's degree from the University of Kentucky in 1966, and his doctorate from the University of North Carolina at Chapel Hill in 1973. He has taught English at MSU since 1967. Among other writings, several of Mincey's own poems have been published and Dr. Rogers has authored several textbooks for English courses. Other members of the project team included Dr. Mary Anne Pollock, MSU associate professor of education, and Dreama D. Price, MSU assistant professor of education.

One of the goals of the Witter Bynner Foundation is to broaden the audience for poetry. "Exploring and Creating Poetry with Children" begins at a foundational level to nurture audiences by exposing school-age children in their formative years. Many studies have shown the superior capacity children have for learning languages and their structures. Imbuing children with the excitement

and satisfaction to be had from reading, writing and speaking poetry becomes a lifelong pleasure for them–they are easily adaptable because of their ages.

To the child encountering poetry on the page, the experience may prove to be strange or alienating; comprehension may be halted. What is the process by which Mincey makes poetry approachable and appealing to children? Figurative language itself is not generally the substance of conversational language or children's prose. Mincey and Dr. Rogers dissect the machinery of poetry, exposing each of its parts in singular simplicity. The language becomes more palatable as metaphors, similes, rhymes, alliteration, onomatopeia, and others become identifiable tools that the previously mysterious poet used to construct the work. "The concentration of poetic expression models the desirable economy of good writing in any genre. The intensity of poetic language provides rich distillation of meaning and feeling, offering opportunity for microcosmic language learning." Mincey is convinced of poetry's wide-reaching benefits. Additionally, she says "Writing poetry challenges students to stretch their vocabulary and imaginative expression. . . . Moreover, the achievement or recognition of artistic unity in a poem (seeing the relationship of the parts to the whole) exercises the cognitive ability to synthesize and perceive the gestalt of experience."

Of course, clinical analysis of the many parts of poetry does not account for the children's greater comprehension–animated oral interpretation, however, reaches to the intuitive level of a child's thinking in a way that defies definition. The performance of a poem leads the viewer to more easily recognize the "message."

Mincey and Dr. Rogers have individual styles of performance when reciting poems to children. The event of reading a poem aloud moves close to theatre as they use their entire bodies in gestures that correlate with the words. If a poem requires several characters, children are embarrassedly but excitedly pulled up to the front of the class to enact them and encouraged to use identifying gestures for their roles. The room is soon filled with laughter as the words on the page come alive.

"Don't expect children to be inherently excited about writing poetry in a vacuum, but be prepared for the burst of enthusiasm and creative energy that follows effective oral interpretation, interactive reading/participation in the poetic experience, and discovery of relevancy through whole language, across-the-curriculum learning with poetry." Mincey enumerates her several methods in this claim: strong performance, active involvement of the children, and the teaching of how poetry can be found in many other school subjects "across the curriculum."

Their latest request of the Foundation offered a refined set of intentions: to provide more resources for teachers; to visit more classrooms; and, to equip "pre-service" teachers. Though the subsequent grant for the 1994-95 was funded only for the fiscal year, work is continuing despite the conclusion of the grant period.

Mincey is teaching the teachers by actual example in the classroom and by preparing packets of material for the teachers which include bibliographies, sample thematic units with research questions to be asked of the children, features of poetic language and samples of invention, drafting and revision techniques. Many of these ideas were expanded upon in the professional development workshops for teachers in which the assessment of student poetry was one of several key features. Additionally, teachers were given articles that Mincey and Dr. Rogers had authored for submission to professional journals and conferences.

An important part of Mincey's grant was in preparing students of education to teach poetry, to help children write poetry, and then to be able to assess the work in some objective fashion, with distinct evaluative tools and measures. Mincey and Dr. Rogers have presented several workshops for MSU students who are pre-service teachers in education classes on campus.

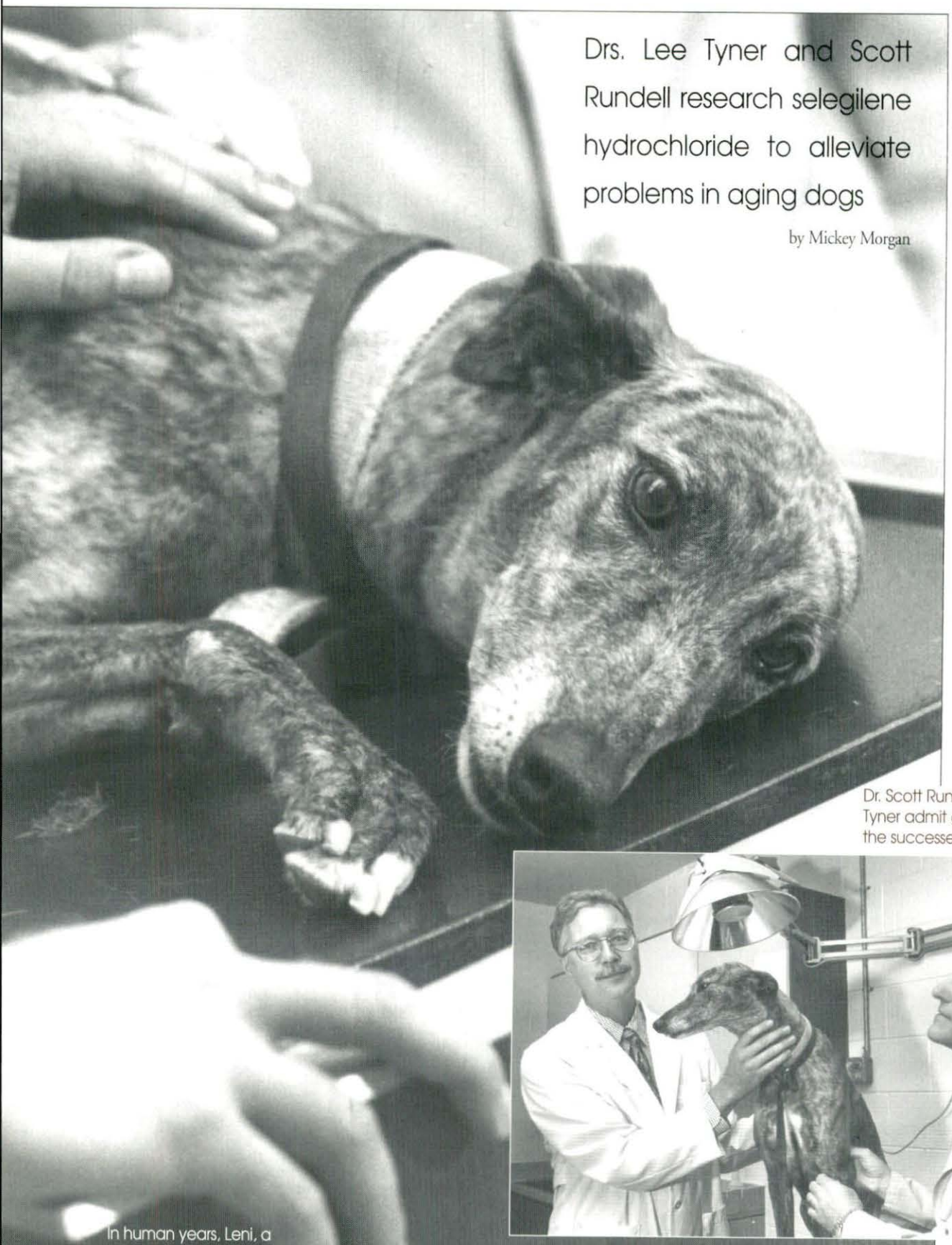
One of the classroom activities developed by the team included the collaborative writing of a poem which engaged invention techniques and the use of newly-learned poetic tools to prompt the children's imaginations. "Spring Falls" by Mrs. Wheeler's fourth and fifth grade class at Morehead Elementary School is a testament to the success of Mincey's project:

> Enormous, luscious trees
> Bend in the damp, misty valley.
> The rushing water crashes and splashes
> Against the mossy, rocky cliffs:
> The cool, clear, refreshing breeze
> Whispers secrets through the trees
> In this paradise
> With the birds chirping mesmerizing melodies.
> I feel free, relaxed and refreshed,
> And immortal
> In the dark green rainforest.

A 16-YEAR-OLD PUPPY?

Drs. Lee Tyner and Scott Rundell research selegilene hydrochloride to alleviate problems in aging dogs

by Mickey Morgan



In human years, Leni, a greyhound retired from the racetrack, is 50 years old.

Dr. Scott Rundell (left) and Dr. Lee Tyner admit great satisfaction in the successes of their work.

A fountain of youth for dogs? Can selegilene hydrochloride really bring an aging dog back to his frivolous self despite gray hairs, pacing, urinary incontinence and sluggishness? Doctors Lee Tyner and Scott Rundell, working out of the Veterinary Technology Clinic at the University Farm, have witnessed successes such as these in a large majority of the "canine patients" they have treated with the drug.

Veterinarians seem to have a special compassion. So it is with these two doctors who were funded to research the use of selegilene hydrochloride, a drug already in limited use for humans with Parkinson's disease. "Its known effect on the nervous system alleviates many of the problems associated with old age in dogs," says Dr. Tyner, coordinator of the Veterinary Technology Clinic.

"The drug is not 100% effective, but many [pet owners] report that their aging dogs have more energy, are livelier, and are relieved of urinary incontinence. . . . One veterinary surgeon who owned a dog in the study reported that his dog actually returned to his previous frolicking behavior!" Dr. Rundell, associate professor of Veterinary Technology, smiled warmly as he said this, patting ten-year-old greyhound Leni, a "potential patient," as she relaxed on the examination table.

Dr. Tyner, who has taught at veterinary schools for ten years, stressed the importance of the pilot study as a teaching tool. Students graduate with "hands on" research experience as they assist in gathering objective data for evaluation. They become competitive in the job market because of their exposure to good laboratory practices.

A pharmaceutical company in Finland entered into an agreement with the Department of Agricultural Sciences to obtain the "special services" of the two professors in identifying new indications for the substance. The doctors were required to report changed behavior and/or clinical signs evolving from the daily tablet given orally to aging pets suffering from senility.

"Old" dogs are those considered to be in the last 25% of their lives–generally over ten years of age. Dr. Tyner explains, however, that the smaller the dog, the longer its life expectancy. Small dogs live 14 to 16 years while large dogs, such as the great dane, have shorter life expectancies of nine or ten years. The first six months of a dog's life–from birth to puberty–are equal to 12 human years. Thereafter, every dog year equals four human years. "This would put Leni in her 50s," Dr. Rundell calculates. The regal greyhound, retired from the racetrack, seems content with her gray hairs.

Both doctors concur that "no adverse reactions to the drug" have been observed but stress the effects of subjectivity in such a project. While the clinical pilot study is being replicated in several environmentally different locations to maximize accuracy, the "highly variable" portion of the process reveals itself in attempting to gather behavioral information from patient owners. A question such as "Did your dog start sleeping all night?" would be posed to an owner who had previously observed his dog's nightly pacing. "Well, I guess . . ." was sometimes the vague response. "This is especially true for subtle behavioral changes," Dr. Rundell specified.

Interviews with patient owners are sent to the pharmaceutical company through a contracted study monitor who visits the several study sites collecting information. The private consultant gathers data and presents it to the Food and Drug Administration (FDA). The FDA then reviews the material. "It is a major, major project to get FDA approval for a drug," Dr. Tyner proclaims. The two doctors have contended with the many governmental regulations involved. "We are required," Dr. Rundell confirms, "to assure that our study can be repeated by others and achieve similar results. Each study must have a complete protocol developed which is designed to meet the Good Laboratory Practices Act, the needs of the sponsor, the requirements of the quality assurance officer and the welfare of the animals."

But primarily, both doctors agree, the real objective is to benefit older animals. The indirect but pleasant benefit for humans is prolonged and fuller interactions with the dogs they love.

Helping At-Risk Youngsters and Homeless Adults

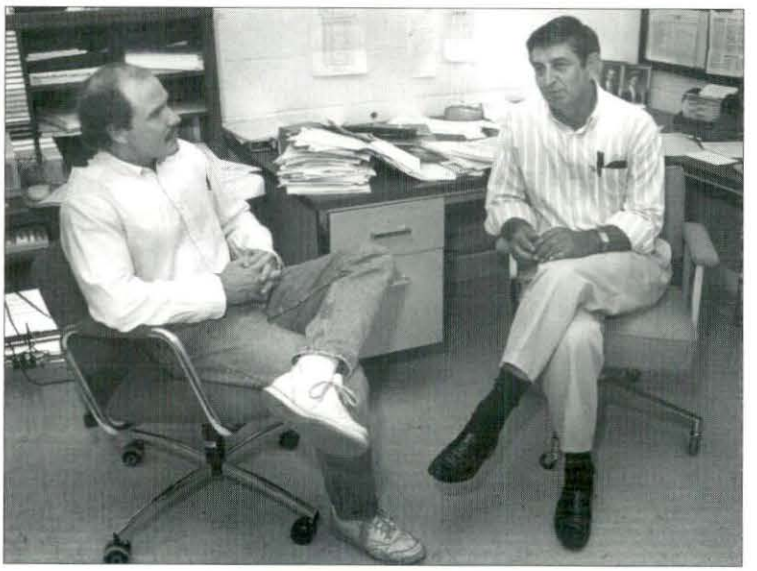
by Rebecca Bailey

"While the importance of parental involvement has been emphasized in most recent educational reform efforts, many involvement programs have been instituted as a collection of disjointed activities with no clear purpose or sense of direction." Dr. Harold Rose, professor of Education, Leadership and Secondary Education, and Dr. Richard Shepard, associate professor, have developed a model to increase parental involvement, supported by a grant from the Family Resource and Youth Service Centers Branch of the Cabinet for Human Resources.

Drs. Shepard and Rose began their study by asking this question: Why did parents lose interest in interacting with their children's education in public schools? The reason, they ultimately decided, was that parents felt they lacked empowerment.

Their four-step "Empowerment Model for Parental Involvement" begins with "basic communication," the establishment of an initial link between the child's parents and teacher or school. Secondly, "home improvement" attempts to enhance parenting skills, focusing on such topics as disciplining, health care, homework assistance, and reading at home. "Volunteering" brings parents into closer involvement with their child's school, establishing stronger contacts with other parents and school personnel. The fourth step, "advocacy," includes involvement in local, district, or statewide groups which impacts policies, procedures, and institutional changes within the community. They have recently received funding to test the model which they believe will help schools meet the goals of the Kentucky Educational Reform Act.

Dr. Rose has also completed a study for the Department of Adult Education and Literacy to evaluate the effectiveness of programs in educating the homeless. Dr. Rose was assisted by graduate student Christopher Moore and Associate Professor of Psychology Dr. David Olson.



Dr. Richard Shepard (left) and Dr. Harold Rose consider the implications of their research.

Adult education programs in Bowling Green, Covington, Lexington, Louisville, Owensboro, and Paducah received funding from the Cabinet for Workforce Development, Department of Adult Education and Literacy, to establish programs to serve homeless adults. Dr. Rose's evaluation covered the second year of the three-year project.

Dr. Rose and his colleagues developed an evaluation model to solicit information on the programs, with separate instruments designed for education and mental health components. The goal of most programs was to build self-sufficiency and to facilitate either life skills or academic learning for each of the participants.

"In shelters where charity is an end product," Rose says, "educational programs are usually unsuccessful. At shelters where the philosophy is to assist the homeless to become self-sufficient, where a planned program of activities including education and life skills is provided and participants are strongly urged to attend by shelter staff–these programs can make beneficial changes in the lives of the program participants."

The study on all six sites was published in March 1995.

Language Structure: How Do We Know What We Know?

by Mickey Morgan

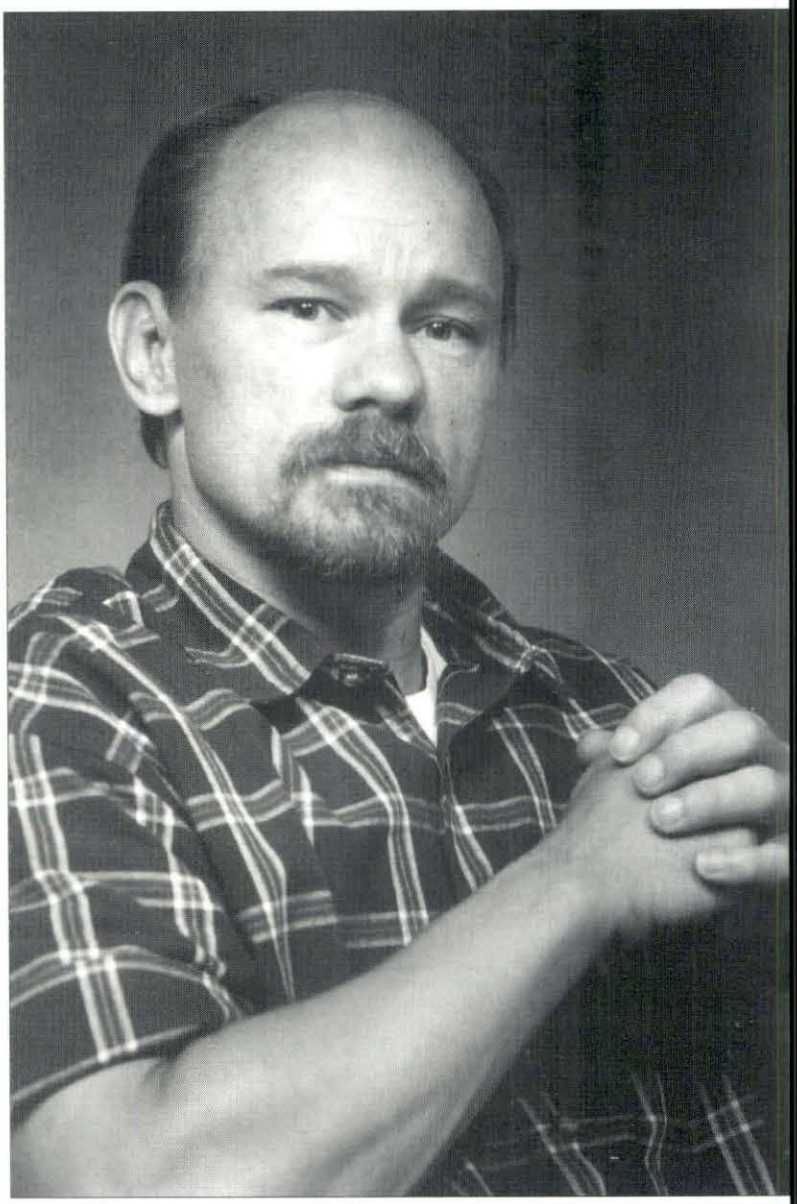
Associate Professor of Linguistics Dr. Thomas Stroik is interested in how rapidly children learn language. Parents never explain the logic of a sentence but somehow communication occurs. "How do kids learn so fast–without instruction?" he ponders. "We have to look at the formal logical systems they have, and then ask how our brains are wired to set up these logical systems." The fundamental question then becomes: What is acquiring language?

Dr. Stroik was funded by MSU to address these questions in his research project entitled "Linguistics: Three Semantico-syntactic Studies" from January to May of 1994. MSU allowed him the release time from teaching in order to complete three papers delving into various aspects of the above, highly-generalized explanation of his subject matter.

"Language isn't learned, it's triggered–and it is species-specific." Dr. Stroik explains that human beings are not "wired" to pick up whale language because our brains as organs require a certain signal to be sent out; the wrong one is sent out by whales. Human language comes out partially determined and Dr. Stroik is trying to ascertain the logic of what we are born with. He is trying to gain some sense as to how we know what we know–what has never been taught to us.

"Grammar is a genetic property we have . . . When we react negatively or positively to language [or grammar] variation, there is a distinct social reaction." The implication is that much is built on social prejudice and not on how language works. "Language attitudes are socially engineered." A moral and intellectual judgment is passed. "Minorities are vilified because of language. . . . The more we can understand the structure of language, the more human it becomes, and the less divisive."

Dr. Stroik received his bachelor's degree in mathematics in 1973, his master's degree in English in 1979, and his doctorate in English in 1987, all from the University of Wisconsin-Madison. He is the author of *Path Theory and Argument Structure* (1991, Indiana Linguistics Club, Indiana University) as well as of numerous articles published in, among others, *The Linguistic Review*, *Linguistic Analysis* and *Linguistic Inquiry*.



Dr. Tom Stroik writes extensively in the field of linguistics.

Interdisciplinary Efforts Locate High Quality Limestone in Kentucky

by Mickey Morgan

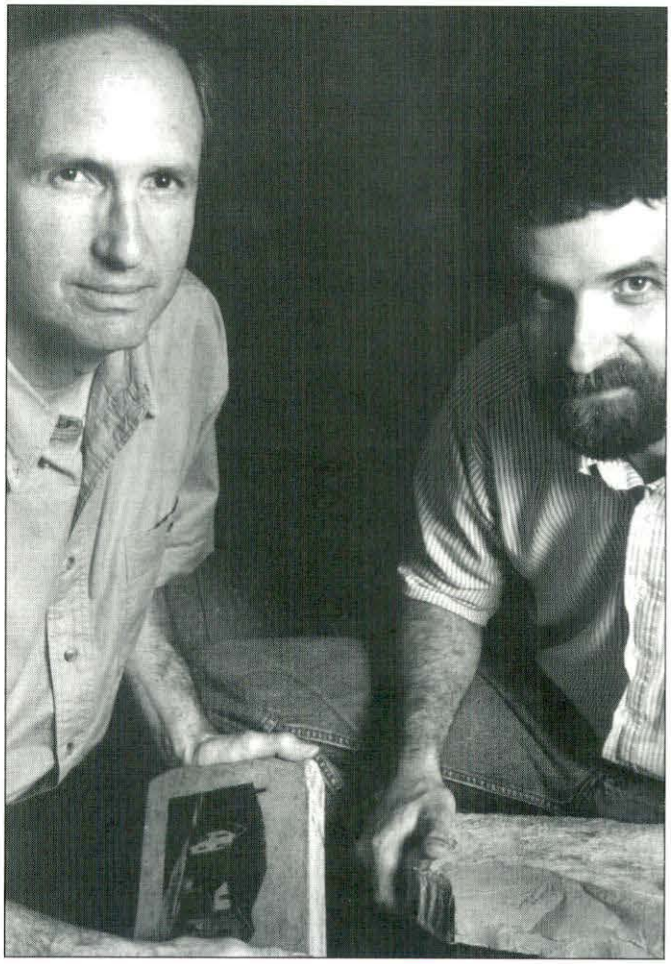
Cincinnati, Ohio
February 18th, 1881
To the Estill Lithographic Quarry Company,

Gents,

We have tested several of your Lithographic Stones and are using them right along for transfer work, and think them just as good as the best Yellow German Stone, and the last lot much better than the former ones.

Yours Respectfully,
Strobridge Lithograph Co.

The above testimonial was extracted from an 1881 prospectus of the Estill Lithographic Quarry Company of Winchester, Kentucky. Professor of Art Robert Franzini, who has worked with stone lithography for 25 years, came across the document while researching possible lithographic limestone quarries in Kentucky.



Professor of Art Robert Franzini and Geologist Dr. Steven Reid hold the results of their collaboration.

In the art of lithography, limestone is the ingredient which enables high-quality printmaking. The highest quality limestone for lithography has been quarried near the German town of Solnhofen. "Although plentiful deposits of limestone exist in other parts of the world, virtually none have yielded products equal in chemical purity, fine granularity, and excellent printing quality to Sohnhofen stones," write Garo Antreasian and Clinton Adams in *The Tamarind Book of Lithography: Art and Techniques* (1970).

Franzini and Dr. Steve Reid from the Department of Physical Sciences became friends and began to share their common interest in limestone. Dr. Reid, a geologist who specializes in limestones, has written extensively on diagenesis, sedimentology, sequence stratigraphy and basin evolution of Cambrian and Mississippian dolostones and limestones in the Northwestern U.S. The grant from MSU entitled "An Artistic Documentary of the History, Geology and Quality of Lithographic Limestone in Kentucky" is truly interdisciplinary. The project has involved two other art faculty, Elizabeth Mesa-Gaido and Gary Mesa-Gaido; two chemistry faculty, Richard Hunt and Zexia Barnes and their analytical chemistry students; Robert Stidham, an undergraduate geology student, and art students Rita Cameron, Trisha Brown and Tim Holbrook (currently chief photographer for MSU).

The artists and geologists traveled to natural outcrops, road cuts, and limestone quarries in Kentucky to collect samples for comparison with the expensive and scarce Solnhofen Limestone. Back on campus, MSU artists, geologists and chemists tested the samples. To present their results, the group is creating a collection of prints pulled from Kentucky limestone depicting local landscapes, people and history. Their deep interest is summarized by Franzini: "These are not just chunks of stones . . . They are alive with possibility." Currently, an image produced from Kentucky stone is on exhibit at Appalshop in Whitesburg, Kentucky, and The Tamarind Institute has expressed interest in publishing the results of this study.

Investment Tax Credit and Capital Formation

by Rebecca Bailey

Dr. Ishappa S. Hullur, associate professor of Finance, received an MSU Summer Fellowship to study the impact of Investment Tax Credit (ITC) on capital formation and to formulate an analytical model to justify re-institution of the ITC in the nation's fiscal policies.

Capital formation refers to the increase in quality and quantity of capital stock that results from investment spending, without which no economy can survive and prosper. The growing concern about the slow growth in the U.S. economy in the recent past can be linked to a certain extent to the decreasing investment rates in capital goods.

Investment Tax Credit was one of the instruments used by previous administrations to enhance long-term economic growth. Starting in the 1960s, the ITC has been set at various rates, removed, resurrected retroactively, and eliminated completely in the Tax Reform Act of 1986. Re-instating the ITC was one of the big issues of President Clinton's election campaign and it subsequently became a part of the Clinton Administration's economic proposal to Congress, but unfortunately it was not part of the 1993 budget bill enacted into law.

ITC encourages businesses to invest more in capital stock by allowing firms to deduct a percentage of their investment from taxes. ITC has been given great importance in so-called Third World countries such as China, India, and Taiwan, whose economies have been experiencing double-digit growth rates for several years.

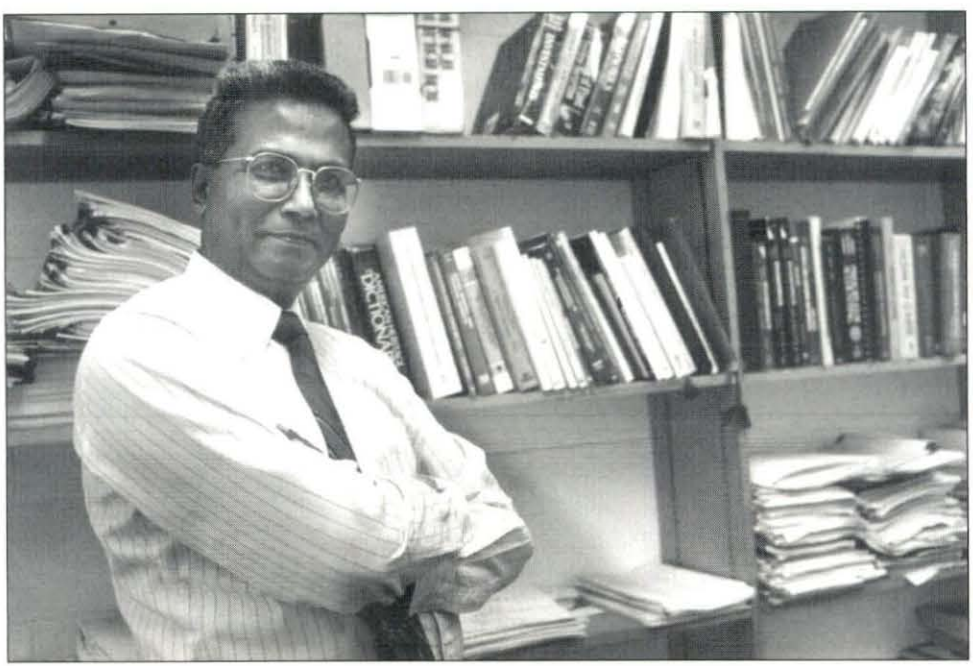
Dr. Hullur, who has earned two doctoral degrees and four master's degrees, used fundamental principles of macroeconomics, finance and integral calculus in formulating the model.

Previous researchers had provided a direction to formulate a comprehensive model to demonstrate a strong and positive impact of the ITC on capital formation. "The implications of this model are unambiguous," Hullur states. "That is, any tax shield substitutes, including the ITC, would definitely induce firms to increase their investment in capital stock."

However, many economists believe there is an optimal level of investment in a given time period, above which long term benefits may not be that great. Yet in the short run increasing investment can be a powerful economic stimulus.

Though theoretical implications favor re-institution of the ITC, Hullur found that empirical evidence in support of it was not as strong as expected. "The factors that disrupt capital formation, the quantification of optimal amount of capital formation at any given time, and the amount of debt issued to achieve that optimal amount of capital, and its impact on interest rates are some of the important issues that need to be investigated before the re-institution of the ITC."

Dr. Hullur will empirically test this model in his home state of Karnataka in India.



Dr. Ishappa Hullur s research findings will be tested in Karnataka, India.

PROJECTS-IN-BRIEF

LIBRARY OFFERS NEW SERVICES FOR RESEARCHERS

A 1994 award from the College Library Technology and Cooperations Grants Program has allowed Kentucky's eight regional universities to establish the Kentucky Academic Libraries Networked Resources System. As a result, Morehead State University's Interlibrary Loan Department (ILL) in the Camden-Carroll Library now works small miracles for researchers.

The grant's purpose, according to Director of Library/Instructional Media Larry X. Besant, is to set up a fax system on the Internet to transmit documents from one library to another. "This is a long-term component of Kentucky interlibrary cooperation," Besant explained.

A patron requests a journal article. Once library staff locates the article, whether in hard copy or on microforms, it is then scanned into the Ariel system. The highly decompressed text is then sent via Internet to the patron library, where it prints out on a laser printer within a matter of minutes. This means that the turnaround time between making the ILL request and receiving the document may be as short as two to three days rather than the approximately two weeks it took before.

With the increased use of computer databases, researchers are finding more and more bibliographic citations for materials the library doesn't own. At MSU, the ILL user rate has been growing annually at a rate of 15-20%, according to ILL Coordinator Greg Mitchell, and this year the rate is expected to be at least 20% higher than last year's rate, which was the record year for ILL requests.

Kentucky's eight regional universities, which all received Ariel systems from this statewide grant, have agreed to give one another's ILL requests priority, which will speed turnaround time. Hundreds of other libraries also use the Ariel system; additional Kentucky libraries will become involved as well.

Interlibrary Loan is not just restricted to MSU faculty; Camden-Carroll Library allows interlibrary loans for students, whereas many university libraries (including those at Eastern Kentucky University and the University of Kentucky) do not. "Our students have better access to information than do students at larger universities," said Mitchell. As long as the campus remains on the Internet, the cost of sending or receiving a document through Ariel is zero.

Larry X. Besant and Greg Mitchell estimate that several hundred volumes of materials are sent and received through Interlibrary Loan each year.

PRE-IMPLANTATION MOUSE EMBRYOS AND HUMAN DEVELOPMENTAL BIOLOGY

Dr. David Magrane, MSU professor of biology, is interested in steroids the body produces: hormones such as estrogen, cortisol, testosterone, and progesterone which are released from the ovaries, testes, or adrenals.

A 1993 internal grant from MSU enabled Dr. Magrane to focus his research on a couple of major questions: Are estrogens and progestins necessary while the embryo is still in the oviduct? Do steroids come from the mother or from the embryo? He used pre-implantation mouse embryos to conduct his research.

Four- to six-week-old Swiss albino mice were injected with pregnant mare's serum gonadotropin to induce superovulation. The treated females were then placed with a fertile male. At the appropriate stage of embryo development (one-cell, two-cell, four-cell, eight-cell), the mice were sacrificed. The pre-implantation embryos (PIEs) were treated with various steroids and steroid blockers, and the results statistically analyzed.

Research showed when drugs that block estrogens were added to two-cell embryos, no effects on viability were seen. However, blocking estrogens at four-cell and eight-cell stages prevented further developments. These results suggest that estrogens are important in PIE development at four-cell and eight-cell stages but not at the two-cell stage. This lack of influence at the two-cell stage is consistent with the observation that the two-cell embryo depends on pre-packaged molecules from the mother, and only after the two-cell stage does the embryo begin activating its own genes and synthesizing its own proteins. Progesterone was without effect throughout all stages of development. Finally, a drug that blocked steroid production in the embryo was effective only at the eight-cell stage, suggesting that the embryo is producing its own steroids at this time.

No experiments of this sort can be conducted on humans, but these results can be extrapolated to human cell development and cell function. "The questions asked in this research are all basic cell biology questions," Magrane explains. "It is not at all far-fetched to say that answers to these questions have relevance to cancer biology (understanding basic ideas of growth regulation), to contraception, to fertility, and to molecular genetics."

Dr. David Magrane has studied steroids since his postdoctoral fellowship at the University of Minnesota.

HONING PREPAREDNESS IN HAZARDOUS SPILLS

"Want some facts?" Dr. Ron Mitchelson asks immediately as he sits down for his interview. He smiles as if nothing else matters except getting to the truth–no pontificating, no telling of tales–just the portrayal of the real situation. He proceeds to unroll his list of facts which, as he intended, point to the need for action in a thoroughly objective but thoroughly persuasive fashion.

"There are 1.5 million chemicals produced in the USA of which 63,000 are deemed hazardous by the Environmental Protection Agency. The U.S. Department of Transportation regulates 3,800 of those. Over four billion tons of hazardous materials move [from place to place] in one year." Studying the patterns of these combined facts produces information, and information is what Dr. Mitchelson, professor of Economic Geography and associate director of the Center for Community and Economic Development at Morehead State University, is pursuing–ultimately, a database to be referred to for prime preparedness training in cases of spills of hazardous materials.

Funds received from the Kentucky Emergency Response Commission were used by Project Director Mitchelson and his coordinator, Dale Caudill, assistant professor of Management at MSU, to "summarize the movements of hazardous materials along the I-64 corridor within the Commonwealth of Kentucky." The 12-month grant aimed at collecting four databases from which to compile specific implications as to how to prepare for "incidents" (accidents) along the 191-mile interstate segment. The first data set contained notes from 800 hours of observation done by students Robyn Adkins (1994 graduate in Geography from MSU), Matthew Baldwin (current MSU student in Mathematics), Christopher Gast (current MSU student in History), Brady Johnson (1995 graduate in Geography from MSU), and Anthony Lawson (1995 graduate in Geography from MSU). Truck stops, weigh stations, rest areas and terminals became their locales and prime sources of information. Observation hours were distributed among peak period patterns (7-9 a.m. and 4-6 p.m), weekdays, weekends and nonpeak periods.

Placards of this sort are required on trucks carrying hazardous material.

"The final product [includes] maps, other graphics, and summary tables which . . . clearly communicate where and when the greatest chemical risks take place within the I-64 corridor. Hard copy and computer disks containing the final report and all raw data [has been] provided." The information is to be distributed to the 12 counties through which the I-64 corridor stretches.

PRESERVING APPALACHIAN KENTUCKY HERITAGE

"As part of efforts to fulfill the mission of Morehead State University, the Center for Community and Economic Development (CCED) engages in activities which provide assistance to the people of Eastern Kentucky in their efforts to improve the quality of life in their communities." One successful activity geared precisely to this intention is the "Appalachian Cultural Resource Development Project." Executive Director of the CCED Michael Harford requested $26,000 of the Kentucky Heritage Council and $140,000 from the Appalachian Regional Commission to support a collaborative effort between Morehead State University's CCED and these agencies to seek out places in 33 counties with historically significant architecture.

The main purpose of the grant is to "transform this coal-based region," (Eastern Kentucky) into a more economically diverse area by way of historic preservation and adaptive reuse. The ultimate aim of the identification of these locations is to "prepare these sites for economic redevelopment through downtown revitalization, such as new business and housing projects and cultural tourism . . . thereby contributing to . . . community and regional pride." Additionally, some sites would be located as potential entries onto the National Register of Historic Places.

Project Coordinator and folklorist Lynn David says that the preservationist and economic aspects of the project can't be separated: "We want merchants to be aware of the historic value of their buildings, not to rip them down or cover them up. We have found that owners increase respect for their own property through this process."

To have an area designated as a historic district is an honor, says Architectural Historian Christa Smith. "The economic value of the district is stabilized, making prospects for the future brighter through an emphasis on the value of the past." There are economic advantages from this process, making businesses interested in such districts and willing to invest in this market for historic buildings.

The project team also includes Mary Dawson, project development specialist, and John Mayse, research analysis specialist. "The team is going all over Eastern Kentucky trying to make people aware of the worth of their buildings," says Harford.

Seeking out buildings 50 years or older in a 33-county region of Appalachian Kentucky, the team uses a geographic division of the market area for initial prospecting for historic structures, but works together to find ways to preserve and reuse significant older structures. "Preserving the Appalachian Kentucky heritage," according to Harford, "is an excellent way of preparing for the future."

Executive Director of the CCED Michael Harford and his team seek out previously unacknowledged historical buildings.

Grants Summary 1993-94

External Grants

Division of Academic Affairs

Larry Besant and Greg Mitchell, "Kentucky Academic Libraries Networked Resources System." U.S. Department of Education/University of Kentucky

William DeBord, "Eastern Kentucky Health Science Information Network–1994-95." Meadowview Regional Hospital

William DeBord, "Eastern Kentucky Health Science Information Network–1994-95." Our Lady of the Way Hospital

William DeBord, "Eastern Kentucky Health Science Information Network–1994-95." Northeast Kentucky Area Health Education Center

William DeBord, "Eastern Kentucky Health Science Information Network–1994-95." Our Lady of Bellefonte Hospital

William DeBord, "Eastern Kentucky Health Science Information Network–1994-95." Pikeville United Methodist Hospital of Kentucky, Inc.

William DeBord, "Eastern Kentucky Health Science Information Network–1994-95." St. Claire Medical Center

William DeBord, "Eastern Kentucky Health Science Information Network–1994-95." Highlands Regional Medical Center

William DeBord, "Eastern Kentucky Health Science Information Network–1994-95." Three Rivers Medical Center

William DeBord, "1993-94 Eastern Kentucky Health Science Information Network Supplement I." University of San Francisco, Quito, Ecuador

Michael Harford, "GADD Empowerment Zone and Enterprise Community Application Technical Assistance." Gateway Area Development District

Michael Harford, "KRADD Empowerment Zone and Enterprise Community Application Technical Assistance." Kentucky River Area Development District

Michael Harford, "The Forest and its Uses Activity Book Project." Kentucky Forest Industries Association, Inc.

Michael Harford and Ron Mitchelson, "Appalachian Cultural Resource Development." Kentucky Heritage Council

Michael Harford and Ron Mitchelson, "Appalachian Cultural Resource Development." Appalachian Regional Commission

Michael Harford, Melinda Jones and Janet Ferguson, " Market Audit of Hypac, Inc." Hypac, Inc.

Michael Harford, "Mountaintop Agricultural Complex Partnership." Mountaintop Agricultural Complex Partnership

Ron Mitchelson, "1994-95 Commodity Flow Analysis Project." Kentucky Emergency Response Commission

Ron Mitchelson, "Rural Development–Strengthening Rural Economies." Natural Resources and Environmental Protection Cabinet

John Philley, Judy Rogers and Linda Salyer, "1994-95 Rural Allied Health and Nursing Program." Council on Higher Education

John Philley and Vic Ramey, "Sciences and Math Alliance Project–Year 9." Council on Higher Education

Division of Administration and Fiscal Services

Todd Bowman, "Proposal to Create an Academic/Research Network for the State of Kentucky–Year II." University of Kentucky Research Foundation

Todd Bowman, "Proposal to Create an Academic/Research Network for the State of Kentucky–Year I." University of Kentucky Research Foundation

Gene Caudill, "Urban Forestry Tree Planting Project–1994." Kentucky Division of Forestry/U.S. Small Business Administration

Division of Student Life

Michael Mincey and Judy Krug, "Wellness Peer Educator Program–Year 2." U.S. Department of Education

Timothy Rhodes, "94-95 Student Financial Aid." U.S. Department of Education

Division of University Advancement

Larry Netherton, "93-95 National Program Production and Acquisition Grant." Corporation for Public Broadcasting

Larry Netherton, "93-95 Radio Community Service Grant." Corporation for Public Broadcasting

College of Business

Wilson Grier, "1994-95 Ashland Small Business Development Center." Economic Development Corporation of Boyd and Greenup Counties

Wilson Grier, "1994-95 East Kentucky District Small Business Development Center." Kentucky Cabinet for Economic Development/University of Kentucky Research Foundation

Wilson Grier, "1994-95 Ashland Small Business Development Center." Kentucky Institute of Banking

Wilson Grier, "1994-95 East Kentucky District Small Business Development Center (Morehead/Pikeville/ Ashland)." Small Business Administration/University of Kentucky Research Foundation

Wilson Grier, "93-94 MSU Small Business Development Center Program Supplement I." Citizens National Bank of Paintsville

Wilson Grier, "93-94 MSU Small Business Development Center Program Supplement I." Bank One of Pikeville

Wilson Grier, "93-94 MSU Small Business Development Center Program Supplement I." Pikeville National Bank and Trust Company

Wilson Grier, "93-94 MSU Small Business Development Center Program Supplement I." TransFinancial Bank of Pikeville

Wilson Grier and Michael Morley, "Pikeville Small Business Resource Library." Wal-Mart Foundation

Sue Luckey, "Enrichment Activities for Business Teacher Education." Kentucky Department of Education

Sue Luckey, "1994 Vocational Education Title II-C–Information Sciences." Kentucky Department of Education

Beverly McCormick, "Auctioneering as Part of Real Estate Studies." Kentucky Board of Auctioneers

Beverly McCormick, "Real Estate Education Grant Program–1994-95." Kentucky Real Estate Commission

Robert Meadows, "Small Business Institute." U.S. Small Business Administration

College of Education and Behavioral Sciences

Cathy Barlow, "Morehead State University Regional Technical Assistance Team–1994-95." Kentucky Cabinet for Human Resources

Byron Johnson and David Rudy, "Evaluation of Substance Abuse Programs at Selected Kentucky Correctional Institutions–1993-94." Kentucky Department of Corrections

Sylvester Kohut, "MTEP 1995 Summer Program Expansion." Kentucky Department of Education

Sylvester Kohut, "Family Resource and Youth Services Centers Branch Liaison Program Administration." Kentucky Cabinet for Human Resources

Sylvester Kohut, "Family Resource and Youth Services Centers Branch Liaison Program Administration." Kentucky Cabinet for Human Resources

Bruce Mattingly, "Receptor-Dependent Sensitization to Cocaine." National Institutes of Health

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement III." Big Sandy Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement IV." Middle Kentucky River Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement III." Williamstown Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement II." Bell County Board of Education

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement II." Kentucky River Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement I." Williamstown Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement II." Whitley County Board of Education

Debra Mattingly, "Child Development Associate Training Program–1993-94." Bourbon County Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement I." Madison County Board of Education

Debra Mattingly, "Child Development Associate Training Program–1993-94." Bluegrass Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement II." Middle Kentucky River Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94." Bell Whitley Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement I." Laurel County Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement I." Knox County Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement II." Bell Whitley Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement II." Big Sandy Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94." Licking Valley Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94." Laurel County Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement I." Bourbon County Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement I." Community Action Council for Lexington-Fayette, Bourbon, Harrison, and Nicholas Counties, Ky.

Debra Mattingly, "Child Development Associate Training Program–1993-94, Supplement I." Big Sandy Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94." Gateway Head Start

Debra Mattingly, "Child Development Associate Training Program–1993-94." Breathitt County Board of Education

Connie McGhee, "1994-95 Head Start Program." Gateway Community Services Organization, Inc.

Barbara Niemeyer, "Interdisciplinary Early Childhood Education, Birth to Primary (ICEC)–Phase II Implementation." Kentucky Department of Education

Harold Rose, "MSU-Adult Learning Center 1994-95 BASIC ABE/GED/LIT Program." Cabinet for Workforce Development

Harold Rose, "MSU-Adult Learning Center 1994-95 JOBS ABE/GED/LIT Program." Cabinet for Workforce Development

Harold Rose, "Family Literacy Grant Application–1993-94." Cabinet for Workforce Development

Harold Rose, "MSU-Adult Learning Center JTPA Project." Cabinet for Workforce Development

Harold Rose, "Employment Training Program." Cabinet for Workforce Development

Harold Rose, "Increasing Parental Involvement in Eastern Kentucky Schools Through Family Resource and Youth Services Centers." Cabinet for Human Resources

Harold Rose, "Evaluation of Homeless Program." Cabinet for Workforce Development

Harold Rose, "Systematic Training Approach for the Future-II." Cabinet for Workforce Development

Michael Seelig and Ted Marshall, "MSU Training Resource Center–1994-95." Eastern Kentucky University

Michael Seelig and Ted Marshall, "MSU Training Resource Center–1993-94 Amendment #1." Eastern Kentucky University

Jack Sheltmire, "1994 Summer Food Service Program for NYSP." Kentucky Department of Education

Jack Sheltmire, "1994 Summer National Youth Sports Program." National Collegiate Athletic Association

George Tapp, "1994-95 Institute for Psychological Service–Rehabilitation Partnership Grant." Carl D. Perkins Comprehensive Rehabilitation Care Center

George Tapp, "1993-94 Institute for Psychological Service–Rehabilitation Center Partnership Grant Addendum." Carl D. Perkins Comprehensive Rehabilitation Care Center

Wayne Willis and Joy Gooding, "University Writing Project–1994." Kentucky Department of Education

Wayne Willis and Joy Gooding, "University Writing Project–1993 Outreach Training." Kentucky Department of Education

Wayne Willis and Joy Gooding, "Extension Writing Project for Kentucky Public School Teachers–Year 3." National Writing Project

Caudill College of Humanities

Glen Colburn, "Social Change in Early Modern Britain and the Rise of the Novel." National Endowment for the Humanities

Andrew Glendening, "Meet the Composer/Southeast: Joseph Klein." Southern Arts Federation

William Green, "Supreme Courts and Civil Liberties in Comparative Perspective: The Canadian Charter of Rights and Liberties and the U.S. Bill of Rights." Canadian Embassy, Government of Canada

William Green, "The Canadian Charter and the U.S. Bill of Rights in Comparative Perspective: Supreme Court, Civil Liberties, and Minority Language Education Rights." Quebec Ministry of International Affairs

Jennings Mace, "1994-95 Lexmark Technical Writing Services." Lexmark International, Inc.

Jennings Mace, "Lexmark Technical Writing Services–Year 2." Lexmark International, Inc.

Kathryn Mincey, "Exploring and Creating Poetry with Children." Witter Bynner Foundation for Poetry, Inc.

Stuart Sprague, "African-Americans of Eastern Kentucky: The Civil War and Aftermath." Southern Regional Education Board

College of Science and Technology

Joe Bendixen, "Enrichment Activities for Agricultural Education." Kentucky Department of Education

Robert Boram and Joyce Saxon, "Morehead State University Teacher Education Equity Project." The Teacher Education Equity Project

Charles Coddington and John VanHoose, "Field-Based Teacher Education for Industrial Technology Education." Kentucky Department of Education

Charles Coddington, "1994 Vocational Education Title II-C–Industrial Education and Technology." Kentucky Department of Education

Robert Cowsert, "1994 Vocational Education Title II-C–Agriculture and Natural Resources." Kentucky Department of Education

Gerald DeMoss, "Administration and Coordination of Vocational Education Programs." Kentucky Department of Education

Gerald DeMoss, "Title II-C Postsecondary Vocational Education Program (93 Carry Forward)." Cabinet for Workforce Development

Gerald DeMoss, "1994 Vocational Education Title II-C–Dean's Office, Science and Technology." Kentucky Department of Education

Jane Ellington, "Enrichment Activities for Vocational Home Economics Education." Kentucky Department of Education

Jane Ellington, "1994 Integration of Academics and Vocational Education." Kentucky Department of Education

Benjamin Malphrus, "Travel to NASA Centers to Explore Research Opportunities." Kentucky Space Grant Consortium

Benjamin Malphrus, "Partnership for Reform Initiatives in Science and Mathematics (PRISM)–Year II." Kentucky Department of Education

Benjamin Malphrus, "Kentucky 4-5 Science Resource Specialist (PRISM)." Kentucky Department of Education

Benjamin Malphrus, "Eastern Kentucky K-3 Science Specialist Performance Event Project to Drive Activity-Centered Science." Kentucky Educational Development Corporation

Benjamin Malphrus and Andrew Martin, "JOVE Faculty Research Associate Program." National Aeronautics and Space Administration

Benjamin Malphrus, "Space-Science Resources Travel." Kentucky Space Grant Consortium

Ted Pass, "94-95 Microbiology Testing for NREPC." Natural Resources and Environmental Protection Cabinet

Ted Pass, "Porter Waste Disposal Project, 1993-94." Office of Arvis Porter, M.D.

Ted Pass, "Cave Run Clinic Waste Disposal Project, 1993-94." Proudfoot and Associates, Inc., DBA Cave Run Clinic

Ted Pass, "Shay Dental Practice Waste Disposal Project, 1993-94." Shay Dental Practice

Ted Pass, "Gateway District Health Department Waste Disposal Project, 1993-94." Gateway District Health Department

Ted Pass, "Blair Waste Disposal Project, 1993-94." Office of Don Blair, M.D.

Ted Pass, "Jackson Waste Disposal Project, 1993-94." Office of James E. Jackson, M.D.

Brian Reeder, "Water Quality Assessment and Trophic Status of Eastern Kentucky Reservoirs–Year 2." Natural Resources and Environmental Protection Cabinet

Brian Reeder, "Fertilization Study of Grayson Lake." Kentucky Division of Fish and Wildlife

Linda Salyer, "1994 Vocational Education Title II-C–Nursing and Allied Health Sciences." Kentucky Department of Education

Marilyn Sampley and Sue Luckey, "Tech Prep Consortium Serving Eastern Kentucky." Cabinet for Workforce Development,

Department for Technical Education
Marilyn Sampley, "1994 Vocational Education Title II-C–Human Sciences." Kentucky Department of Education
Joyce Saxon, Lloyd Jaisingh, Daniel Seth, Robert Lindahl, Rodger Hammons, "Mathematical Instruction/Exploration Laboratory." National Science Foundation
Daniel Seth, "Integrodifferential Equations for Two-Dimensional Transition Kernels in Particle Transport: Derivation and Numerical Computation." Kentucky NSF/EPSCoR
Lee Tyner and Scott Rundell, "Selegiline Hydrochloride for the Treatment of Symptoms of Aging in Dogs: A Clinical Study." Orion Corporation Animal Health

Office of Academic Support

Jennifer Cady, "1994 Summer Food Service Program for Upward Bound Program." Kentucky Department of Education
Jennifer Cady, "1994-95 Upward Bound Program." U.S. Department of Education
Dan Connell and Catherine Riley, "Retired Senior Volunteer Program (RSVP)–1994-95." ACTION
Dan Connell, "Rowan County-Morehead State University Mentoring Program–1994-95." Christian Appalachian Project
Dan Connell and Rodney Mitchell, "Destination Graduation–Summer 1994 Expansion." U.S. Department of Education
Dan Connell, "1994 MOAR Summer Food Service Program." Kentucky Department of Education
Dan Connell, "1994 MSUCorps." Kentucky Community Service Commission
Dan Connell, "1994 MOAR Program (Morehead Occupational and Academic Retreat)." TENCO Private Industry Council
Dan Connell and Rodney Mitchell, "Destination Graduation–Year VI, 1993-94 Bell South Supplemental." U.S. Department of Education
Carolyn DeHoff, "1994-95 Educational Talent Search." U.S. Department of Education
Dail Howard, "Educational Opportunity Center 1994-95" U.S. Department of Education
Betty Karrick, "Morehead State University Mentoring Program in Rowan County." Rowan County Fiscal Court
Catherine Riley, "Retired Senior Volunteer Program for Montgomery County–1994." United Way of the Bluegrass
Judy Rogers, "General Education Reform: Planning, Collaboration, and Commitment." Association of American Colleges
Judy Rogers, "1993-94 Title III–Improvement of Academic Programs and Faculty Development (Supplemental)." U.S. Department of Education
Judy Rogers, "1994-95 Title III–Improvement of Academic Programs and Faculty Development." U.S. Department of Education
Elaine Tyree, "Student Support Services–1994-95." U.S. Department of Education

Office of Graduate and Extended Campus Programs

Jan Burge, "1994 Summer Band Camp–Whitesburg High School." Whitesburg High School
Jan Burge, "1994 Summer Band Camp–Pikeville Independent High School." Pikeville Independent High School
Jan Burge, "MSU Horsemanship Camp II–1994." Each Camp Participant
Jan Burge, "1994 Summer Band Camp–Peebles High School." Peebles High School
Jan Burge, "1994 Summer Band Camp III–North Laurel High School." North Laurel High School
Jan Burge, "1994 Summer Band Camp–Male Traditional High School." Male Traditional High School
Jan Burge, "1994 Summer Band Camp–South Laurel High School." South Laurel High School
Jan Burge, "1994 Summer Band Camp–Highlands High School." Highlands High School
Jan Burge, "1994 Summer Band Camp–Campbellsville High School." Campbellsville High School
Jan Burge, "Elderhostel II–1994." Each Camp Participant
Jan Burge, "MSU Horsemanship Camp I–1994." Each Camp Participant
Jan Burge, "Little League Baseball Day Camp–1994." Each Camp Participant
Jan Burge, "MSU Golf Camp–1994." Each Camp Participant
Jan Burge, "Run and Shoot Football Camp–1994." Each Camp Participant
Jan Burge, "Kentucky Technology Student Association Leadership Workshop." Kentucky Technology Student Association
Jan Burge, "State Health and Safety School–1994." Each Camp Participant
Jan Burge, "Baseball Camp–1994." Each Camp Participant
Jan Burge, "Whitney M. Young Scholars Program II–1994." The Lincoln Foundation, Inc.
Jan Burge, "Mountain Dulcimer Camp–1994." Each Camp Participant
Jan Burge, "Whitney M. Young Scholars Program I–1994." The Lincoln Foundation, Inc.
Jan Burge, "Kentucky Boys State–1994." American Legion of Kentucky
Jan Burge, "Elderhostel III–1994." Each Camp Participant
Jan Burge, "1994 Summer Band Camp–Prestonsburg High School." Prestonsburg High School
Jan Burge, "Especially for Youth–1994." Brigham Young University
Jan Burge, "MSU Horsemanship Camp III–1994." Each Camp Participant
Jan Burge, "AmeriCheer Cheerleading Camp–1994." AmeriCheer, Inc.
Jan Burge, "Summer Keyboard Experience–1994." Each Camp Participant
Jan Burge, "Dick Fick Basketball Team Camp–1994." Each Camp Participant

Research Highlights

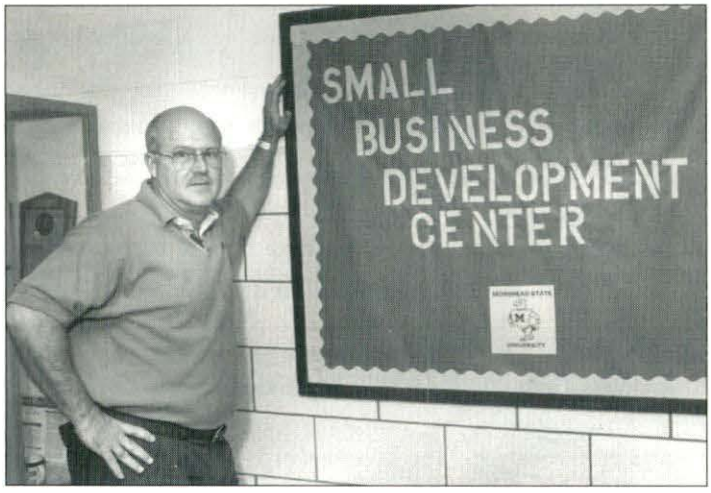
Dr. Andrew Glendening pushes near the cutting edge with his work.

COMPUTER TECHNOLOGY ENHANCES TROMBONE SOUND

Assistant Professor of Music Andrew Glendening doubled the amount of equipment in the University's music lab with funding received from MSU for his project, "Live Inter-active Music Performance." Dr. Glendening is working in an unusual field where few musicians have explored: the area of computer technology to modify and expand the sound of the trombone. While acquiring the "advanced digital signal processing" equipment for permanent and future use by MSU faculty and staff, Glendening commissioned three new solo works to add to the scant existing literature for trombone, tape and electronics: "Wintermute," by Bruce Hamilton; "Flux," by Christopher Cook, and "White Moths," by Cindy Cox. Despite the commonality of elements, each composer created works of distinctly different character.

Additionally, project funds enabled three different programs to be produced: a showcase of performance skills of faculty and students in improvisation on the newly-purchased equipment; a performance of the pre-existing repertoire; and, finally, a premiere of the three commissioned works. All programs were taped for possible radio broadcast.

Because the equipment is portable and requires minimal electrical access, Glendening hopes to carry the avant-garde exposure to high school and university students. "My principle goal is to remain," as he puts it "at the cutting edge of New Music . . . I'm not interested in being replaced as the source of sound by a synthesizer or computer. Rather I want to use the technology to expand the type of sounds I can make . . . to alter it, create more colors, create texture."



Wilson Grier has directed MSU s Small Business Development Center for 13 years.

SMALL BUSINESS DEVELOPMENT CENTERS FLOURISH

Wilson Grier, assistant professor of management and director of the East Kentucky District Small Business Development Center, has received both state and federal funding from the University of Kentucky Research Foundation, allowing MSU to oversee the Morehead, Ashland, and Pikeville Small Business Development Centers (SBDCs).

The major thrust of SBDC is three-fold: to help existing successful small businesses expand, to facilitate new business ventures, and to assist existing small businesses with problem-solving. Consulting services offered by each of the three centers include needs assessment, comprehensive business planning, market research and market strategy, financial statement analysis and control, cash flow analysis and financial projections, debt and equity funding development, valuation methods, strategic planning, management issues and technology transfer.

In the past program year over 400 small businesses were provided with SBDC counseling services. In excess of $15 million of new capital was raised for expanded economic development purposes. Grier believes that the success of the MSU SBDC is directly related to the professionalism of the consulting staff: Keith Moore, general management consultant of SBDC; Kimberly Jenkins, general management consultant of SBDC; and Mike Morley, general management consultant of SBDC; as well as the continuing support of the University.

Office of Research Grants and Contracts
Morehead State University
Ginger Hall 901A
Morehead, KY 40351-1689

Non-Profit Organization
U.S. Postage
PAID
Morehead, Ky.
Permit Number 55

MOREHEAD
STATE UNIVERSITY