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EAST CAROLINA UNIVERSITY

research and creative activity

SPRING 2001

RACE, POVERTY AND POLLUTION

Also in this issue: Ship-shaped History, Alcohol's Pain and Pleasure, A Writer's Story

EAST CAROLINA UNIVERSITY
Spring 2001

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Leadership Transition

The publication of this fourth edition of *edge* finds ECU on the cusp of a major transition. Dr. Richard Eakin, chancellor of the university since 1987, is retiring from that position, and Dr. William V. Muse, former president of Auburn University, will move into the chancellor's office on Aug. 1.

This, then, is the proper time to salute Dick Eakin for all that he has meant to the Division of Research and Graduate Studies. From the time that he arrived in Greenville, Dick was supportive of the critical role of research in the university as well as throughout eastern North Carolina. Discovery and creation not only provide zest and renewal on the campus, but they prime the engine of economic growth and fire the imagination and curiosity of the public.

As ECU grew in size, influence and complexity, Dick had the vision to create the Division of Research and Graduate Studies in 1995, and I was fortunate enough to be selected as the first vice chancellor.

With his encouragement and leadership, ECU faculty members have significantly increased their research activities. External grants and contracts have now reached the $40 million annual level, as detailed elsewhere in this issue, and the university has received the Carnegie designation of doctoral/research-intensive.

I am proud of the exceptional work of the faculty, and I am grateful for Dick's confidence and enthusiasm. The Division of Research and Graduate Studies and I wish him every success in his new role on the faculty in the School of Education.

With continued support from Bill Muse, I have no doubt that faculty members will continue to expand their considerable successes in research and creative enterprises. I am convinced that this will be the case because he strengthened the research mission at both Auburn and the University of Akron, which he also served as president. We look forward to having him on campus.

— Dr. Thomas L. Feldbush,
Vice Chancellor for Research and Graduate Studies

inside edge

on the cover

ECU faculty take a look at the question of whether living near sources of pollution hurts people's health and, if so, who's being harmed the most. Their research is part of a growing national interest in environmental justice. Story, page 12.

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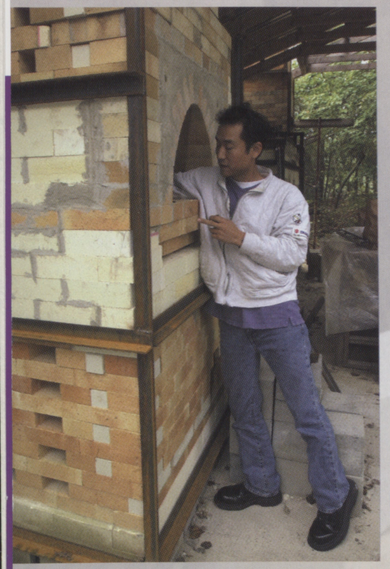


Seo Eo inspects the firing chamber of one of his newest "installations": a two-chamber, wood-firing kiln.

Beyond the 'Pale'

Seo Eo, assistant professor of art, kept heady company in 2000.

Max Halperin, art critic for *The News & Observer* in Raleigh, listed Eo's installation "Pale" among the 10 best exhibits in the Research Triangle area in 2000. Joining him on the list were such exhibits as the North Carolina Museum of Art's blockbuster showings of work by Rodin and Ansel Adams and "To Conserve a Legacy," a showing of 200 works by African-Americans – a collection so large it took three universities to display it.

With "Pale," Eo created a single room-sized work of art by mixing everyday objects and mathematical principles with a desire to challenge notions about space and color. Halperin summarized the piece this way:

"In a dimly lit room, 13 square columns of nylon mesh hung from the ceiling while thin strings were looped in corners and placed along one side of the room – all eerily lit by small, naked light bulbs. Though spaced columns and twine defined areas within the gallery, shadows at the outer edges suggested endless and mysterious space that the eye cannot follow."

Alas, the nature of Eo's installations means that anyone who missed the monthlong exhibit at Artspace is out of luck. He mounts each installation for a particular place and time.

Lately, Eo has been thinking of installations of a different kind. A ceramic artist by training, he designed and built a two-chamber, wood-firing kiln that will allow him and his students greater opportunity to explore different firing methods. In one chamber, he hopes to experiment with a Korean firing technique that produces black pottery. The other chamber is dedicated to salt-glaze firing.

The new kiln is in Greene County on land owned by a graduate student, who paid for the materials. Eo provided all the labor. The bricklaying alone took a year. Although the School of Art has both gas- and wood-fired kilns, Eo said lack of storage space for wood limits the latter's use.

Now Eo has something bigger in mind: a university wood-firing research center with a dozen or more separate kilns based on designs from around the world – each of which produces a different type of pottery. His vision includes conference facilities, classrooms, a gallery, shop and educational landscaping. Last year a symposium he organized on pyrochromatics (the color of fire) brought 100 ceramic artists from around the world to ECU. The research center, he said, could draw many more.

Two sizable obstacles stand in the way – obtaining a site and money – but Eo's enthusiasm is contagious. "There's not a facility like this in the world," he said. "We'd have the world of ceramics in one place. It would be the main attraction for anyone working in the field of ceramics." •

How to lasso a cell

His equipment resembles a do-it-yourself electrical engineering project, but Yong-qing Li's goal belies the humble appearance of his laboratory. The assistant professor of physics aims to help medical scientists study the effects of medicine on the individual cell.

Li's first step is to develop a system that can measure the dynamic motions of cell membranes. Both living and nonliving (abiotic) cells are in constant motion from being hit by external forces — the molecules of water, air or any other medium they inhabit. Living cells also jiggle constantly as a result of the chemical energy inherent in life. By isolating externally produced movement, Li said, scientists can see whether medicine slows or speeds a cell's internal motion and thereby gain insight into whether and how the medicine is working.

The primary tool of Li's research is a relatively new invention called optical tweezers, which unite the laser beam with the microscope. "The laser lets you capture and manipulate any single particle or cell," he said. "Then you can modify or control the cell without touching it so you avoid contamination." To the optical tweezers, Li is adding a Doppler "microphone," which will enable him to measure and record the ultrasonic waves created by the motion of the cells. •

abstracts

Optimism about cancer therapy

Dr. James A. McCubrey, professor of microbiology and immunology, is a cautious optimist. He cautions against expectations of a magic bullet, but says new cures for cancer are on the horizon.

"There is definite hope for cancer therapy," he said. "The more we understand about cancer, the more likely there will be cures. Although progress may appear slow, it has happened, and it is continuous." McCubrey himself has four research projects under way, each seeking to understand the disease from a different angle:

- His longest running project investigates the mechanisms that trigger blood cells to turn cancerous. Since 1992, the project has received more than $1.3 million in grants from the National Institutes of Health.
- A second study focuses on how molecules called cytokines stimulate growth and prevent cell death, a trait often used to help the body recover from chemotherapy. Working with a pharmaceutical company, McCubrey is investigating how synthetic cytokines can stimulate cells more than natural forms.
- The third project, with Dr. Arthur E. Frankel of Wake Forest University, turns on how to kill malignant hematopoietic cells. Hematopoietic cells promote the formation of blood cells. McCubrey said Frankel has developed a therapy that may kill cells other agents don't while also being more selective in what it targets.
- Most recently, McCubrey has received a grant from the N.C. Biotechnology Center to identify the genes in breast cancer that result in drug resistance.

"Once you identify the genes," he said, "they can be used as markers to see how far the breast cancer has progressed and to identify potential types of treatment." •

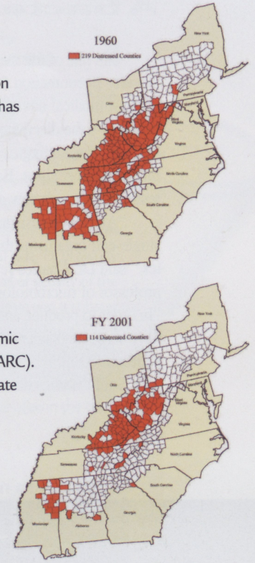
An action agenda on poverty

A study of persistent poverty has evolved into an action agenda for the ECU Regional Development Institute. The institute has taken the lead in a seven-state working group that plans to push Congress to establish an economic development program for the Southeast similar to the Appalachian Regional Commission.

It all began with a report, "Northeast by West," published in September. The report compares the economies of northeastern and western North Carolina over the past 35 years. In 1965, those economies looked similar. Both were dismal. Today, the picture for the west looks brighter while in the east, poverty keeps an unrelenting stranglehold. The authors conclude that one factor has made the overwhelming difference: billions of dollars in economic development funds from the Appalachian Regional Commission (ARC).

"Lo and behold, money does make a difference," said Associate Vice Chancellor Albert A. Delia, director of the institute and lead author of the report.

With the institute's associate directors, S. Richard Brockett and Malcolm T. Simpson Jr., Delia then cast a wider net. "Realistically we know we won't get the federal government to target 12 counties in eastern North Carolina so we looked at the broader picture," he said. They found an area of persistent poverty stretching from south-central Virginia, through eastern North Carolina, down to northern Florida and across to Mississippi. Of the 412 counties in this swath, 70 percent meet the criteria for areas of persistent poverty. Chiefly, for the years 1970 to 1990, they had an average poverty rate of 20 percent or more. In 84 of those counties, poverty worsened between 1980 and 1990. By contrast, Delia said, poverty has been reduced greatly in most of the 12-state area of the ARC.



Federal and state investments have decreased the number of distressed counties in Appalachia.

Scanning the nation, the authors found six multi-state regions or groups with historical patterns of persistent poverty. These include such regions as the ARC area, the Mississippi Delta and Southwestern border states. Of the six, only the Southeastern swath lacks a federal authority to address poverty. Such an authority did exist for a while. The Coastal Plains Regional Commission was created in 1967 and covered parts of five states when it was killed by Congress in 1981. "You can't help but ask, what did we do to be left out," Delia said.

With data in hand, the authors set out to spread the message, working first with the councils of government (COGs) and economic development regions of northeastern North Carolina, then receiving the unanimous endorsement from COGs in the seven-state study area. By May, Delia expects to have addressed meetings of statewide COGs in the seven states. He also is calling on other potential players, such as universities, state agencies and utilities.

The study-area COGs have formed a steering committee to pursue establishment of a regional development commission in Congress. The authorization likely would take two to three years, Delia said, but the steering committee will try to shorten the timeframe by developing a clear proposal for how the commission could be organized and operated. •

A bacterial counter-offensive

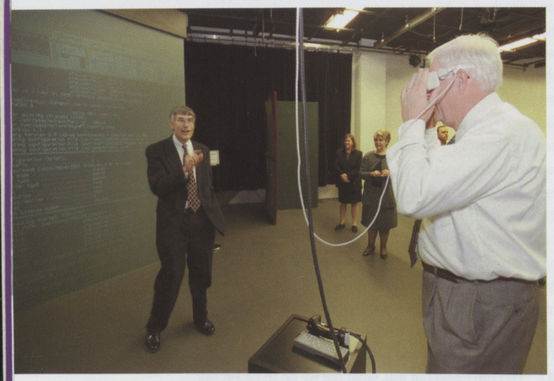
In one of the many quirks of nature, the very phenomenon that led to one of the greatest medical advances of the 20th century — the discovery of antibiotics — has been threatening to subvert our best intentions ever since. Bacteria build resistance to each new antibiotic developed.

"Antibiotic-resistant genes first arose in single-cell organisms that produce antibiotics," said Dr. Charles Jeffrey Smith, professor of microbiology and immunology. "In order to produce antibiotics, you have to have some mechanism to be resistant to the antibiotic itself."

Smith studies how these antibiotic-resistant traits transfer into and through the gene pool of bacteria with an emphasis on commensal bacteria, those non-pathogenic organisms that occur naturally in the body. He seeks to answer whether these otherwise harmless (and frequently beneficial) bacteria act as a reservoir for antibiotic-resistant genes. "When you have a pathogen causing an infection," he said, "can it get some of these resistant genes from the commensal organism? Those kinds of things complicate any kind of treatment that would occur."

Smith has found that *Bacteroides fragilis* — bacteria that inhabit the gastrointestinal tract — transfer antibiotic resistance in more complex and diverse ways than previously thought. He has identified two general methods — through plasmids, small circular fragments of DNA that replicate independently of the chromosomes, and through the chromosomes themselves.

"Without knowing as much as we can about the processes, we will never fully comprehend or combat the problem of antibiotic-resistant genes," Smith said. "We're constantly trying to come up with new drugs, but that doesn't seem to quite keep up with the rate of resistance." •



Associate Vice Chancellor Jeffrey Huskamp gives Chancellor Richard Eakin a tutorial on RAVE.

All the RAVE

With a new virtual reality tool, ECU faculty are testing innovative approaches to teaching, research and long-distance collaborations. In the first applications, faculty are developing a virtual tour of the wreck thought to be Blackbeard's ship *Queen Anne's Revenge*, designing a hotel for space travelers that will help students learn interior design concepts and showing how scorpion venom travels at the molecular level.

But this is just the beginning. Through the Center for Interdisciplinary Instructional Technology Research, housed in the School of Education, more faculty are being trained to use the tool, called RAVE, for Reconfigurable Advanced Visualization Environment. In time, the applications may span the curriculum and the state – from consultations on difficult diagnoses between ECU and UNC-CH medical faculty to collaborative teaching involving faculty from several institutions. Such cross-fertilization is encouraged through a partnership with the UNC-wide Teaching and Learning with Technology Collaborative in the Office of the President.

RAVE was installed in Joyner Library last fall. It consists of a 10-foot by 10-foot glass screen with a rear projection system and a Silicon Graphics Onyx2 computer. When users don special goggles, the images appear to be three-dimensional, and with a hand-held pointer, they can manipulate projected images in a way that gives the impression of handling the objects pictured or, in some cases, moving through the virtual space.

As of last fall, ECU's RAVE was one of only three installed in the United States. It was created by Fakespace Systems Inc. The system is expandable, allowing the addition of projection walls to create a more "immersive" effect than the single panel allows.

RAVE and its computer cost about $325,000. They are part of a technology initiative that also has included upgrades in the campus network and connection with the National Science Foundation's high-performance Backbone Network Service. •

Two start-ups launched

Two start-up companies were incorporated during the past year to develop and market ECU technology. The first product may be on the market by the end of this year.

Janus Development Group was launched to develop technological devices that assist persons with disabilities. ECU holds the patent on its first product — an anti-stuttering device invented by Drs. Michael Rastatter, Joseph Kalinowski and Andrew Stuart of the department of communication sciences and disorders. Darwin Richards, who will become president and CEO of the company this summer, said he expects the device to hit the market by the end of the year.

Janus also is developing a wheelchair treadmill whose patent belongs to the LeRoy T. Walker International Human Performance Center, an affiliate of ECU. The design for the wheelchair treadmill was donated to the Walker Center by a Chicago engineering company that developed it for the Veterans Administration. The treadmill is targeted to clinical settings and is at least a year away from being ready for market, Richards said.

The second company, called Sequoiah, is developing a wireless, Internet-based system for maintaining and analyzing medical records. It is the brainchild of Drs. Walter Pories, professor of surgery, and Mohammad H. N. Tabrizi, associate professor of computer science.

Tabrizi said Sequoiah can be operated from a hand-held touch-tablet computer. Physicians will be able to enter clinical data rapidly and accurately through a multi-specialty, fixed lexicon presented in the logical sequence used by clinicians. Sequoiah will store the information in a secure data warehouse for full, rapid retrieval and analysis. Sequoiah stands out from competitors, Tabrizi said, because of its ability to do rapid analysis of clinical records for population-based studies. Prototypes have been developed, he said, but the company won't be ready to market the full service for another two years.

Another ECU spin-off company, EpiGenesis Pharmaceuticals, recently signed a $100 million development and licensing agreement with Taisho Pharmaceuticals of Japan. EpiGenesis grew out of the research of Dr. Jonathan Nyce, former professor of pharmacology.

In other technology transfer news, the university received six patents, filed applications for seven more and received disclosures from faculty of seven other technologies that may hold patent potential. University income from licenses rose 33 percent, to $101,446. •

On-line enrollment rises

Distance education is boosting graduate school enrollment. The number of students enrolled in on-line courses rose 26 percent to 881 during the 2000-01 academic year. At the same time, on-campus enrollment fell slightly. The two combined create a modest increase in total graduate enrollment, now at 2,483 students. The Graduate School is analyzing the trend as it works to forecast on- and off-campus enrollment through 2010.

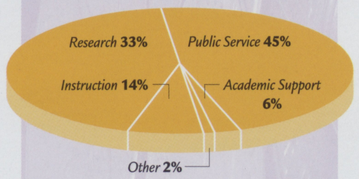
Meanwhile, the school has submitted requests to begin accepting students into two new programs, a Ph.D. in nursing and a master's in public health, in fall 2002. Approval by the UNC General Administration is anticipated in the next few months. •

Grants, contracts up 50 percent

ECU external funding reached record levels in 1999-2000. University faculty received 394 grants and contracts for a total of over $40 million, an increase of almost 50 percent over the previous year.

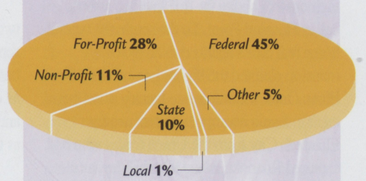
On the proposal side, ECU faculty sustained the high level of activity of the previous year, when there was a substantial increase in proposal submissions. Faculty submitted 521 proposals requesting $125 million in funding. Results of these submissions will materialize in the coming months. •

Distribution of Funding by Program Type



Public Service • 45% • $18,232,716
Research • 33% • $13,290,735
Instruction • 14% • $5,590,842
Academic Support • 6% • $2,302.965
Other • 2% • $835,533

Sources of Research Dollars



Awash in History

CIVIL WAR SHIPWRECKS REVIVE THE STORY OF A COMPLEX MILITARY STRATEGY

"Splendid Victory," courtesy of the Mariners' Museum, Newport News, Va.

The smooth, black waters of the Pasquotank River hid their secret well. On the north side of the river, scattered cypress lifted their crowns above the tree line in a swamp called Hospital Point. To the south, the type of home real estate agents dub an executive mansion claimed the higher ground of Cobb Point. Once, a Confederate battery stood guard there in a vain attempt to protect nearby Elizabeth City from the Union forces who had captured Roanoke Island. On this day, as the sun beamed a foretaste of August's mid-day heat, neither cannon nor cannon ball offered even imaginary resistance. Instead, the only visible reminder of those times bobbed in the river like someone's trash.

At the red and yellow detergent bottles, two boats anchored and their crews donned scuba gear. Six feet down, at the end of the bottles' tether, lay the prize: the skeleton of the *M.C. Etheridge*, a commercial schooner armed and pressed into service during the Civil War as the *Black Warrior*.

Once part of North Carolina's pesky Mosquito Fleet, the *Black Warrior* serves as a metaphor for Civil War naval history: out of sight and out of mind. Americans pay their respects to the hallowed grounds of Gettysburg, Manassas and Fredericksburg. They revere the names of Lee, Grant, Sherman and Jackson, generals all. Discussions of long-past political and military strategy raise mention of only a rare celebrity of the sea. The *Monitor*, certainly. The *H.L. Hunley*, perhaps. And, thanks to their daredevil image, a general recognition of blockade runners. Otherwise, the collective mind of America keeps its Civil War solidly on terra firma.

Almost. For the last 20 years, ECU's maritime history program has plumbed the depths of the naval side of the Civil War. Last summer alone ECU faculty, staff and students worked on four separate Civil War research projects. The program also had connections through two of its graduates (Wes Hall and Harry Pecorelli) to the biggest Civil War event of the summer: the raising of the Confederate submarine *Hunley* near Charleston.

Part of the program's emphasis grew from the interest of its founder, Dr. William Still, who retired in 1994. Part has been driven by almost unlimited access to Civil War shipwrecks. A treasure trove of Civil War ships lies underneath the waters of the Southeastern United States and of North Carolina in particular. But the Southeast proved to be just a starting place.

Conducted on sites from North Carolina to Florida, Bermuda, France and Micronesia, the research revives the story of a complex, global war strategy. It supplies unique and important details for generally skimpy records of shipbuilding and armament. It gives color to the lives of ordinary seamen living and fighting in an extraordinary time. It connects then and now.

Consider the case of the *Monitor*. Never a particularly seaworthy vessel, the famous ironclad sank in a storm 16 miles off the coast of Cape Hatteras as it was being towed from Hampton Roads, Va., to Charleston, S.C. early New Year's morning, 1863. It came to rest upside down in more than 230 feet of water. Its exact location remained a mystery until 1973. At the time Dr. Gordon P. Watts Jr., who retired as professor of nautical archaeology in January, was North Carolina's underwater

Continued

Courtesy of the Mariners' Museum, Newport News, Va.

THIS PAGE, TOP: The anchor from the Monitor, *now displayed at the Mariners' Museum in Newport News, was preserved at ECU.*

THIS PAGE, BOTTOM: Capt. Raphael Semmes, in foreground, and his executive officer, John McIntosh Kell, pose aboard the Alabama.

FAR RIGHT, TOP AND MIDDLE: Working from a 292-foot barge moored over the Monitor *site, Navy divers in heated suits are lowered into the ocean.*

FAR RIGHT, BOTTOM: Matt Muldorf prepares to dive to the Black Warrior *in the Pasquotank River.*

archaeologist. He was a co-investigator in the team that located the wreck, and his analysis of the data identified the *Monitor*. Watts also was the principal investigator of the first three archaeological investigations at the wreck site. The anchor, which he helped recover in 1983, was preserved in a makeshift conservation laboratory at ECU. It is now housed with other *Monitor* artifacts at the Mariners' Museum in Newport News, Va.

In recent years, the wreckage has started to collapse. In conjunction with the National Oceanic and Atmospheric Administration, a U.S. Navy salvage unit is trying to shore up deteriorating sections in preparation for recovering the engine and the turret. The recovery effort may begin later this year. As the Navy packed in grout bags last summer, ECU staff archaeologist Frank J. Cantelas — at the behest of NOAA — led another team of divers excavating the turret and charting details of the engine room's condition. Working with Cantelas were dive safety officers Gary Byrd and Steve Sellars, graduate student Tane Casserly, and divers from NOAA's Underwater Research Center and the Cambrian Foundation.

The summer's discoveries included several intact, mercury-filled glass vacuum gauges still on the engine. "The gauges were interesting," Cantelas said. "No one knew exactly what the engine looked like." The *Monitor* was built on a fast track in response to rumors the South had its own ironclad under construction. "It was the first time anybody actually subcontracted big components of a ship and then brought it all back together," he said. "John Ericsson (the designer) made drawings as the manufacturers needed them, and the drawings don't always correspond with what's there."

As the details of the *Monitor*'s construction come to light, they remind historians of the ship's impact on the 19th and 20th centuries. The rumors of a Confederate ironclad had turned out to be true, and the *Monitor* was rushed into service. Although the battle of the ironclads ended in a stalemate, it marked the end of the era of wooden ships. "The *Monitor* was one of first successful armored ships and was the first to employ an armored turret," Watts said. "The design was a radical departure from traditional mid-19th century naval architecture and its influences can be seen on the warships of today." The *Monitor*'s turret resembled a rotating "cheesebox" and was equipped with two 11-inch guns. In a further stroke of daring, the ironclad's designer relied solely on steam power. Until then, all steam-powered ships came equipped with sails for backup.

"One of the great things about working on the *Monitor* is that all of the engineering that made it technologically sophisticated and unique are still preserved there in the hull of the ship," Watts said.

As Cantelas' crew dove offshore, graduate students Doug Jones, Matt Muldorf, Kim Williams and Chris Southerly joined Richard Lawrence, head of North Carolina's Underwater Archaeology Unit, on the Pasquotank River. The *Black Warrior*'s wreckage was long ago stripped of salvageable artifacts, but the site remains interesting as a rare trace of a 19th-century, North Carolina-built ship. Merchants Joseph H. and William D. Etheridge had ordered its construction in 1859 in Plymouth.

"Few people realized how much the navies in the Civil War depended on vessels not designed to be warships at all," Watts said. "Almost every ferry in operation in New York in 1861 was purchased by the Union Navy and fitted out as gunboat."

Watts located one of those ferries, which had been rechristened the USS *Southfield*, in the Roanoke River at Plymouth a decade ago. "Ferries had rudders on both ends and paddlewheels so you could go in both directions with equal efficiency and steer from both ends so they were very effective gunboats in the narrow, shallow rivers of the Southeast," he said. The *Southfield*'s effectiveness ended in dock early in the morning of April 19, 1864, when it was sunk by the CSS *Albemarle*. According to historical records, the Army Corps of Engineers had deemed the *Southfield's* wreckage a shipping hazard and removed it in the 1880s. Apparently the removal applied only to the top structure. The hull — with the deck intact — still lies on the river bottom, about 15 feet below the surface. "The only substantial damage appears to be associated with the *Albemarle*'s attack," Watts said.

A Confederate mine spelled the end of another converted ship — the USS *Maple Leaf*. Once a passenger steamer on the Great Lakes, it was ferrying the personal belongings of 2,000 Union soldiers when it struck the mine and sank in the St. Johns River near Jacksonville, Fla. Because the ship carried little ordnance, neither side tried to recover the cargo.

When the ship was rediscovered in 1984, its deck was buried in eight feet of mud at the bottom of the river — an oxygen-free environment that resulted in remarkable preservation. Nothing had been touched by human hands since the ship went down.

"It's the largest known archaeological deposit in context, totally undisturbed, of Civil War material," Cantelas said. "When you went into the cargo hold, things were still packed in boxes and crates. There were papers, books, photos, clothing, leather goods, things you would not get off a land site at all. The paper was not in good shape, but some of the photographs you could still see. Some of the clothing, especially wool, was still in good shape. We found one cartridge box intact, with a big belt you wore over the shoulder, and it had big brass belt buckle. There was another crate with a mess kit for a company of 20 men or so."

A Florida dentist, Dr. Keith Holland, had located the site and called on Still and Watts, ECU's experts in Civil War history and underwater archaeology, for assistance in investigating the wreck. Cantelas, who had just completed his master's degree in the ECU maritime studies program, was hired to supervise the project. For three years, he lived in Florida and directed the site work — including annual field schools for ECU students.

"What got me interested was the *Maple Leaf* itself," he said. "I was interested in steam engines of that period, but like everyone else, I got on the Civil War bandwagon because there was this incredible material."

The site became the nation's fourth shipwreck designated a National Historic Landmark. (The *Monitor* was the first.) More than 30,000 artifacts, about 5 percent of the total contents, were recovered during Cantelas' stint in Florida and are now housed in museums in Jacksonville and Tallahassee.

The artifacts are prized mostly for what they reveal about the lives of rank-and-file soldiers. For Dr. Lawrence E. Babits, George Washington distinguished professor of history, they also added an interesting note in the history of ordnance.

"Civil War weapons got fouled easily," he said. "That's no secret. In the first two years, there was a lot of jamming. The bullets and rifles had been built to specification. They assumed the jamming was because of the black powder residue building up so they couldn't ram the bullets down the barrel."

Unspent bullets found on battlefields suggested another possibility to Babits. "People will say they were dropped, but about 80 percent were oversized," he said. "My conclusion is they were discarded, not accidentally dropped." It was also suspicious that the number of oversized bullets decreased between the early and middle years of the war.

Two crates of ammunition from the *Maple Leaf* revealed why. The crates were clearly stamped with the name of the same arsenal but two different dates — one in 1861, the other in 1863. Babits tested every bullet, up to 250 in one case. In the older case, 1 bullet in 5 was too large to go down the barrel of an U.S. Army-issued rifle. Among the 1863 bullets, the failure rate dropped to 1 in 20.

Having dated crates from the same arsenal gave Babits the necessary controls and numbers to cement his theory. "It was not reported in official records that they were sizing down," he said, "but apparently in 1863, the federal arsenals made bullets 1/100th of an inch smaller so there was less inherent failure. You know, the industrial revolution hasn't gotten it right yet. There were some of the same complaints in Vietnam with cartridges for M-16s. They had to be changed then, too."

Two of last summer's projects took ECU archaeologists farther afield, examining a largely forgotten aspect of the war from different sides.

For the 12th consecutive year, Watts followed the Civil War to the coast of Normandy. He leads the U.S. arm of a joint effort with France to investigate and recover artifacts from the CSS *Alabama*, the most successful of a fleet of Confederate commerce

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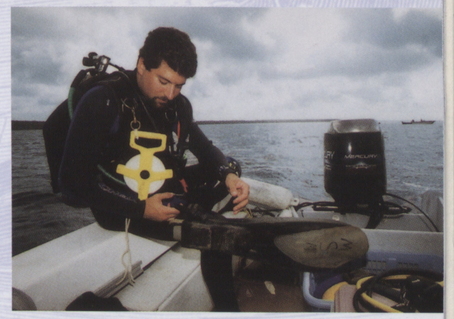
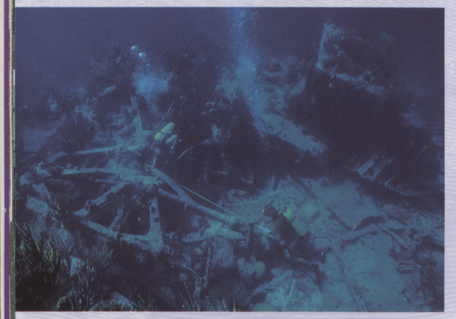


Top two photos courtesy of Gordon Watts



TOP: Clear waters make Bermuda an ideal training ground.
MIDDLE: ECU divers check out the blockade runner Nola.
BOTTOM: It took Navy divers three days to cut this piece of metal off the Monitor.

raiders. It lies in 190 to 210 feet of water off the French port of Cherbourg. The ship became more famous in France than in the United States when on June 19, 1864, thousands of Frenchmen watched from shore and from small boats as the *Alabama* lost its final battle with the Union gunboat USS *Kearsarge*.

By contemporary accounts, the *Alabama* was a beautiful and a powerful ship. Painted black, she boasted three masts and twin horizontal cylinder steam engines. The vessel's screw propeller could be hoisted up into the stern to eliminate drag when she went under sail. But the ship is less noted for its technological innovation than the strategic role she and her captain, Raphael Semmes, played.

"The concept of commerce raiding had a big impact on World War I and early World War II," Watts said. "The Germans based their whole strategy for commerce raiding on the success of the *Alabama*. For two years, Semmes carried out an absolutely staggering operation."

The Confederates operated about a dozen commerce raiders that traveled the globe in search of merchant ships flying the Union flag. In 22 months of operation covering three oceans, the *Alabama* alone captured or destroyed 64 merchant vessels and a Union warship. "When you look at the Civil War, the financial impact on the North was insignificant — except for the commerce raiding carried out by the Confederate Navy," Watts said. "It literally destroyed the U.S. merchant marine, and it never recovered."

The *Alabama*, like several of the raiders, was built and outfitted surreptitiously in England, in defiance of international rules of neutrality. So great was the damage the raiders inflicted that after the war, an international court ordered Great Britain to pay the United States compensation of $15.5 million in gold.

Among the efforts of last summer, Watts and the Franco-American team recovered a 32-pound Fawcett, Preston and Co. cast cannon. Earlier they had recovered a Blakely rifle that did not carry the usual foundry marking, perhaps an attempt to hide its origin. "I'm eager to see if there are marks on the 32-pounder," Watts said.

Less pertinent to military history, but no less interesting, have been the ceramic toilets with intricate printed transfers inside the bowls. The toilets were lined with lead and had pumps for flushing.

Halfway around the globe, Cantelas and Ph.D. student Suzanne Finney led a party researching the fate of the victims of commerce raiding. Second in success only to the *Alabama*, the CSS *Shenandoah* is credited with (or blamed for, depending on perspective) decimating the North's whaling fleet. With a National Park Service grant, Cantelas and Finney went to the Pacific Island nation of Micronesia to locate and assess the condition of four whaling ships the *Shenandoah* trapped, burned and sank in a secluded harbor on the island of Ponapaie.

The park service had surveyed one wreck in the area in 1992 but failed to indicate the location on its records. The Cantelas-Finney team relocated that ship and two of the remaining three. Piles of bricks helped point the way. "Brick is very diagnostic of a whaling ship," Cantelas said. "It's from the stoves used to process the blubber into oil. We also found triworks knees, the 'L' braces that were used to hold up the sides of the stoves." With three whalers that fit the historical accounts, the team could say with certainty they had located the site of the *Shenandoah*'s attack.

Finney, a resident of Hawaii, had heard the story of the attack from Bill Still, who now lives in Hawaii. The team also included Cathy Foch and Russ Greene, two other ECU students, and Megan Moews of the University of Hawaii. They spent three weeks documenting the ships' construction features and locations. Even as it confirms details of Civil War history, Cantelas said, the site may become more important for information it adds to the scant knowledge about 19th-century whaling ships.

Back at home, Watts and Richard Lawrence, of the state Underwater Archaeology Unit, have been putting the finishing touches on a study of Civil War wrecks off the coast of Fort Fisher. Wilmington, just upriver from the fort, was one of the Confederacy's most important seaports and the last to fall to the Union.

Their report summarizes a decade of research by ECU staff and students who investigated the underwater wreckage of three Union ships that participated in the blockade and four blockade runners. Watts called the blockade runners a curious mix of vessels, several of which had started life as packets transporting people and mail around the British Isles. One, the Scottish-built *Condor*, was bringing Confederate spy Rose O'Neal Greenhow home from a trip to England. Greenhow was killed when the vessel sank off Fort Fisher.

In an ironic twist of war, the Union Navy found that the best weapon against a blockade runner was another blockade runner. It converted numerous captured ships into gunboats. One was the gunboat USS *Peterhoff*, which wound up in the study by virtue of being rammed and sunk by another Union warship. Early on the morning of March 7, 1864, the crew of the Union warship USS *Monticello* mistook the converted blockade runner *Peterhoff* for the enemy.

The report to the National Park Service recommends opening public access to three of the sites through the creation of an underwater historic park. Buoys, maps and historical literature would guide amateur divers back in time and perhaps lift the veil of secrecy on the Civil War's naval past. •

Working Blind: UNDERWATER ARCHAEOLOGY CHALLENGES ENDURANCE AND INGENUITY

Bermuda makes underwater archaeology a cinch with its clear and calm blue waters. The former British colony has a history as a major stop for trans-Atlantic trading and coral reefs that have snared many a ship. Easily accessible, the Civil War blockade runners *Nola* and the *Mary Celestia* practically invite divers to come down and take a look. ECU faculty and students have answered the hail and return each fall to enable students to learn the ropes under ideal conditions.

More often, however, conditions are less than ideal. In the rivers and sounds of the Southeast, tannin and sediment reduce visibility to zero. Divers sometimes work by feel.

Frank Cantelas spent three years working on the *Maple Leaf* in the St. Johns River and never saw the ship. He found out which artifacts he was recovering only after he brought them to the surface.

The deck of the *Maple Leaf* lies underneath eight feet of mud at the bottom of the river, and tidal currents wash tons of silt across the site twice a day. "I remember one time swimming across the wreck site before it was excavated, and I sank down into this loose mud," he said. "It's not like you could tell the difference between the river and this thick mud except that very slowly it became thicker and thicker."

To keep the excavation from filling back in as fast as the researchers could dig it out, they had to erect a barricade similar to those at construction sites. At the end of each year's diving season, they'd pull up the barrier, and within two days, all traces of the dig would be covered over.

At the *Monitor*, the challenge was depth. The wreck lies in 240 feet of water, near the limits of diving absent pressurized suits. Making the dive safely with scuba equipment meant limiting the time on the site.

"We were making 20- to 25-minute dives, counting from the time you jump in to the time you start to come back up," Cantelas said. And each diver could make only one dive per day. Being so limited in time, the archaeologists had to make sure they used every minute well. "We would go up to the point of practicing the night before. We'd go out to the parking lot of the motel and draw stuff out and practice to see how long it would take."

Each diver carried four tanks of gas: two on his back and one under each arm. Resurfacing took 60 minutes with long pauses to decompress and change gas mixtures. Every five minutes added to the bottom time would add another 20 minutes to the decompression period. Safety divers met the archaeologists on the way up. "If you're not breathing the right gas, it can kill you, and you won't even know it's happening," Cantelas said.

By comparison, Navy divers working at the same time had it relatively easy. The Navy worked off a 292-foot barge anchored at the site. Its divers wore heated diving suits and breathed mixed air fed by tubes and regulated by specialists on the barge. After dives lasting 40 minutes, they decompressed for several hours in the relative comfort of onboard hyperbaric chambers.

Gordon Watts could have used the heated suits at the *Alabama* last summer. Water temperature in the English channel was in the 50s, which was "right damned nippy" after an hour in a wetsuit, he said.

The *Alabama* lies about seven miles off Cherbourg on the Normandy peninsula. Because of a 17-foot tidal cycle, the depth varies from 190 feet at low tide to more than 210 feet at high tide. At 4 to 5 knots, those tides are nothing to fool with — strong enough to overpower a small research submarine Watts once took to the bottom.

"We dive during a 28-minute window when the current slacks," Watts said. "If you don't finish decompressing before the current starts to pick up, the boat that you're hanging under has to come off the mooring. You drift with it until you have purged enough nitrogen from your blood to be able to get out. Doesn't sound very exciting, does it?"

For every challenge, there's a research agenda, in this case, how to recover information efficiently under adverse conditions. Watts is investigating the use of video for mapping, different excavation techniques and options for remote-operated equipment and vehicles. He also is optimistic that the cost of one-atmosphere suits may drop low enough to be feasible for high-profile, deep water archaeology projects. The suits would eliminate the need for decompression, lengthening the time a diver could stay on the bottom.

Watts barely cracked a smile as he questioned his intelligence for tackling such a hazardous environment. "I am a moron. There can't be any other reason." Only one thing makes it worthwhile.

"These wrecks contain some of the most important sources of information for setting the historical record straight, and they are virtually untapped," he said. "Through them, we learn a lot about our maritime past that otherwise would fall through the cracks of history." •

in harm's WAY

IF POLLUTION HURTS THE POOR AND MINORITIES MORE THAN OTHERS, IS IT A CASE OF BAD LUCK OR A GREATER EVIL? THE ENVIRONMENTAL-JUSTICE MOVEMENT SPURS A FRESH LOOK AT AN OLD PROBLEM.

Hogs, hurricanes and factory locations earn headlines in eastern North Carolina. They also have earned scrutiny by ECU sociologists, who ask whether the region's downtrodden shoulder a disproportionate share of the harm those hogs, hurricanes and factories can bring. The work relates to a growing national interest in environmental justice.

"The issue is to what extent and in what ways are lower-income and minority communities in the United States suffering from exposures to things that harm their health and their quality of life," said Dr. Bob Edwards, assistant professor of sociology. "There are a lot of data about a gap in health between blacks and whites and between middle-class people and poor people. Part of that is access to health insurance and medical care for prevention. Another part is probably that poor people and nonwhites in America live in situations where they're more likely to be exposed to things that are going to harm their health."

Edwards has completed a series of studies of the burgeoning swine industry and its effects on African-Americans and the poor. He and Dr. Marieke Van Willigen, assistant professor, also were part of a team that examined the economic and social consequences of the hurricanes that hit North Carolina during the 1990s. On a new project, Van Willigen has teamed with another assistant professor of sociology, Dr. Liam Downey. Van Willigen's expertise lies in health issues, Downey's in applying computerized mapping technology to social science research. Together, the two are investigating the health effects of living near industrial polluters. Numerous other studies, including Downey's previous works, have shown that high-polluting industries are more likely to be located near minority and poor neighborhoods.

"Environmental justice researchers haven't done much to address the question of whether living near pollution sources has an adverse effect on health," Downey said. "The work that does address this question (by researchers in other fields) often looks at the impacts of single chemicals rather than the health impact of entire facilities. What we want to do, using statistical techniques to control for a whole set of factors, is to figure out whether cancer rates, for example, are higher in neighborhoods near pollution sources. So we'll be extending the research from who lives near pollution and why to what are the effects of living near pollution."

Before coming to ECU, Downey studied housing patterns in Michigan, looking at where African-Americans and whites live relative to high-polluting industries. As part of the study, he used computerized mapping software — called Geographic Information System software, or GIS — to plot the locations of industries with high levels of toxic emissions. He also created maps showing racial dispersion in housing. With GIS he could then overlay the two types of maps to identify patterns.

Continued

Three ECU faculty members — from left, Bob Edwards, Liam Downey and Marieke Van Willigen — look below the surface in areas of environmental justice.

When Downey arrived in Greenville last fall, Van Willigen saw the potential for collaboration. N.C. physicians are required to report to the North Carolina Tumor Registry every cancerous tumor they diagnose. Van Willigen and Downey will create maps representing all the cancers in eastern North Carolina and overlay those with maps showing factory locations. Because the data will be plotted on maps, the sociologists will be able to ask the computer for correlations based on proximity — say, tumors occurring within a mile of a plant — rather than by artificial boundaries such as county lines.

It is a light-years advance over previous tools. Barely a decade ago, when women on Long Island noticed an unusual number of breast cancers in their neighborhood, they gathered information door to door and drew maps by hand.

"The software Liam uses can do that on a computer for a larger area and generate statistical correlations," Van Willigen said. "When you're looking at a small community with one plant, it's hard to generate anything with statistical significance because statistical tests are affected by the number of cases you have. You can have an outrageously high amount of cancer in your community, but if it's a community of 50,000 people, it's not necessarily going to generate enough cases of cancer to show statistical significance."

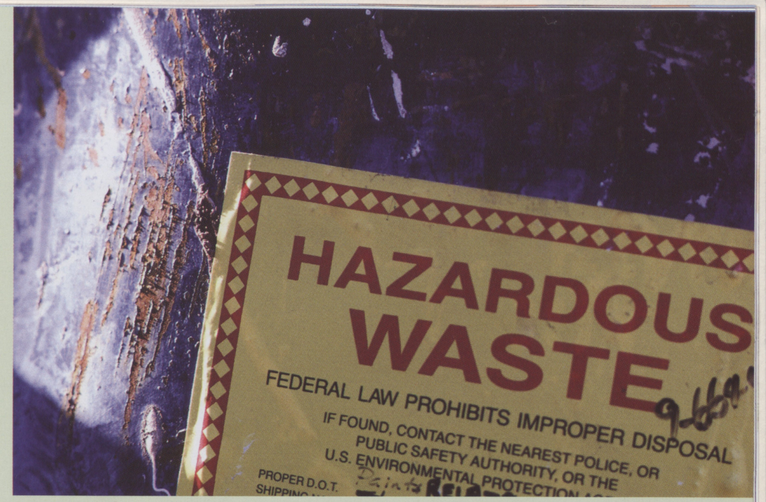
Eventually, Downey and Van Willigen hope to map the entire state, add more sources of pollution and pull in additional data on health, such as health-insurance coverage, birth defects and infant mortality. They may also add the locations of hog farms.

"The public-policy implications are real and enormously important," Van Willigen said. "One of the arguments we can make is that not only is it worse to live near a pollution source, but that it may be even worse for those who are already vulnerable to health problems, like the poor. If we know this is the case, then environmental justice might need to be redefined to strive not just for equal exposure, but equitable exposure. In other words, if a group of people are more vulnerable, perhaps public policy should give them added protections against exposure."

The environmental-justice movement has evolved since Love Canal raised national awareness about toxic waste and North Carolina's own PCB dump in Warren County inspired the phrase "environmental racism." Focusing largely on health issues, it moved environmentalism out of what had been perceived as the elitist concerns of the white, well-educated upper classes and into the back yards of blue-collar workers, said Edwards, who contributed a chapter on the history of the movement to the book *Ecological Resistance Movements*. It also is shifting the focus from intent to effect by viewing environmental issues through the same lens as institutional discrimination.

"For the most part, it's probably safe to say that mainstream America defines racism as a person consciously and intentionally doing something because people are black or Hispanic," Edwards said. "There has to be intention, and that intention is important. And indeed, intention *is* important in litigating this kind of thing under the current interpretation of civil-rights laws and to a great degree in the environmental-justice literature. But nonwhite America tends to define discrimination differently, and for the most part, sociologists define it differently. It doesn't matter what the intention was. It matters what the outcome was."

As a result, environmental justice is uncovered less by incriminating documents than by statistical inference. If blacks or Hispanics or poor whites are disproportionately more likely to be harmed or, in the case of recreational resources, less likely to benefit, then there is a prima facie case of an environmental injustice.



The guilty party, instead of being an individual "bad apple," is "the system," the way society is organized and operates. If the poor have less political clout, for example, they are less likely to be able to stop a project or process or even to be heard. "It doesn't mean it's impossible, just that it's harder," Edwards said. "That bespeaks a collective and political fix, not an individual and punitive fix."

The beginning of a collective fix was put into play in 1994 when then-President Clinton signed an executive order requiring an environmental equity impact assessment on any project involving federal highway funds. Residents of a black neighborhood in the Alamance County town of Mebane used the requirement to force a review of a highway that would have sliced through their community, requiring demolition of homes, businesses and churches.

"Now, you can't simply cut a highway through the poorest neighborhood or the blackest neighborhood because it's the easiest place to put one," Edward said. "You can't simply follow what is likely to be the path of least political resistance. It gives citizen groups standing to get their issues on the table if they feel like they have been bypassed in the process before."

In the issue of North Carolina's hog population, Edwards sees the national debate over environmental justice in microcosm. In just a few years, North Carolina's swine industry grew from 2 million head to 11 million, and rather than being dotted across the state as it once was, 97 percent of the industry became concentrated in the counties east of Interstate 95. The large, factory-style farms that produce those hogs also fill scores of open lagoons with malodorous waste that has spilled into streams and rivers.

"The state's poorest region has become a repository for virtually all of the state's hog waste," he said. "There's an extreme concentration in this region, which has less political clout, more poverty and more African-Americans than other parts of the state."

Edwards has tracked the growth of the industry and its effects, from the volume of waste and the loss of small farms on the negative side to the economic benefits on the positive. In each study, he found that African-Americans came out shortchanged. They lost land and income while whites — even poor whites — gained. And the racial composition of counties is a strong predictor of where swine farms are concentrated. This is true even after controlling for property values and other factors that influence the location of large livestock operations.

It is not that someone pointed to the east and decided to locate a polluting industry here because it is where a lot of African-Americans and poor people live. "Longer-term political and economic processes have made eastern North Carolina the poorest region of the state and the least politically connected," Edwards said. "These processes won't change by changing the way certain bad apples think. They will change when the people who are affected achieve a stronger relative position in state government and state politics and by changing decisions about economic development and where different kinds of resources are invested."

The same processes may lie behind racial disparities in the impact and recovery from hurricanes, he said. "Why were blacks in coastal counties more likely to experience damage from Hurricane Bonnie when they live farther from the ocean?" he asked. "Is it because they're more likely to live in mobile homes? We don't know, but it suggests something is going on that puts black households at greater risk. When you come inland, it doesn't take a rocket scientist to figure out that development in floodplains is almost exclusively low-income and minority. Clearly the people put at greater risk in our current land-use patterns are poor people." •

MESSAGE IN A BOTTLE

Medical researchers tackle the use and abuse of alcohol and other drugs from many angles.

Think about all the patients in all the hospitals in the United States. Now consider that one-quarter of those hospitalizations in some way relate to the use of alcohol. It is a heavy price to pay and one that gets heavier when you tally the additional costs of drug abuse and addiction.

In North Carolina alone, substance abuse and addiction cost the economy an estimated $5 million to $7.5 million every year. That includes such factors as medical care, lost productivity, automobile accidents and crime.

At the Brody School of Medicine, scientists are investigating a range of questions related to the use and abuse of alcohol and other addictive substances. These questions carry particular relevance in eastern North Carolina, where some counties report hospitalization rates for alcohol- and drug-related diagnoses substantially higher than the state average. In Edgecombe and Halifax counties, for example, the rate exceeds 200 per 10,000 population. The statewide rate is 126.

While the ECU scientists conduct independent research projects, they are allied under the umbrella of the Alcohol and Drug Abuse Research Center. Here are a few of their stories.

RX: BLOCK THE REWARD

Years of studying alcoholism and drug addiction have shown Dr. Brian A. McMillen the hard reality that addicts face, and he says without qualification that what keeps them from getting off alcohol and drugs is not lack of will power.

"It takes a lot of effort to be an addict," he said. "Will power is not the problem."

McMillen, professor of pharmacology and research director for the Center for Alcohol and Drug Abuse Studies, employs the neurobiology of animal behavior to investigate drugs that he hopes one day will help those addicts come clean. McMillen sees pharmaceuticals as a necessary adjunct to psychotherapy for some patients.

"The hallmark of substance dependence is repeated attempts to cut back or stop," he said. "If they come back two to three times (after falling off the wagon), you don't give them the same treatment and say use more will power."

In his laboratory, McMillen explores the ways that alcohol, cocaine and their ilk reward the user by altering the brain's biochemistry. One affected chemical is dopamine, a precursor to adrenaline and a neurotransmitter in the brain. (Swedish pharmacologist Arvid Carlsson was just awarded a share of the Nobel Prize for this discovery.)

"Narcotics and alcohol make the brain neurons that use dopamine fire faster," McMillen said. "Cocaine and amphetamines work on the nerve endings to put out more dopamine. So these are two different mechanisms to increase the release of dopamine, and that explains basically why people like to mix these drugs. They mix cocaine and heroin as a 'speed ball,' or they drink a lot on top of cocaine. It dampens the anxiety and paranoia produced by the cocaine, but it also gets more kick to the reward of cocaine."

Increasing numbers of addicts do mix drugs in just that way. "In the under-45 population, those born after 1955, there are very few one-drug connoisseurs," he said. "They use one primarily, but will add in others. This makes it more complicated to work with them."

The end goal of McMillen's research is to develop drugs that can block the neurologic rewards of abused substances. If users do not get their kicks, the craving that pushes them to use alcohol or drugs will

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dwindle. The drug naltrexone, for example, has been approved for the treatment of addiction to alcohol and narcotics. Du Pont Pharmaceuticals markets naltrexone under the brand name ReVia for the treatment of alcoholics and as Trexan for opiate addicts. To overcome addictive behavior, McMillen said, the addict must challenge the prescribed drug by using the abused drug in as normal a setting as possible. For example, an alcoholic on ReVia will have a cocktail at his usual hour, but because he doesn't get the same feel-good response from it, he won't reach for the second one. "This concept is anathema to most substance-abuse counselors," he said.

McMillen has tested a number of similar drugs to treat alcoholism and now is working with two experimental drugs, tiaspirone and amperozide, that appear to interfere with the reward effects of both alcohol and cocaine. "My belief is that for a treatment drug to be useful, it has to address multiple drugs of abuse," he said. Tiaspirone blocks the receptors for dopamine, he said, but the mechanism by which amperozide works remains unclear. Both drugs interact with receptors in the brain other than those for dopamine, but is there one that is critical?

To test the effects of potential treatments, McMillen has developed a number of experiments using animal models. In some, rats that have been bred to drink large amounts of alcohol are given a choice between water and alcohol solutions. In cocaine studies, he employs a technique called condition place preference. Standard laboratory rats are placed in a box that contains two chambers, each with different flooring and walls. Once the preferred side is established for a rat, it receives an injection of saline and is confined to that chamber. Then it receives an injection of cocaine and is confined to the less preferred chamber. After four injections each of saline or cocaine, the rats will dramatically increase the time they spend in the chamber linked with the cocaine injections. While some projects monitor the animals' behavior, others look more closely at what happens in the brain — specifically, how alcohol stimulates certain receptors.

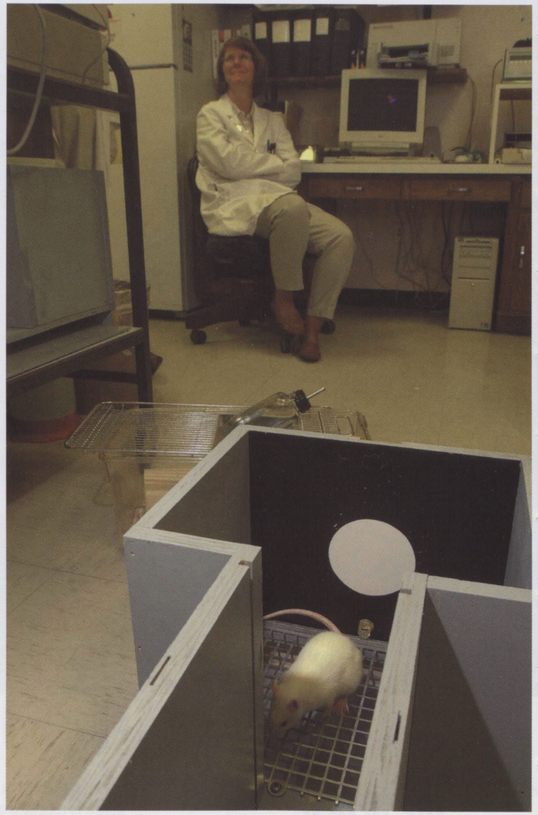
The complex nature of addiction guarantees that finding solutions will be difficult. There's the genetic factor, for example.

About one-quarter of all alcoholics carry a biochemical abnormality that predisposes them to alcoholism, McMillen said. In a 1987 experiment, McMillen proved that he could identify these alcoholics based on a urine specimen alone.

"You can clearly tell an alcoholic from a nonalcoholic, even when they haven't had a recent drink," he said. "In my study, they had been sober for three weeks." In his tests, both urine and spinal fluid indicated that alcoholics produce unusually low levels of serotonin, a hormone that regulates brain activity and affects mood. The body produces serotonin when it metabolizes tryptophan, an essential amino acid found in most proteins.

In some cases, high rates of alcoholism in the elderly and in rural populations point to a social root to the disease. A growing body of evidence suggests that diet also may play a role, he said. Low levels of zinc and tryptophan are the suspected factors. This is of special interest to eastern North Carolina, where the natural zinc content of water is low.

All those factors may need to be taken into account in the treatment of addiction, McMillen said. "The more you know about the underlying biochemistry and neural biology, the more you'll be able to predict which treatment will or won't work," he said.

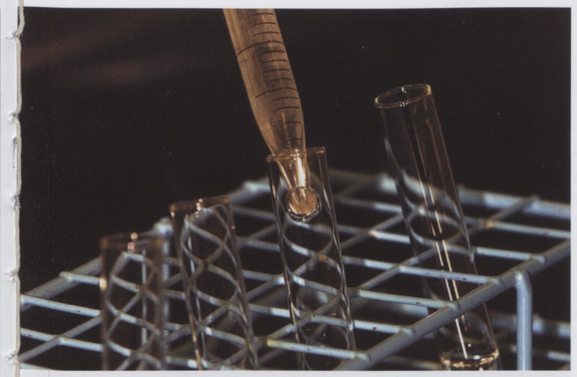


Lab assistant Helen Williams relaxes while a rodent establishes its place preference.

'TWO BAD THINGS'

Chance led Dr. Abdel A. Abdel-Rahman, distinguished professor of pharmacology, into the work that has occupied much of his research team for the last 15 years and that now brings in $400,000 a year in grants from the National Institutes of Health. He had been investigating the areas of the brain that control cardiovascular function and the way that some drugs act to lower high blood pressure when he noted the results of alcohol studies by ECU colleagues. The effects of blood pressure medication and of alcohol, he said, "were mirror images, like day and night."

From that observation came one small project, funded by the American Heart Association, to examine whether alcohol counteracts the effects of hypertension medications. The answer was yes, for centrally acting medications like clonidine. Furthermore, only a small amount is required, the equivalent of one social drink. "Not only do you lose the antihypertensive effects, but blood pressure shoots to a level higher than it was pre-medication," Abdel-Rahman said.



Four researchers share interest in alcohol studies, from left, M. Saeed Dar, Sam N. Pennington, Brian A. McMillen and Abdel A. Abdel-Rahman.

Ever since, with a series of grants from NIH's Institute for Alcohol Abuse and Alcoholism, Abdel-Rahman has been on a quest, delving ever deeper to understand how alcohol influences cardiovascular function. Among his findings:

• ***Side-effects at issue, too.*** Alcohol not only counteracts the benefits of clonidine, but also intensifies the side effects, including drowsiness. Laboratory rats given clonidine remain alert and responsive. Add only the tiniest amount of alcohol, and the rats are knocked unconscious. "They cannot move," he said.

• ***Timing can make a difference.*** If the drug is taken first, alcohol counteracts the medication. When alcohol is taken first, it has no effect on the drug, at least with one-time use. If the pattern is repeated regularly, however, a chronic interaction develops, and the antihypertensive action of the drug is lost.

• ***So does the type of drug.*** Alcohol has the opposite effect on an older type of antihypertensive than it does on clonidine. When alcohol is combined with a calcium channel blocker, it can intensify the effect of the drug, dropping blood pressure low enough to cause fainting.

• ***Why alcoholics are prone to high blood pressure.*** Long-term alcohol abuse disrupts the baroreflexes that signal blood vessels to increase or decrease blood pressure, leaving the vessels permanently set for hypertension. Abdel-Rahman's research group was the first to report this connection.

• ***Alcohol's harmful effect on women.*** Estrogen protects women from cardiovascular disease by enhancing their baroreflexes and thus making it easier for the heart to pump blood through the body. Alcohol, however, erases that protection. In experiments with rats, the worst cardiovascular consequences of alcohol consumption were among females that lacked estrogen because their ovaries had been removed.

Abdel-Rahman's findings carry an important message for ECU's home territory. "Hypertension is an especially big problem in eastern North Carolina, and there's a high level of alcohol consumption here, too," he said. "That's quite a bit of two bad things, and when you combine them, they cause more health problems for our part of the state."

Now, with a team covering three research labs, Abdel-Rahman is exploring further to discover just where and how all these interactions occur. He is focusing on the lower brain stem, an area critical to cardiovascular function, and on changes in the neurotransmitter norepinephrine. Norepinephrine is released by the sympathetic nerves, and its electrical signals provide a measure of neuronal activity.

His team studies these electrochemical signals while injecting minute amounts of an antihypertensive drug or alcohol directly to the brain stem of conscious rats. To prevent trauma, the animals have been fitted with permanently placed injectors and with carbon filter probes that provide instanta-

Continued

neous readings of neural activity.

"When we inject clonidine or rilmenidine (a similar but newer drug) into the specific neuronal pools, we can see a very clear and dose-related reduction in the norepinephrine signal," Abdel-Rahman said. "When alcohol is given, that reduction is gone. That reduction, based on our research and others', is important because it precedes the lowering of blood pressure. The medicine has to gain access to this area of brain to lower neural activity and lower sympathetic nerve activity. Then the blood pressure will be lowered. Alcohol counteracts these effects."

Although many questions remain, Abdel-Rahman said the message to physicians and patients is clear: At the very least, patients taking clonidine or a related blood-pressure medication should avoid drinking soon after taking their medicine. Abdel-Rahman would go one step further. "If alcohol is taken along with the prescription, there is no benefit whatsoever," he said. "Abstinence is the best policy."

THE PATHWAY TO MOTOR IMPAIRMENT

The statistics are grim. Every year on America's highways, drunken drivers kill 16,000 people, accounting for more than a third of all traffic fatalities. About 1,500 of those deaths occur in North Carolina.

For the past 20 years, Dr. M. Saeed Dar, professor and coordinator of graduate studies in the Department of Pharmacology, has been fine-tuning scientists' understanding of how alcohol contributes to those accidents by impairing motor function. He has coupled these studies in recent years with parallel research on the effects of marijuana.

Dar's initial breakthrough came in 1983 when he published the first paper linking the effects of alcohol with adenosine, a naturally occurring chemical that, in the brain, acts as neuromodulator. Research at the time already had shown that adenosine helps regulate brain cells by slowing their reaction time. Increasing the amount of adenosine in the brain slows reaction time further, which Dar recognized as an effect similar to alcohol's. Caffeine, on the other hand, blocks adenosine receptors, preventing the adenosine-related slowdown and thus making cells more active. Those findings led Dar to hypothesize that alcohol-induced motor impairment is regulated in some way by adenosine and originates in the brain.

He proved his point using laboratory mice and rats as models. Whereas drunken driving suspects might be called on to walk a straight line, the rats were challenged to walk on a rotating treadmill. Normal, sober rats had little difficulty with the task. Impairment was measured by how quickly the test rats lost their footing. In his experiments, Dar injected the rats first in the stomach and later in the fluid that bathes the brain with one of three different solutions — alcohol, an adenosine-like drug or an adenosine-blocking drug — or with combinations of these solutions. Each experiment confirmed another piece of his hypothesis.

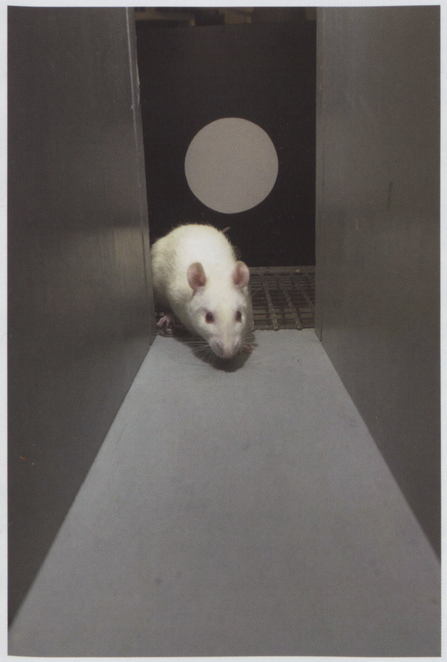
Dar then turned to the question of how alcohol and adenosine interact. He found two phenomena at work. Under normal conditions, adenosine flows in and out of brain cells regularly. Alcohol causes more adenosine to be released from the cells while also blocking its reuptake. "So you get an excess accumulation of adenosine outside the brain cells, and that slows the messages between cells," Dar said. When brain signals slow, the function those signals control — whether it's speech or vision or the ability to put one foot in front of the other — deteriorates.

Now he is trying to pinpoint exactly where this is happening. "We know the cerebellum is a key area for controlling movement," he said, "but the corpus striata and cerebral cortex also are involved. So we're looking at those areas to figure out precisely what area of the brain is affected by this accumulation of adenosine."

This requires delivering the alcohol and test drugs to those specific regions of the brain. Using different rats for each site, he implants a tiny tube directly into the region he wants to study. An atlas of the rat's brain tells him just where to go. After a five-day recovery period, with plenty of antibiotics and painkillers, the rats are ready to hit the treadmill. By trial and error, Dar has identified a specific area of the cerebellum where alcohol influences the amount of adenosine in circulation. Experiments on the other suspect regions continue as Dar also studies the intermediary chemical changes taking place in the signal transduction pathway.

To complement his alcohol studies, five years ago Dar obtained a license from the Drug Enforcement Administration to examine the motor effects of marijuana. Both marijuana and alcohol modulate adenosine, he said, and the sites where they act on the brain sit next to each other. "That makes it devastating when you combine the two," he said. "If you take very little of the second drug and combine it with a normal amount of the first, the effect is markedly enhanced. It's not an additive but a geometric increase in the effect in the mouse model."

Biochemistry and neural biology are aiding the development of treatments for addiction, Brian McMillen says.



Addicted rats will seek out the chamber associated with cocaine injections.

For law enforcement, this presents a particular challenge. A driver who has mixed the two could be significantly impaired, yet test within the legal blood alcohol limit. "We don't know about the prevalence of marijuana use in highway accidents," Dar said. "Alcohol and marijuana are commonly mixed together, but these cases are hard to prosecute unless they specifically test for traces of marijuana."

DIABETES: THE HIDDEN DANGER

Medical scientists have long recognized that women who drink alcohol during pregnancy risk impairing their children's mental and physical development. Now it seems some effects may not show up until years later.

In studies with laboratory rats, Dr. Sam N. Pennington, professor of biochemistry and associate dean for research and graduate studies, is finding that both alcohol consumption and high-fat diets during pregnancy contribute to insulin resistance in middle-aged offspring.

Insulin resistance is the primary cause of type 2 diabetes. The research carries significance in eastern North Carolina, where high-fat diets and alcohol use are common. Furthermore, the poor and rural residents of eastern North Carolina are disproportionately more likely to suffer from diabetes and its serious complications, such as heart disease, kidney failure and blindness.

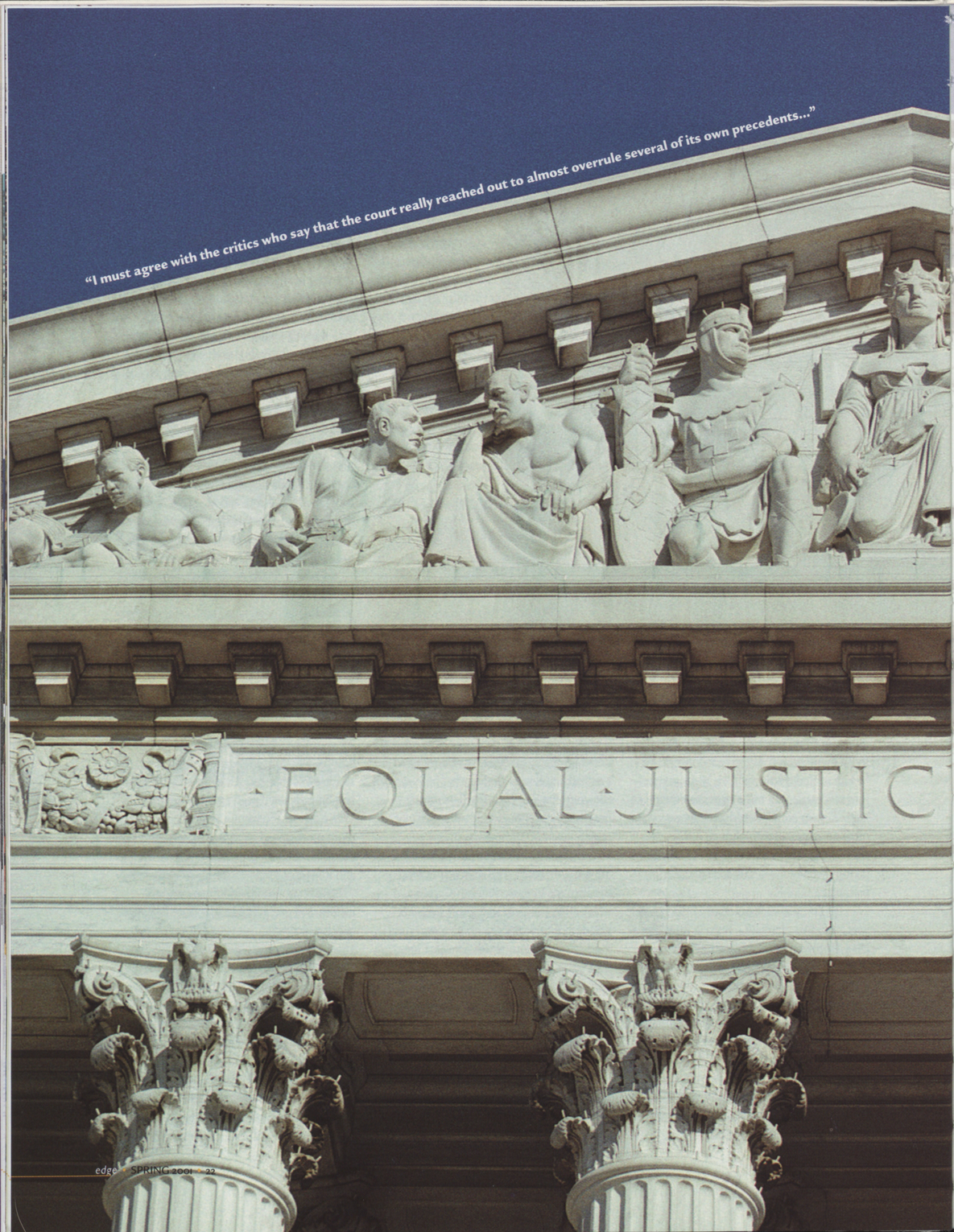
Pennington cautions that he is far from linking his laboratory findings to humans, but they are consistent with recent reports out of England. People born in England during the early 1940s, when good nutrition fell victim to World War II, now suffer from metabolic problems such as diabetes at rates higher than can be explained by their own diet, exercise and weight patterns. "The theory is that it's related to poor nutrition in utero," he said, "but it's controversial."

For his study, Pennington is raising thousands of rats. For each experiment, he breeds 60 to 100 females, who will give birth to an average of eight pups each. Some are fed regular rat chow. These serve as surrogate mothers for the experimental pups. The mothers in the experimental group are fed carefully controlled liquid diets in various combinations of high-fat, low-fat, alcohol-free and alcohol-containing. Pups are placed with the healthy surrogate mothers immediately after birth, to avoid exposure to the birth mothers' milk.

Two trends come through. First, the pups whose mothers drank diets with 35 percent fat content — regardless of alcohol — show insulin resistance as adults. "Their bodies don't respond normally to the presence of insulin," Pennington said. "The first reaction that's part of the process of taking up and burning glucose doesn't occur. Normally, muscles would take up more glucose when insulin binds, but theirs don't." The pups mature to a normal weight so the effect appears to be different from insulin resistance in overweight animals.

Second, the insulin resistance becomes more pronounced in pups whose mothers drank high-fat diets that included alcohol, and it is most pronounced in male offspring. "These pups not only don't respond to insulin, but get a double whammy," he said, because their bodies manufacture fewer glucose transporters, the proteins that draw glucose from the blood into cells to be metabolized. He said the effect of the alcohol does not appear to be through blood, nor are there any apparent genetic changes.

The three-year study continues as Pennington confirms his initial findings and seeks to decipher the metabolic mechanisms by which fetal diet and alcohol consumption affect health long after any exposure. •



"I must agree with the critics who say that the court really reached out to almost overrule several of its own precedents..."

Judging Justice

POLITICAL SCIENTIST TINSLEY YARBROUGH ANALYZES FEDERAL COURTS AND JUDGES IN THE LIGHT OF HISTORY AND THE U.S. CONSTITUTION.

Despite the distance from Greenville to Washington, D.C., political science professor Tinsley E. Yarbrough was particularly well-positioned to view the U.S. Supreme Court rulings that determined the outcome of the 2000 presidential election. Earlier last year, Yarbrough had published The Rehnquist Court and the Constitution *(New York: Oxford University Press), a study of the justices and the direction of the Supreme Court since 1986. And just as the court handed down its final decision on the election, his latest book,* The Burger Court: Justices, Rulings, and Legacy *(Denver: ABC-CLIO), was scheduled to roll off the press. Previously, Yarbrough had published five judicial biographies and edited a book-length study of human rights during the Reagan administration. He is completing a case study of North Carolina's racial redistricting litigation for the University Press of Kansas and recently signed a contract with Oxford University Press to write a biography of Supreme Court Justice Harry A. Blackmun, author of the court's opinion in the* Roe v. Wade *abortion case.*

edge *talked with Yarbrough about his views of the federal judiciary, including the recent election decisions.*

EDGE: *What's your impression of the role the U.S. Supreme Court played in last year's presidential election?*

YARBROUGH: I must agree with the critics who say that the court really reached out to almost overrule several of its own precedents in finding justification for federal Supreme Court intervention in a state matter. In voting-rights decisions based on equal protection during the Warren court era, the purpose was to assure that the votes are counted and the people are allowed to vote. In this case, the court seemed to be turning those precedents on their head in stopping the counting of votes in a state. Of course, the outcome was critical in determining the election (of Republican George W. Bush), and it's hard, given that outcome, to avoid feeling that the court acted in a very partisan way. (All five justices voting in the majority were appointed by Republican presidents.)

The Florida Supreme Court can be faulted for being partisan, too, in the sense that most of its members are Democrats, but whether partisan about it or not, they were interpreting state law. That is the very traditional function of state supreme courts. One may debate whether the Florida Supreme Court properly interpreted the state statutes, but the place to have that debated was in the Florida legislature.

EDGE: *Do you foresee any long-term consequences?*

YARBROUGH: The justices have created some remarkable new law by intervening in this case. They are essentially saying to states, you're going to have to have a statewide, uniform method of determining the intent of voters. There isn't any state in the country that has that, even precinct to precinct. Elections involve judgment calls, yet as a federal constitutional matter the justices have established a precedent that litigants in other states can jump on in future elections. Of course, they can say this was a presidential election and that's very different, but a lot of their language could be used for most any federal election.

EDGE: *Will the court's credibility be hurt?*

YARBROUGH: In my judgment, it does threaten some long-term harm to the court because it makes the majority justices appear more partisan than perhaps they are.

EDGE: *One of the issues in this past presidential campaign was the opportunity the winner would have to appoint Supreme Court justices. What do you see happening on the court now?*

YARBROUGH: I think that because Bush has been elected, the chief justice will retire relatively early. During my research on the Rehnquist court, I read the papers of Justice Thurgood Marshall. When he was retiring, in 1991, he and Chief Justice Rehnquist were corresponding about the terms of the retirement, and in one memo, Chief Justice Rehnquist pointed out that the retirement was not a purely academic matter to him because he expected to follow Marshall in a year or two. Of course, his assumption was that in a year or two, George Bush (the elder) would still be president, and instead Bill Clinton was elected. Had George Bush gotten a second term in 1992, Mr. Rehnquist might have retired even then. I think he wants to get out, and he wants to be replaced by a Republican. I'm not saying that's the whole reason he would side with (George W.) Bush, but it just adds to the whole partisan image of it. I think Sandra Day O'Connor also will step down relatively soon. Justice Stevens, who's the oldest justice, is a little different matter. There's been a lot of speculation that he's going to retire, and I assume that, as a Republican, he would prefer that a Republican replace him, but given the election litigation and his position as probably the staunchest dissenter, he may be planning to stick it out just as long as he can. He has become one of the most liberal of the justices, at least on this court.

EDGE: *As a candidate, George W. Bush pointed to Justice Antonin Scalia, a consistent conservative, as the type of justice he would appoint. Is he likely to follow through?*

Continued

Chief Justice William Reinquist, center front, leads the current nine-member U.S. Supreme Court.

YARBROUGH: I don't know what's going to happen down the line, but given the 50-50 split right now in the Senate, it's unlikely that Bush is going to try to appoint any justices who have a clear-cut Scalia-type philosophy in their backgrounds. He may be able to slip someone in who has no paper trail, but I don't think he will give us an obvious Scalia, (failed nominee Robert) Bork, (Clarence) Thomas or William Rehnquist because I don't think it would make it through the Senate. That dog won't hunt, as Mr. Bush's supporters would probably put it. I think they'll try to go to the middle as much as possible.

EDGE: *In your book on the Rehnquist court, you note that presidents don't always influence the direction of the court as much as they expect with their appointments. Why is that?*

YARBROUGH: It's what we've witnessed with the Rehnquist and Burger courts. President Nixon wanted to place on the court justices who would change the direction of the (liberal) Warren court decisions. He got to appoint four justices, including Chief Justice Burger, but the counterrevolution he wanted largely didn't occur. There were changes certainly, and important changes, but there were also other forces at work. And some of the dramatic changes that did take place on the Burger Court were in the liberal direction, most notably *Roe v. Wade*.

In the Rehnquist court, the most significant changes have occurred in the area of economic rights. The court is paying closer attention to government regulation of business and industry and restricting the federal government's power over the states more. But in the civil liberties area, the changes have not been as dramatic as one might have thought. The court has not overruled *Roe v. Wade*. It struck down — though over Rehnquist's dissent — an anti-gay constitutional amendment in Colorado. At the end of the last term, there was a feeling that the court might be willing to overturn *Miranda v. Arizona*. But a majority, speaking through Chief Justice Rehnquist, said that *Miranda* is based in the constitution and is a constitutional requirement. For years, Rehnquist had been one of the staunchest critics of the warning that police are obliged to give suspects under *Miranda*. Yet he and a majority, with only Scalia and Thomas in dissent, refused to overturn it.

EDGE: *Why aren't presidents able to predict how their nominees will act?*

YARBROUGH: Sometimes a president makes a selection that he thinks will vote in a certain direction and is mistaken. Justice Souter, Mr. Bush's first nominee, has become one of the most liberal justices on the court. I'm sure President Bush's advice about Souter was not along those lines.

But sometimes there are other forces at work. In the case of President Reagan, for example, he had elevated Justice Rehnquist to chief justice. That was in line with the Reagan ideology. He had appointed Antonin Scalia to replace Rehnquist as an associate justice. That was in line with the president's philosophy. Then when his attempt to add a third ideologue of the Rehnquist-Scalia variety was derailed in the Senate (with the failed nominations of Robert Bork and Douglas Ginsburg), he decided to go for a more low profile, noncontroversial candidate, and he picked Anthony Kennedy. Justice Kennedy is relatively conservative, but like Justice O'Connor, he is more moderate than President Reagan would have preferred. And O'Connor herself probably was picked by Reagan not only because she had good conservative credentials on most issues but because of her gender, so gender overwhelmed ideology there. Consequently, Mr. Reagan wound up putting on the court two justices, O'Connor and Kennedy, who are less predictably conservative in their votes, and because they are less predictable, they are more influential in the decisions of the court.

EDGE: *The process of selecting Supreme Court justices has become highly controversial. Are we getting the justices we should?*

YARBROUGH: Some people are concerned that the politicizing of the confirmation process in the Bork case and in the Clarence Thomas case has influenced presidents to pick noncontroversial, "stealth" candidates who are not likely to provoke much opposition. They are concerned this may mean some more outstanding prospects get passed over. My own feeling is that it's pretty much a cut of the cards. Justice Souter was truly a stealth candidate, an obscure New Hampshire official and judge, but on the court he has become perhaps the most effective counterpoint to the conservative ideologues and quite an articulate and effective justice in defending his positions on the issues confronting the court. So I don't know that it makes a lot of difference.

EDGE: *Until recently, you concentrated on biographies of individual justices and lower court judges. Why was that?*

YARBROUGH: I find biography to be a very enjoyable way to study an institution. I primarily look at their opinions and their doctrinal views, but also look at their backgrounds, their personalities and their relationships with their colleagues. It's fun, not like work. Now grinding out books is work because I'm not a naturally gifted author.

EDGE: *How do you select your subjects?*

YARBROUGH: I have had an interest probably since high school in the civil-rights movement and in civil-liberties issues. The justices I have studied cover most of the history of civil rights and civil liberties since the Civil War. They've also been people I admired, whether or not I agreed with them.

The first Justice Harlan was on the court from 1877 to 1911. He was the great dissenter during a period when the court was not very sympathetic to civil rights and was upholding segregation laws and striking down civil-rights laws. He had been a Kentucky slaveholder, and as a politician in Kentucky he had opposed abolition. On the stump he could use crude racial humor. Yet he had become a great defender of civil rights on the Supreme Court. My biography of Harlan I hope gave me some insight into civil-rights controversies on the court during this era.

Hugo Black was appointed to the Supreme Court in 1937, about the time it started to become more sympathetic to civil-liberties and civil-rights claims. I guess I also found him, like Harlan, to be something of an enigma. He was a member of the Ku Klux Klan. He was not above using race in his appeals to jurors as a lawyer in Alabama. Yet he underwent a transformation and became a great defender of civil rights.

I got interested in the second Justice Harlan, who was on the court from the mid '50s to '71, because he was a major critic of what the Warren court was doing in civil-liberties cases. Justice Black for the most part was a major part of the coalition expanding civil rights and civil liberties during that period. Justice Harlan was more likely to be critical of those decisions.

The two lower-court jurists I looked at — Frank Johnson and J. Waties Waring — also had a tremendous impact on civil rights law. Judge Waring was on the federal district court in South Carolina in the 1940s and handed down a number of controversial pro-civil-rights rulings — outlawing white primaries and differential pay for black and white teachers, for example. He handed down decisions that were way ahead of their time, and for that he became a pariah in Charleston, where his family had lived for eight generations.

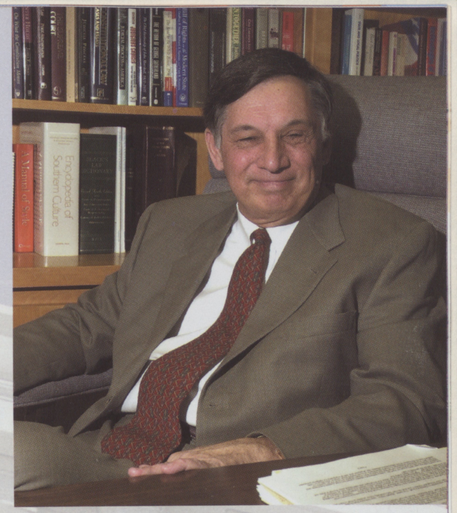
Judge Frank Johnson was on the U.S. District Court in Montgomery, Ala., the cradle of the Confederacy. His whole career on the district court, from the '50s through late '70s, was devoted to civil-rights and civil-liberties issues — racial reform, mental-health reform, prison reform. He came from the Republican mountain area of Alabama. That area was not sympathetic to the Confederate cause, but was hardly supportive of racial integration either. Yet Judge Johnson became a real trailblazer in terms of promoting civil rights at the lower-court level. He suffered tremendous reprisals for his efforts, and for 18 years he had to have guards on his house at night.

EDGE: *That's quite a group. Does any one of these men stand out for you personally?*

YARBROUGH: Judge Johnson was truly a heroic figure, probably the most courageous person I've ever known.

As an Alabaman from a pretty humble background myself, I've also admired Justice Black, whose father was a storekeeper. It was interesting that this man, whose law training was limited to a couple of years at the University of Alabama, could go head-to-head and more than hold his own with far better-educated justices, such as Felix Frankfurter, the former Harvard law professor, and the second Justice Harlan, an Oxford Rhodes scholar. That has long fascinated me.

Black's relationships with the other justices were interesting, too. He and the second Justice Harlan generally didn't vote the same way but were warm personal friends. But Black had a rocky relationship with Robert H. Jackson and Felix Frankfurter. Black probably camouflaged his feelings better than Jackson and Frankfurter. If you look in the papers of these three justices, you see more of the venom of Jackson and Frankfurter displayed in letters. It's hard to find in Justice Black's papers any of the strong feelings he probably held toward those two. Part of the reason may have been their different backgrounds. Frankfurter had been a law professor. Jackson had been attorney general under Roosevelt but also had not held elective office. Black, on the other hand, had been a United States senator so he was probably more comfortable with the give and take of dealing with intense personalities and not taking it personally. He was a person of steel-like determination, but wrapped in silk.



Tinsley Yarbrough has completed eight books on the federal courts and justices, with another under contract.

EDGE: *Have you come to an understanding of what makes a good Supreme Court justice or lower-court judge?*

YARBROUGH: I don't know that there's any one-size-fits-all mold there. Some of my subjects, such as the second Justice Harlan, have favored a common-law approach. For them there are no absolutes. The job of the judge is to weigh competing issues and reach a decision in an individual case. Others, such as Justice Black, have been more dogmatic: I follow the language of the Constitution and the intent of the people who wrote the Constitution. I admired both those approaches.

EDGE: *What's the primary lesson you have learned about the Constitution and the rule of law as it is practiced in this country?*

YARBROUGH: Although I may favor certain courts, or justices, or decisions over others, I think the system works pretty well to produce a gradually developing body of judge-made law. There are forces within the system that make it less likely rather than more likely that the court is going to move in dramatically different directions from one set of appointments to another. That's probably for the best. •

The phone range. It was Mary Dryer. I didn't recognize the name. School. She had gone to Immaculate Heart with my mother and was a friend in high school too. It was a real shame, my mother was so young, such a good soul. Becky Penland had run into this Mary Dryer and given her the news. Had my mother's co[illegible] Was there any hope? How was my father [illegible] bad that she had lost touch with my mot[illegible] of fact, she had just recently been thinkin[illegible] renewing their friendship. I felt like saying [illegible] but knew she needed to talk, needed to tel[illegible] sometimes hard but God was good, tha[illegible] people start to fall like autumn leaves. T[illegible] the fallen leaves. describe for me ho[illegible] Jake, Tillie, and Wendell went. Finally [illegible] no idea who she was or who any of these [illegible] interrupted, described things I needed to help my father with. Of course, of course, she knew how much I must have on my mind. God bless me, my mother was so lucky. And how was I doing? In *my* life? Where was I now? I told her where I was living, but her voice was full of doubt; she was positive I was living in Nebraska. That was what Becky Penland told her, and she was always right about things like that. I was fairly certain, I said, that I was living in North Carolina. In fact, I'd never even been to Nebraska. Well, she said, your mother would have wanted it that way. *From Piecework, in This Is Where We Live: Short Stories by 25 Contemporary North Carolina Writers*, Eliz[illegible]

MAKUCK'S BOOKCASE

For this author and teacher, one short story kindled an enduring love of literature.

"Just give it a try, Peter," his mother had said. So 18-year-old Peter Makuck left his home in coastal Connecticut for a small college in Maine and what he now calls a transformational encounter.

"In high school, I thought nothing could be more boring than sitting in a quiet room with a book," he says. "I was on the move. I wanted to be racing my car, hanging around the pool hall, running around with my friends or shooting baskets at the playground."

In freshman English, he was assigned to write an essay on William Faulkner's "Barn Burning," the story of a young boy torn between love of family and his recognition of injustice. "So I finally had to read, and when I read Faulkner's story, that just did it for me."

At Thanksgiving, he spent the entire holiday at home reading and writing. "I went from never reading, to all of a sudden not being able to get enough. My parents seriously wondered if there were something wrong with me."

Makuck still can't get enough to read. Phyllis Makuck points to the living room bookshelf lined with a dozen volumes that make up her husband's current reading: *The Monk and the Philosopher. The Wind Birds. Final Vinyl Days. Meditations from a Movable Chair. Studies in J.D. Salinger. The Tibetan Book of Living and Dying. . . .* Students of Dr. Peter Makuck, distinguished professor of arts and sciences, likely would point to other shelves, the ones filled with authors whose words flow from Makuck's tongue more readily than a roll call — Shakespeare, O'Connor, Poe, Dos Passos, Faulkner, Wolfe. Were he less modest, Makuck might designate a shelf for his own work — three full collections of poetry and two shorter chapbooks; one book of short stories; scores more poems, stories, essays and reviews that have appeared in journals, magazines and newspapers; a collection of essays he co-edited on the work of Welsh poet Leslie Norris; and 41 volumes of *Tar River Poetry*, the journal he founded and has edited for 23 years.

"I think he probably is a man of letters more than a writer," Norris says. "There is no literary activity he isn't good at."

Though he grimaces to recall his misspent youth, the same physicality that drove the teenage Peter propels the mature Makuck — boater, fisherman, tennis player, scuba diver — and flavors much of his writing. The drench of sweat, the exuberance of landing the big catch, the hike across a rock-strewn desert. But more than that, it's the fear and loneliness that grip a swimmer pulled seaward by a rip tide, the rage of violation, the emptiness that follows loss, the comfort in a distant figure — "that man in sandals" — ascending a mountain road, the things Makuck calls "the inner questions that take you to your writing desk every day."

Despite the labor that goes into each work, he is unfazed by a shrinking market for serious literature, particularly in its shorter forms. "You can't adjust what you do to meet the demands of a public that would rather watch television," he says. "Whether you're writing a novel, a poem, a story, an essay or a review, the process finally is its own reward."

Years ago, it seemed the process would be the *only* reward. Makuck was a graduate student at Kent State University and had recently met a young English instructor named Phyllis Zerella. He lamented aloud that his work had not been published.

"She said, 'What have you got in the mail? Let me see the poems that are under consideration.'

"Faulkner's story... just did it for me." **Peter Makuck**

"I said, 'I don't have any under consideration.'

"So she said, 'Let me see one of the stories that you've got out.'

"I said, 'I don't have any stories out either.'

Continued

"She looked at me and said, 'How do you expect to get something published if you're not trying?'"

With her encouragement, he submitted several poems to a journal. Two weeks later, he received a letter of acceptance. Three years later, they married. Now an organizational consultant with the N.C. Department of Revenue, Phyllis Makuck remains her husband's trusted adviser.

"I'm fortunate that Phyllis is the first reader of a lot of my work," he says. "She has no qualms about telling me what she thinks."

If only his students understood the value of what he calls the merciless friend, one who'll point out the awkward sentence or contrived character. Makuck learned his trade primarily through trial and error, writing, submitting and being accepted or rejected. Students, unaccustomed to the role of an editor, bleed with every criticism. The frustration shows in the teacher.

"When I was in woodworking shop in high school, we'd make a hope chest or a bookcase or something like that," Makuck says, "and Mr. Gregory would call everyone around. All right, let's critique Makuck's bookcase. Look at the varnish. It's dribbling down the side here. Or look where it's rough on the side and you didn't sand it enough. I didn't break down in tears. I didn't think he was being insensitive because he was telling the rest of the class the mistakes I had made in the construction of my bookcase. And that's what a poem is. A poem is a made thing. It's got joints. Its lines can be rough or polished. It can have a rhythm or a cadence or not. It can be too full of cliches and abstractions. Those things have to be pointed out if you're going to learn anything."

In poetry, in fiction and in person, Makuck is a master storyteller. "Mr. Digression," a colleague calls him. Conversations take a dozen twists and turns, each leading to an anecdote replete with accent-laden dialogue. Incidents decades old spring to life in such minute detail that the listener is left to wonder how much comes from recall, how much from imagination. "I know I'm a fiction writer, but this is gospel," he inserts into one tale.

He grew up the only child of working-class parents in Waterford, Conn. His father, "a nuts and bolts kind of guy," held various jobs through the years — delivering milk or mail and, finally, owning a gas station. His mother, valedictorian of her high school class, followed the traditional path of housewife and mother, mixing a mother's maxims with liberal doses of the literature she loved. Makuck mimics her even now, rattling off the prologue of "The Canterbury Tales" in Middle English. Sir Walter Scott ("Oh, what a tangled web we weave...") she reserved for occasions when, as Makuck puts it, "she caught me in flagrant prevarication."

Childhood seemed idyllic, filled with baseball, flashlight tag and bonfires at the pond where all the kids skated until some parent declared it was time to go in. His Polish immigrant grandparents lived 30 minutes away. Cousins and a couple of colorful uncles (one a restless and shell-shocked veteran, another who taught young Peter the fine art of pool hustling) peppered his days.

With the stories flows a sense of regret. Has the college professor, the Ph.D., the writer turned his back on his blue-collar roots? "My parents were both very proud of me, but my father didn't really know what I was up to," Makuck says. "He couldn't fathom what I was doing, as he said, with my face in a book all the time." Had he gone into the service-station business, would he have been closer to his father?

It's hard to imagine being any closer. With his father's work ethic, he rises by 7 to write each morning he is at home. On campus, he clears off his desk every day. He wears punctuality like a badge. A notice about a time-management series for students warrants disdain. "I don't know why people need a course to organize their time," he says. "You have to structure your time in order to get anything done." Softly in the background echoes a father weary of his son's inattentiveness: "What's the matter with you? When are you going to snap out of it?"

Besides, Dad came around in the end. "Didn't I always tell you to stick with that poetry?" he said when the International Poetry Forum honored his son with the Charity Randall Citation for his written accomplishments and the oral performance of his work. A few years earlier, the N.C. Poetry Society had given Makuck's chapbook *Pilgrims* the Brockman Award for best volume by a North Carolina poet.

For Leslie Norris, to honor the poetry is to honor the poet. "The man and his work are unusually one," he says of Makuck. "His work is obviously the product of a warm and compassionate man living in this world, at this time."

Though his students sometimes doubt it, Makuck's compassion does extend to other writers. Many journals keep writers in suspense for months. Makuck reads every submission to *Tar River Poetry* and responds within a week. "I love to open envelopes and see what I'm going to find," he says.

Over the years, the journal has evolved from a one-person operation to a collaboration including associate editor Luke Whisnant, a team of reviewers and several graduate students. *The Directory of Literary Biography* ranks it as one of the top 10 poetry markets in the country.

"*Tar River Poetry* is considered excellent," says Frederick Morgan, founding editor of *The Hudson Review*. "It shows good taste, sensitivity to quality and an openness to new work. At the same time, it has standards, a consistent point of view. Peter has a good grasp of the most interesting and worthwhile poetry that is being written. He has not been led astray into fashionable nonsense."

Yet *Tar River Poetry* almost wasn't. Makuck recalls the day the former department chair, Dr. Erwin Hester, hired him to come to ECU. "Evidently I was hired to teach creative writing and modern American literature, but also to start a poetry magazine," he says. "I must have been nervous during the interview, but I never remembered our speaking about starting the journal. Dr. Hester was very laid back and indirect and wonderful in that old gentlemanly Southern way. At the beginning of my second year, he called me into his office and he said, 'Pete-ah, when do you reckon you're goin' to get stah-ted with that poetry magazine you were hired to work on?'"

Small decks flank Makuck's third-floor home office. From one, he watches the sun set over Bogue Sound. From the other, the Atlantic Ocean beckons.

More than once, the siren's call has proved irresistible. It lured him to ECU from a teaching job in West Virginia. For the next 19 years, he sated himself with vacations and weekends at the coast, often sleeping on his boat. Five years ago, the pull stronger than ever, the Makucks built a home at Pine Knoll Shores.

"We moved just in time for (Hurricane) Bertha," Makuck says. "After Bertha came through, I had just gotten the shingles back on the roof when another one came. It sort of takes the romance out of coastal living."

Little matter. For Makuck, the appeal lies in the reality, not the romance, of coastal living. He knows to time the choppy waters as he guides his 25-foot Parker toward open ocean. Once, on a smaller boat in Bogue Inlet, an ill-judged start had loosed the bonds of gravity, albeit temporarily. Newton's law and the ship's wheel prevailed. Nine stitches closed the gash in his chin, but not until he had loaded his fish box with the Gulf Stream's bounty, bleeding all the while. It was a Peter Makuck kind of day, filled with physical vigor and the inner questions that return him to his writing desk.

"Peter is *the* contemporary poet of coastal North Carolina," says Whisnant, associate professor of English and a former student of Makuck's. "His subject matter is the place where land and sea come together, and he writes about that better than anyone else now going."

But should it be a poem or a story or even an essay? "Unlike a lot of my colleagues, I don't seem to be able to specialize," Makuck says. "There are some things that can only take a fictional form, and some kinds of emotional material are only right for poetry. I tend to save humor for fiction. When I get characters talking to one another, it's a natural time for me to allow these characters to banter with one another or just to be themselves and to speak in their own peculiar idiom that I might find funny."

There was nothing funny on the day his son and only child almost drowned. At the time, Keith Makuck, now 28, was about 5. They were walking with a family friend and the friend's son on a bank of a swollen Tar River. Makuck, at the head of the line, heard a splash and turned. His friend, Mike Strada, was already airborne, diving toward the floating dot that was Keith. Makuck raced ahead and jumped into the water's edge just in time to grab Strada, who was holding onto Keith, as they swept by.

Makuck retells the episode in the poem "Rerun Scene: You Rescue My Son." Though poems often pull from life, most events have been altered, shaped by artistic demands.

"What have you got in the mail?" **Peter and Phyllis Makuck**

"Rerun Scene" sticks to a reality so harrowing Makuck chokes at the memory more than 20 years later.

"The poem is in the way of a thank-you note," he says. "It also goes to the question of what poetry is for. Sometimes poems enable us to say things that we could not say convincingly in any other form. For me to say, when my friend Mike pulled Keith out of the Tar River, 'Hey, Mike, man, really, thanks a lot. I appreciate it,' that just doesn't make it. I had to write a poem that would more or less prove my gratitude. (Pause.) Because as we all know there's a certain amount of effort that goes into writing a poem. It took him five minutes to rescue my son. It probably took me five days to write the poem. (Longer pause.) Even so, I'm still not even with him."

Death and near death play recurring roles in Makuck's poetry and fiction. Danger and death haunt "Bluefishing the Bogue Narrows." "A Sense of the Other Side" finds consolation after a death. In the story "Assumption," a boy haunted by the nuns' literal interpretations of life after death falls through the burned-out roof of a building where his father had died. "Piecework" takes the narrator to his hometown, where his mother lies dying in the hospital.

"I'm a Catholic," Makuck says. "I suppose that's part of my religious upbringing, the constant presence or the possibility of death. That's not a bad thing. It makes you more mindful and more appreciative of the unique structure of any given moment."

Continued

Peter Makuck

But it *was* morning, and sleep wouldn't come. With a beer in hand he sat and gazed at the blank space where the TV used to be. A kind of mockery surfaced everywhere an item was missing. Worse than mockery, each object gone was felt as a bruise. It must be something like rape, he thought. *Punky wants to see you outside.* Nothing could be quite the same any more; he felt like moving. *You do the same thing every Friday?* No. He had never sat alone drinking beer without the lighted face of the TV to hold his consciousness. Everything felt strange, unfamiliar, tainted. He lay on the sofa. It was impossible to sleep upstairs with Nance. He had to be alone.

From "Breaking and Entering," in the collection of the same title.

What else do you want?
Tell yourself nothing
that's not right here,
leaves bursting into light,
light into leaves.

From "A Guide to Arrival" in Against Distance

Back home at last
After seeing my mother
Lowered into frozen earth,
I couldn't find sleep
With wine or even pills,
When our calico, as if
Called, came to the sofa
And did something
Never repeated since —

One soft foot at a time,
She climbed on my chest,
Looked through the blank
Lid of my face, made
The faintest cry, then
Curled over my heart
And slept, so that I could,
For three nights in a row —
Visitations like belief,
Unreal, against all odds.

"A Sense of the Other Side," in The Sunken Lightship

On my Renoir report
about "The Boatmen's Lunch,"
you wrote that "*joie de vivre*
is a gift,
and not a basis to evaluate painting."
I didn't know what you meant
until years later
when I saw you for the last time,
chemo-bald but undiminished,
smiling with your whole face,
radiant, like a bulb
before its filaments blow.

from "Tangier Island," in Against Distance

No one was coming.
Moments got longer.
Water slapped at the tube.
The valve stem bubbled away.
And something sinister began.
A faraway house
alone on an undeveloped dune
became a face
with wide apart dormers for eyes,
a porch-roof nose in between,
twin brick chimneys for ears.
The face, like some false god,
commanded belief, gloated,
then fixed us
with a sunstruck paneglass eye.
For a moment,
just a moment, I was ready to believe,
to sacrifice whatever it wanted,
until we drifted up to a raft
of gulls that rose and broke apart
like some selfish memory
I wanted to forget —
an eighth-grade nun
who knew I'd come to no good end
for laughing always at the wrong time

as I did just then, a panicky cackle
that frightened the boy
who let go a cry, lonely and lost
as any I had ever heard, as if his mind
or mine had snapped,
then grew calm as the current.

from "Against Distance," in a collection of the same title

Dr. Ed Janosko, a Greenville urologist, has noticed that about his friend and longtime fishing buddy. "I think Peter doesn't worry very much," he says. "He's the kind who always enjoys what he's doing at the time, whether it's fishing, skiing or being with his son or at a poetry reading. If somebody starts talking about a diesel engine, he's interested. He's immersed in what he's doing."

Immersed and sometimes oblivious. A few years ago, Janosko, a licensed pilot, was flying the two of them to Key West, Fla. "It was horrible weather, and we were racing just ahead of thunderstorms," Janosko recalls. "I knew if I didn't make landing in Key West, we would have to fly back to Miami without much fuel to spare. I had never flown there before so I didn't know the airport. Visibility was low, and the air traffic controller was guiding us in. It was really tense. As soon as we touched down, lightning popped. I looked over at Peter, and he said, 'This is great!' He was so caught up with being guided in that the danger didn't hit him."

At the Makucks' home, sunlight streams into the open vistas of the living room. Nothing is out of place, and the decor — white walls and upholstery, light oak floors and bookcases, photographs matted in white with simple black frames — adds to the sense of openness. An Oriental rug supplies only muted color.

Peter and Phyllis Makuck sink into the sofas and talk about the relaxation of the open ocean beyond sight of land. About the strange and wonderful fish they have seen.

About each other. "Peter is not a materialistic person," she says. "He could live with a lot of things around him, or with nothing, and be equally happy. It never occurs to him that he needs anything more. The downside is that all of the anxieties are mine. I take care of all the business."

About words and literature. "Who's my favorite writer?" he asks. "Shakespeare. Period. End of story. He's off the scale. Like Mozart in music. Picasso in painting. He reminds you of what the language can do when it's performing at the level that Shakespeare has it perform. It's a pleasure to say."

Against the far wall, a bookcase awaits. •

Plays well with others

PIANIST PAUL TARDIF THRIVES ON ENSEMBLE PERFORMANCES.

"There's certainly a high you get from playing with others," says pianist and professor Paul Tardif. "Emotionally, it's very charging."

For the 1938 premiere of Bela Bartok's "Contrasts for Clarinet, Violin and Piano" — a piece written for clarinetist Benny Goodman — the composer himself played the piano. For his own recognition concert last October, Paul Tardif took Bartok's place.

Tardif was being honored with the university's Career Award for Excellence in Research and Creative Activity and the title of distinguished research professor. Before the concert or the honors, however, Tardif tended to a few details. Perhaps appropriate for someone who calls himself a "working musician," he opened the doors of the A.J. Fletcher Recital Hall and stacked the evening's programs at the entrance.

The concert placed Tardif exactly where he likes to be, not alone on stage, but in the midst of a small group. First, with violin and clarinet performing classical chamber pieces by Schumann, Ravel and Bartok. Then in a jazz quartet heating up the auditorium with numbers by the likes of Duke Ellington, Chick Corea and Billy Strayhorn.

"There's a certain high you get from playing with others," he said. "Emotionally, it's very charging."

Tardif has had time to sort out his likes and dislikes in a career spanning more than three decades of performances as a classical solo and chamber artist, as an accompanist and as a jazz musician. He played the Kennedy Center honors for 20 years running, several presidential inaugurals and live network television shows. He toured with Tony Bennett, performed intimate concerts at the National Gallery and played in Salzburg, Austria.

Some of those performances required nearly every skill in Tardif's repertoire. He recalled a Kennedy Center show for which he accompanied Jack Jones doing pop music, Bernadette Peters doing musical theater, a ballet company dancing to Gershwin's *Piano Concerto in F* ("I had to play a great deal of the first movement solo") and an opera singer performing an aria. When the opera score didn't arrive on time, he said, "The conductor handed me the vocal score and said, 'Play this.' We had to rehearse."

He was trained strictly as a classical musician at the Eastman School of Music and the Peabody Conservatory. He learned jazz on his own, beginning in high school. At Eastman, he and fellow students would gather to jam in the practice rooms. "I remember very distinctly one day the registrar of the school coming into the room and telling us, 'That type of music is not allowed to be played at Eastman.' Now Eastman has one of the biggest jazz programs in the country."

Classical music, with its demanding technical preparation, remains Tardif's first love, but he'd be loath give up jazz. At the same time, he criticizes classical stars who take jazz too lightly. Itzhak Perlman playing with the Oscar Peterson Trio? "It's like a rank amateur playing with this incredible, top-of-the-line trio." Kiri Te Kanawa singing "Blue Skies"? Daniel Barenboim playing Duke Ellington? Oh, please.

"They're just doing it to sell recordings," he said. "They don't understand the music."

Most good crossover musicians work in virtual anonymity in recording studios, he said. For those with name recognition, he points to Wynton Marsalis ("a phenomenon, very good in both") and clarinetist Eddie Daniels. Daniels is remarkable, he said. "He can play jazz and bebop with the best of 'em, and he can turn around and play a Mozart quintet and sound wonderful."

Rather like Tardif himself. And rather like the future that Tardif sees for professional musicians in an ever-tightening job market.

"The new-millennium musician will have to be qualified to do many more things than they have in the past in order to survive," he said.

Shrinking music school enrollments will give fewer of them the opportunity Tardif has had — to set his own performance and recording schedule while teaching upper-level students. He currently teaches about a dozen individual students, two jazz studies classes and a jazz combo. He also writes and arranges jazz, some of which he performed on his CD "Points of Departure" for the Koch Jazz label. Other recordings — including 20th-century violin and piano music with former ECU faculty member Fritz Gearhart — have been on the Digital Arts Classical and Koch International Classics labels. And he continues his live performance schedule — playing often with faculty colleague and violinist Ira Gregorian or appearing in jazz clubs in Greenville and Raleigh with Paul Ingbretsen (bass), Dan Davis (drums), Ray Codrington (trumpet) and Stephen Riley (tenor saxophone). During the past year, he also performed Gershwin's *Rhapsody in Blue* with both the North Carolina Symphony and the Tar River Orchestra.

A busy schedule? Tardif flashed a smile. "Busy but enjoyable," the working musician said. "The biggest temptation in a job like this is not to keep up with performance. I couldn't live with myself if I did that. I couldn't face my colleagues. I need it, and I enjoy it." •

Smoke signals to satellites

TELEMEDICINE SHOWS ITS POTENTIAL IN DISASTER SIMULATION.

Portable equipment on a remote lava field in Hawaii links volunteer "patients" with the ECU Telemedicine Center.

First, the ECU Telemedicine Center demonstrated how to deliver high-quality medical care to isolated rural communities. It then transformed 10 years of telemedicine experience into emergency medical response when Hurricane Floyd flooded vast areas of eastern North Carolina. And last June, taking part in a multinational exercise, it demonstrated that telemedicine can aid in disaster relief anywhere in the world.

A crew from the Telemedicine Center set up shop on an isolated lava field in Hawaii during a seven-nation civilian-military exercise called Operation Strong Angel. The site had no electricity, no running water and no shelter outside the makeshift camp. As 30-mile-per-hour winds coated equipment and people with red dust, the ECU crew used a variety of portable equipment to link a simulated refugee camp with the Telemedicine Center in Greenville and from there to medical specialists as far away as Korea and Great Britain. Volunteers acted as refugees, ranging from those wounded and sick to women in labor. Aid workers connected instruments that transmitted medical readings — from vital signs to joint flexibility — to distant physician specialists who diagnosed and treated the patients.

The experiment proved that telemedicine can use any available communications technology, said David Balch, director of the Telemedicine Center. "Most telecommunication technology is very specific, but we showed that we can morph to any environment," he said. "No one had tested that before. We used everything from smoke signals to satellites."

For Balch's figurative smoke signals, substitute ham radio, and you get an idea of the potential impact of the demonstration. Ham radio — inexpensive, highly portable and available nearly everywhere — could be taken to disaster sites in southern Africa or other places lacking infrastructure. In China, a relief team could make use of an existing network of wireless relay towers. In more developed parts of the globe, fiber-optic cables and satellites could offer the best options. Operation Strong Angel tested them all under conditions that required the on-site crew to adapt quickly.

While flexibility in the field was one key to the demonstration's success, the other was back home in Greenville. Here the Telemedicine Center operated a "bridge," or switch, that quickly linked telemedicine inquiries with specialists in other locations.

Balch sees potential for immediate applications. Telemedicine travel kits, under development at ECU, could be deployed as part of an initial disaster response. The kits would link the first-responders to the bridge at ECU. Balch said the Telemedicine Center is building a worldwide matrix of telemedicine connections so the bridge can call on physicians with a broad range of language skills in any time zone.

"We at ECU don't want to provide clinical response to disasters around the world," he said, "but we see ourselves as a link. It's a good niche for us, an opportunity to leverage what we're best at, which is taking scarce resources and turning them into something useful."

Operation Strong Angel was part of a large-scale military exercise testing the naval services of six Pacific Rim nations and Great Britain. The humanitarian component also involved the United Nations and International Red Cross.

The organizers of the exercise had learned about ECU's capabilities through the Hurricane Floyd experience. The partnership also benefited from the university's $4.6 million federal grant to develop and test improved methods of delivering medical care and education over the Next Generation Internet. Some of those applications were tested during Operation Strong Angel. They included mini webservers that can relay such data as vital signs and blood glucose readings in real time. Balch said such "technology widgets" eventually may help doctors monitor patients in their own homes. The Next Generation Internet project is in the second year of a three-year grant. •

'I will be the artist'

CIVIC CONSCIOUSNESS DRIVES HANNA JUBRAN AND HIS ART.

Wherever he goes, Hanna Jubran leaves something of himself behind.

In Mexico City, it was a stainless steel sculpture, "Man Versus Nature," whose gear system grinds into the curved lines that represent the natural landscape.

In Colorado, it was a 6-foot-high wooden carving that reflects the surrounding forest while also hinting of the totems of the Pacific Northwest.

In his home village of Jish, Israel, it was a stone piece called "Moon Harvest." Into it he had carved symbols of wheat and plow and inserted pieces of basalt, the very rock used in the region's traditional method of separating wheat from chaff. In neighboring Ma'llot, he left "On a Dove's Wing," a 10-by-4-foot wish for global peace.

Last year alone, Jubran, an associate professor of art, participated in about 30 exhibitions worldwide, creating a new, non-commissioned piece — sometimes a whole body of work — for each. The larger pieces he creates on site, drawing inspiration from the local landscape and culture. Many have won awards, from best execution of concept at the 2000 Ma'llot International Sculpture Symposium to first-place honors at woodcarving competitions in St. Balsien, Germany, and Breckenridge, Colo. Most become the property of the local community.

For Jubran, selling artwork misses the point. "As an artist," he said, "your job is to create, to work, to expose your work to the public, to work with your colleagues, to work with the community. That is what's important. I see myself as an artist working for my community."

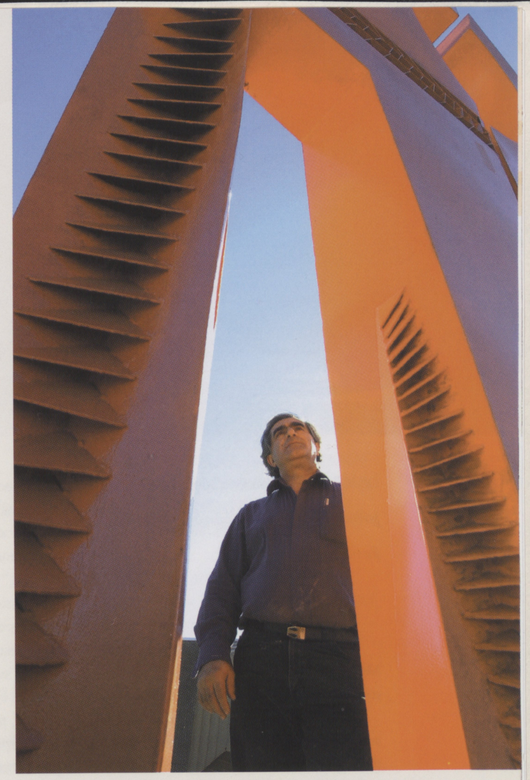
That community includes not only his home village, but his home of the last six years — North Carolina. He has held one-person shows across the state, touching cities as large as Raleigh and towns as small as Ayden. "Everybody deserves good-quality work," he said.

Jubran's commitment to community was born in the early 1970s back in Jish, a village of about 2,000 people. After completing a technical high school education, Jubran and about 15 other young men of the village formed a youth club. They chipped in $50 each, rented space, bought chairs and tables, and set out to create a cultural renaissance for their village. They brought in faculty for lectures, sponsored music and dance performances, and invited in schoolchildren for supervised activities and help with homework.

"We did all this for the sake of the village," he said. "During that time we were sitting around a table. We said, OK, we're the future of the village. How are we going to improve? What are we going to do when we grow up? We went around the table and each one said what he would become. So it came my turn. I am already qualified to go to technical engineering school, but I see we have an architect and none of us is going to be an artist so I say, I will be the artist.

"We felt we were smart and good enough to be whatever we wanted. Instead of waiting for someone to give it to us, we thought you can achieve things just by doing it. So do it. Just go ahead and do it."

He went to work immediately learning to sculpt. By 1976, as a self-taught artist, he was featured in a 45-minute program on Israeli national television. For formal training, he had to come to the United States. He completed a bachelor's and a master of fine arts degree at the University of Wisconsin-Milwaukee. The ECU School of Art lured him to Greenville in 1994.



Hanna Jubran stands behind his painted steel piece "Autumnal Equinox" on the ECU campus.

Still, he has not forgotten his commitment to his native village, where the youth club is still going strong. Last year, Jubran created an international sculpture symposium in Jish. His idea is to bring sculptors to the community every year to study and to create works of art for a Jish sculpture garden.

His sculptures range in size from 12 inches to 12 feet. For one project, he may create with painted steel beams and, for the next, combine stone and patinaed bronze to evoke crystalline formations. He used concrete for a commissioned piece at Fayetteville State University.

"Versatility is creativity," he said. "I am not afraid of trying new things or changing directions. But I see my hand in there, my style. This piece in Colorado — hopefully it reflects my personality. People can look at it and see that it is rich in texture, line and form. I like people to think of me as not rich in money but rich in love and care." •

Da Vinci's advance

ECU TAKES ROBOTICS PROCEDURE TO NATIONAL TRIAL.

Dr. Wiley Nifong, director of surgical robotics, positions the da Vinci surgical robot in preparation for a mitral valve repair.

Surgeons at the Brody School of Medicine have launched a national trial of a robotics procedure to repair faulty heart valves.

The procedure uses a computer-assisted surgical robot to enable doctors to operate through dime-size incisions with remarkable precision. It was performed for the first time in North America at ECU on May 3 of last year. At the time, only ECU and the Ohio State University Medical Center, which is developing bypass procedures, had U.S. Food and Drug Administration approval to test the device.

Chief of surgery Dr. Randolph Chitwood, an international pioneer in minimally invasive surgery, is directing the national trial that began in the winter. It will enroll 90 patients, in addition to the 15 who already have successfully undergone the surgery in Greenville. Five university hospitals are joining ECU in the newest trial: Johns Hopkins Medical Center in Baltimore, Brigham and Women's Hospital in Boston (part of Harvard University), Baylor College of Medicine in Houston, Ohio State University Medical Center in Columbus and St. Vincent's Medical Center in Portland, Ore. Two surgeons from each hospital, along with their teams of nurses and profusionists, will receive extensive two-day training in the procedure at ECU. Surgical Intuitive, the manufacturer of the robotic da Vinci Surgical System, also has designated ECU as its national training site.

The surgery involves repair of the mitral valve, which links the chambers on the left side of the heart. With the latest trial, the FDA has expanded the types of mitral valve repairs the surgeons can perform, said Dr. Wiley Nifong, director of surgical robotics at ECU. "Everyone's valve is not defective in the same fashion," he said. The new trial is expected to last six months to a year.

As the cardiac procedures were still being tested, the FDA approved da Vinci for general surgical use in July. The next week, Dr. William H. Chapman III, assistant professor of surgery, performed the country's first gastric reflux repair using da Vinci. In August, he performed the world's first removal of an adrenal gland using da Vinci. By December, ECU surgeons had completed more than 50 operations with da Vinci, including gall bladder and spleen removal.

Surgeons began to develop minimally invasive techniques for general surgery, especially abdominal and orthopedic, more than 10 years ago. Tiny video cameras helped the surgeons see to operate. With less trauma and less blood loss, patients suffered less pain and recovered more quickly. Heart surgery proved more challenging because of the difficulty of working on the beating heart or attaching the patient to a heart-lung bypass machine without opening the chest. Chitwood completed the first minimally invasive mitral valve repair in the United States in May 1996.

With the advance came drawbacks. It required new, longer instruments that were more challenging to control. "It's like trying to hold a broom at one end," Nifong said. "It's hard to keep the other end steady. Robotics allows us to operate on the heart with less invasive procedures while increasing our dexterity and accuracy."

At the tip of the robotic instruments are articulating wrists. Although no more than a millimeter in size, they have the same freedom of movement as a human wrist, maybe more. "It feels like you're back inside the heart operating like we used to," Nifong said.

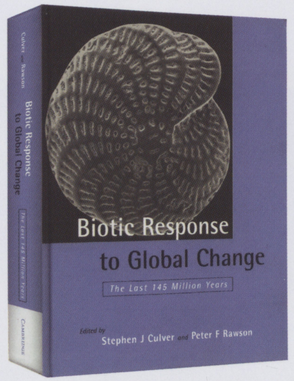
It feels the same, but it looks much different. Instead of a 10-inch incision and opened rib cage, this requires two half-inch incisions between the ribs for the surgical instruments and one two-inch incision for the camera and passage of sutures. At the patient's side is a surgical cart with the robotic device that positions and controls the surgical instruments.

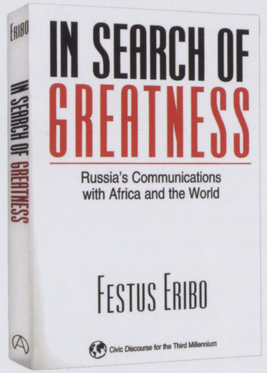
The surgeon performing the operation is 6 feet away — leaning inside a control console. With sensors strapped to his fingers, he performs a virtual operation. The computer filters out any tremor as it directs the robotic device to mimic the surgeon's movements while the camera sends back a three-dimensional picture of what's happening inside the chest.

The surgery takes about an hour longer than an open-heart procedure, but Nifong said the extra surgical time brings a better outcome for the patients: less time on a ventilator, less time in intensive care and less time overall in the hospital. Patients with open-heart surgery generally spend at least a week in the hospital. Non-robotic minimally invasive surgery patients go home in four to five days. Those operated on with the da Vinci have gone home in an average of three days.

ECU surgeons aim to begin bypass procedures next. But first, Nifong said, "We have to rethink the whole surgery. We have to develop different types of instruments and different ways to go on a heart-lung bypass machine, perhaps working through the femoral vessels in groin. So it's a lot of work, but we think in time it will pay off for patients." •

in print





• **BIOTIC RESPONSE TO GLOBAL CHANGE: THE LAST 154 MILLION YEARS** ***(Cambridge University Press, 2000), edited by Stephen J. Culver and Peter F. Rawson.***

More than 40 international specialists inform current discussions of global warming by investigating the reaction of life forms to long-term global environmental changes. Culver is chairman of the geology department.

• **FEAR OF THE COMING DROUGHT** ***(Mount Olive College Press, 2001) by Patrick Bizzaro.***

Bizzaro, professor of English, dedicates his seventh volume of poetry to the memory of his parents.

• **WORLDVIEWS AND THE AMERICAN WEST: THE LIFE OF THE PLACE ITSELF** ***(Utah State University, 2000), edited by C.W. Sullivan III, Polly Stewart, Steve Siporin and Suzi Jones.***

Collected essays explore the ways in which the various cultures of the American West understand and express their relationship to the world around them. Sullivan is a professor of English.

• **IN SEARCH OF GREATNESS: RUSSIA'S COMMUNICATIONS WITH AFRICA AND THE WORLD** ***(Greenwood Publishing Group, 2001), by Festus Eribo.***

Eribo, associate professor of communication, examines power and influence, politics and communication in the relationship between Russia and the African continent before, during and after the Cold War.

• **CONVERSATIONS WITH LESLIE MARMON SILKO** ***(University Press of Mississippi, 2000) edited by Ellen L. Arnold.***

In 16 interviews, the Native American Silko reveals the influences on her writing. Arnold is an assistant professor of English and ethnic studies.

• **CANONIZATION, COLONIZATION, DECOLONIZATION: A COMPARATIVE STUDY OF POLITICAL AND CRITICAL WORKS BY MINORITY WRITERS** ***(Peter Lang Publishing, 2001) by Seodial Deena.***

In this volume Deena, associate professor of English, combines cultural criticism with selected British, African, African American, Native American and Caribbean texts.

• **BEYOND THE BOUNDARIES OF PHYSICAL EDUCATION AND SPORT: EDUCATING YOUNG PEOPLE FOR CITIZENSHIP AND SOCIAL RESPONSIBILITY** ***(RoutledgeFalmer Press, 2000) by Anthony Laker.***

• **DEVELOPING PERSONAL, SOCIAL AND MORAL EDUCATION THROUGH PHYSICAL EDUCATION: A PRACTICAL GUIDE FOR TEACHERS** ***(RoutledgeFalmer Press, 2001) by Anthony Laker.***

In *Beyond the Boundaries*, Laker discusses the use of physical education and sport in the complete development of the individual. The latter book provides teachers with practical suggestions. Laker is an assistant professor of physical education.

• **HEALING NARRATIVES: WOMEN WRITERS CURING CULTURAL DISEASE** ***(Rutgers University Press, 2000) by Gay Wilentz.***

This book explores the relationship between culture and health in writings by women authors of African-American, Jamaican, Native American, Maori and Jewish background. It has been nominated for two national awards, the Chicago Folklore Prize and the SAMLA Book of the Year. Wilentz is a professor of English and director of ethnic studies.

• **ALGEBRA I: A PROCESS APPROACH** ***(University of Hawaii, 2001) by Sidney L. Rachlin, Annette N. Matsumoto, Li Ann T. Wada and Barbara J. Dougherty.***

• **THE ALGEBRA I: A PROCESS APPROACH TEACHER'S GUIDE** ***(University of Hawaii, 2001) by Annette N. Matsumoto, Barbara J. Dougherty, Li Ann T. Wada, Sidney L. Rachlin and Fay K. Zenigami.***

• **NAVIGATING THROUGH ALGEBRA 6-8** ***(The National Council of Teachers of Mathematics, 2001) by Susan Friel, Sidney Rachlin and Dot Doyle.***

Continued

in print

The first two volumes promote the open-ended inquiry method of teaching algebra. The third shows how concepts are developed in middle school algebra. Rachlin is a professor of mathematics education.

• **TEACHER EVALUATION FOR BETTER LEARNING** ***(ProACTIVE Publications, 2001) by Lynn K. Bradshaw and Alan A. Glatthorn.***

This work provides a practical guide for educational leaders who wish to develop or revise teacher evaluation practices. Bradshaw is an associate professor and Glatthorn is a distinguished professor of education.

• **DEVELOPING A TEACHING PORTFOLIO: A GUIDE FOR PRESERVICE AND PRACTICING TEACHER** ***(Prentice Hall, 2001) by Ann Bullock and Parmalee Hawk.***

The authors present step-by-step instructions for teachers developing a portfolio. Hawk is an associate professor of elementary education.

• **CHARTING A COURSE FOR CONTINUING PROFESSIONAL EDUCATION: REFRAMING PROFESSIONAL PRACTICE** ***(Jossey-Bass, 2001), edited by Vivian W. Mott and B.J. Daley***

The book analyzes significant issues and trends shaping the field of continuing professional education. Mott is assistant professor of counseling and adult education.

• **INEXCUSABLE OMISSIONS: CLARENCE KARIER AND THE CRITICAL TRADITION IN HISTORY OF EDUCATION SCHOLARSHIP** ***(Peter Lang Publishing, 2001), edited by K. Graves, T.R. Glander and C.M. Shea.***

Essays by colleagues and former students of Clarence Karier examine his legacy. Christine M. Shea is associate professor of education in the department of foundations, reading and research.

• **FIELDS OF THE LORD: ANIMISM, CHRISTIAN MINORITIES, AND STATE DEVELOPMENT IN INDONESIA** ***(University of Hawaii Press, 2000) by Lorraine V. Aragon.***

Aragon describes the colonial and postcolonial circumstances contributing to recent religious and ethnic violence between Indonesia's Muslims and Christians. She is a visiting associate professor of anthropology.

• **ADAGIOS DEL PODER Y DE LA GUERRA Y TEORÍA DEL ADAGIO** ***(Editorial Pre-Textos, 2000) by Erasmo de Rotterdam, translated by Ramón de la Bellacasa, edited and annotated Charles Fantazzi.***

This volume translates into Spanish a selection of Erasmus' *Adages*, a collection of and commentary on the proverbial wisdom of the West. Fantazzi is a professor of classics.

• **UNDERSTANDING JULIO CORTAZAR** ***(University of South Carolina Press, 2001) by Peter Standish.***

• **CULTURE AND CUSTOMS OF LATIN AMERICA AND THE CARIBBEAN** ***(Greenwood Press, 2000), series edited by Peter Standish.***

In *Understanding Julio Cortazar*, Standish analyzes the work of one of Latin America's most acclaimed 20th-century authors. The seven-volume series Culture and Customs provides a reference to the history, religion, social customs, media, literature, cinema and performing and visual arts of Latin America and the Caribbean. Standish is a professor of foreign languages and literature.

"Faith" by Scott Eagle, acrylic and oil on linen.

EXHIBITIONS

• **GREENHILL CENTER FOR NORTH CAROLINA ART**, Greensboro: Scott Eagle, an instructor in the School of Art, was one of 12 contemporary artists from across the state selected to be part of the center's Painters Series. Eagle exhibited 24 paintings, drawings and mixed media pieces May 26-June 23, 2000.

• **COMMUNITY COUNCIL FOR THE ARTS**, Kinston: Eagle's solo exhibition March 22-May 5 includes more than 30 paintings, drawings, prints and mixed media works.

RECORDINGS

• **BRAHMS: QUARTETS FOR FOUR SOLO VOICES, AND VIER ERNSTE GESÄNGE** ***(Arabesque, 2000)***, performed by John Kramar, baritone, with the New York Vocal Arts Ensemble and Raymond Beegle, piano.

• **JOE NEGRI: MASS OF HOPE** ***(Duquesne, 2000)***, performed by John Kramar, baritone, with the Duquesne University Chamber Singers; Brady Allred, conductor.

Kramar, assistant professor of voice and opera, performs classical and modern music on these two recordings. •

Two dozen gold-painted shovels were needed for the groundbreaking on Founders Day for the university's $60 million Science and Technology Building.

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