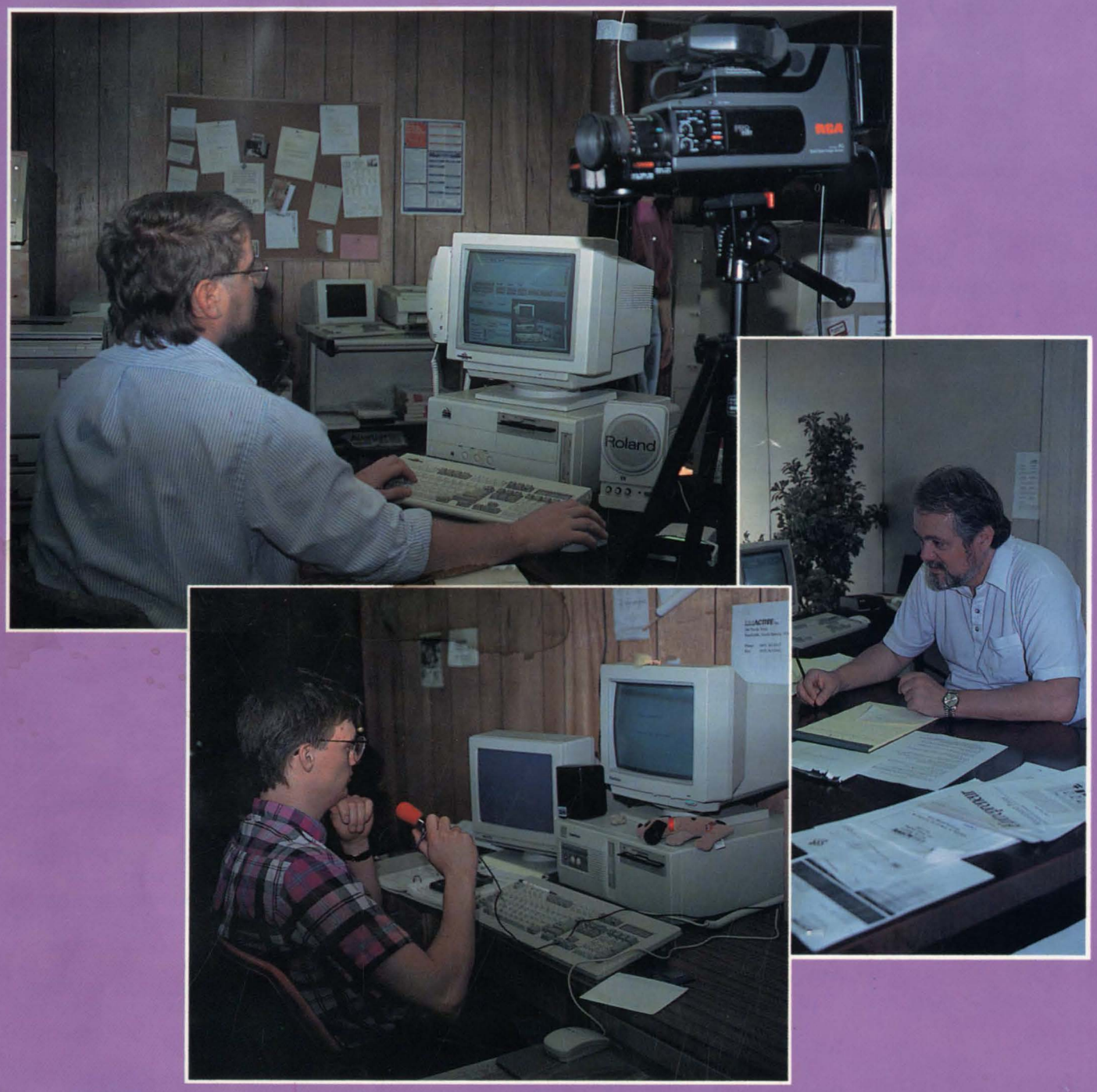
A DYNAMIC FORCE THAT INITIATES MOTION TO A BODY OR SYSTEM

IMPULSE

SUMMER 1992



SDSU

SOUTH DAKOTA STATE UNIVERSITY / COLLEGE OF ENGINEERING / BROOKINGS

Dear Alumni:

Our faculty has just breathed a sigh of relief as we finished the spring semester of 1992 and all final exams and papers have been graded. After the grades are in, some of our faculty members take summer positions at government and industry laboratories throughout the country, while some remain here at SDSU, heavily engaged in research. Over the past few years our faculty has concentrated on improving our research, both through industrial and governmental contacts. This effort has paid off in a number of ways. We now have faculty working at NASA research centers during the summer and significant research here at SDSU, especially in the water resources, ground source heat pump and information processing areas.

Projections indicate additional freshmen students in engineering this year, surpassing last year by at least 45 students. This will put our numbers in excess of 300 new freshmen. The increase in undergraduate as well as graduate students, because of our new research efforts, requires additional faculty, and I am pleased to report that we have been granted two additional faculty positions in the water resources area to bolster the academic as well as the research program, and an additional position in our Department of Mathematics and Statistics.

The Total Quality Management, or improvement process, is being applied in our College. First of all, we are using Total Quality Management in our advising process. We are also contemplating using it throughout the academic programs. Dr. Bob Lacher from our Mathematics and Statistics Department will be attending a Deming Seminar this summer, and we will develop seminars and workshops for our faculty in the fall to provide them with information regarding the techniques and processes of Total Quality Management and continual improvement techniques. We will then encourage the introduction and use of these techniques in classroom lectures and design projects that lend themselves to discussions and utilization of quality improvement processes. It should be an exciting year as we try to incorporate these very important principals and techniques into our curriculum. We expect that this will give our students a decided edge as they seek jobs in the near future.

Progress on the new engineering building continues to move along as we work with the congressional delegation to identify sources of federal assistance which usually require matching funds. President Wagner has continued to discuss the need, along with his ideas toward developing the necessary matching funds for the building, with the Board of Regents.

We had two excellent events this last spring semester — our Engineering Phonathon and Engineering Exploration Days. Through your help and generous contributions, the phonathon has topped $100,000 this year. Engineering Exploration Days, held in conjunction with the South Dakota Inventors' Congress this year, has provided both high school and college students a chance to see the many exciting and challenging opportunities available in engineering, the sciences and technology. If you are in the Brookings area during the early spring, you should consider visiting this excellent event.

Again, I would urge you to stop in and visit at any time.

Sincerely yours,

Duane E. Sander, P.E., Ph.D
Dean of Engineering

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ABOUT THE COVER:

Top: Steven Harvard, director of software development at InterActive, a computer software firm in Humboldt, works with the company's M-Mail system, which unites video and sound in PC E-Mail. Right: InterActive President and CEO Gary Kappenman began the company in a Montrose home in 1989 and bought the Humboldt building that houses InterActive today in May 1991. Bottom: Jim Weier, associate software engineer, works with a vocal word recognizer for personal computers, which InterActive developed with the help of SDSU and associate electrical engineering professor Douglas Miron.

IMPULSE

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interACTIVE™

a multimedia leader with plans to grow. . .

The company has successfully made the transition from a high technology startup with a vision to a leading edge technology company with products to sell.

(EDITOR'S NOTE: SDSU has had an InterActive connection for more than a year now, helping the firm secure funding and faculty expertise to develop a vocal word recognizer for personal computers. (Please see related story on page 4)

A big, old, brick building on Main Street Humboldt, S.D., may seem an unlikely location for a computer software firm that has been mentioned in the Wall Street Journal and some 25 trade publications. But to Gary Kappenman, president and chief executive officer of InterActive Inc., Humboldt is the perfect place for his company.

"It's ideally located," Kappenman said. "It's close to Sioux Falls but not right in the city."

Relocating to Humboldt is InterActive's second move. Kappenman started the company in the second floor of a house he bought in Montrose, the town where he was born and raised and graduated from high school. During a summer visit to his parents' home in Montrose a few years ago, the house across the street was for sale. Kappenman bought it as a summer home. Three years ago, he decided 20 years of living in California was enough; it was time to come home to South Dakota full-time.

InterActive was incorporated in October 1989, founded as a joint venture between Kappenman and Torrey Pines Research in Carlsbad, Calif. Torrey Pines, which has contributed both investment capital and brainstorming ideas, presently owns 40 percent of InterActive, Kappenman said.

"There are 65 stockholders now who have supplied the $600,000 or so that it's taken to get us to this level," Kappenman said.

Kappenman's management core is people he'd worked with in other companies in California and Massachusetts. "They're people who know how to build a company from nothing to, hopefully, a $50 million company," Kappenman said.

So far, so good. The company has successfully made the transition from a high technology startup with a vision to a leading edge technology company with products to sell. The team, infrastructure, products and

InterActive President and Chief Executive Officer Gary Kappenman, center, interacts with sales and marketing director Michael Pulizzi, left, and Jan Carnahan, electronic arts manager. The computer software firm is located on a corner of Main Street Humboldt, inside a big old brick building that promises the company plenty of room to grow.

Joseph Krizan, InterActive software engineer, works with InterActive M-Mail, which mails voice, text, graphics or pictures -- or any combination thereof -- as an "active letter."

facilities are in place to allow the company to rapidly grow to significant revenue levels.

Growth is the nucleus of Kappenman's goal for his company. Two years ago, he was the sole employee of InterActive. A year and a half ago, four employees worked out of the Montrose house. Today, InterActive has 15 employees. In three year's time, Kappenman plans to pump up his personnel numbers by some seven times and fill nearly all of the 22,000 square feet of his building.

"There's lots of space for growth," Kappenman said. "If things go well, I think we could have 100 (employees) working out of this building three years from now. Eighty to 90 percent of the new hires in the next few years will be local people."

In a year or two, Kappenman expects to expand the business into the second floor, a huge, open area that was once the town's dance hall. Business has already made one major mark on the upper level — a conference room built in preparation for an important business meeting. Also upstairs: a half dozen or so cafe booths that Kappenman purchased for future lunch hours.

Not only is the building ideal, it came packaged as an offer Kappenman couldn't refuse. The town of Humboldt secured Community Development Block Grant funds, then loaned Kappenman the money to buy the building in May 1991 on five-year, low-interest terms.

Things are going well. And Kappenman intends to keep it that way. "High technology is high risk and you have to hit the market exactly right with the right technology to stay on top of it," he said.

InterActive's Corporate Charter clearly states the company's intentions: "InterActive intends to become the leader in developing, marketing and supporting Personal Computer based multimedia products for business communications."

The leadership position has already been established. InterActive produced and developed M-Mail, the world's first PC based multimedia electronic mail product for Local Area Networks (LAN). M-Mail, the world's first electronic mail package to support the new TWAIN standard for image-capturing devices, allows executives to scan images with hand scanners, record voice notes and immediately mail these compound documents to other LAN users, all from within M-Mail.

Rave reviews resulted. In an April 28, 1992 article, PC Magazine wrote: "Think of multimedia and you picture expertly crafted desktop presentations or sophisticated educational software. Now we're starting to see how multimedia can apply to everyday business applications as well. M-mail, from InterActive, brings a sort of multimedia mail with voice, text, pictures and graphics to PCs running Windows. Much like the mail system included with NeXT computers, M-Mail makes communicating ideas and information easy and dynamic. . . M-mail is an interesting glance at the future."

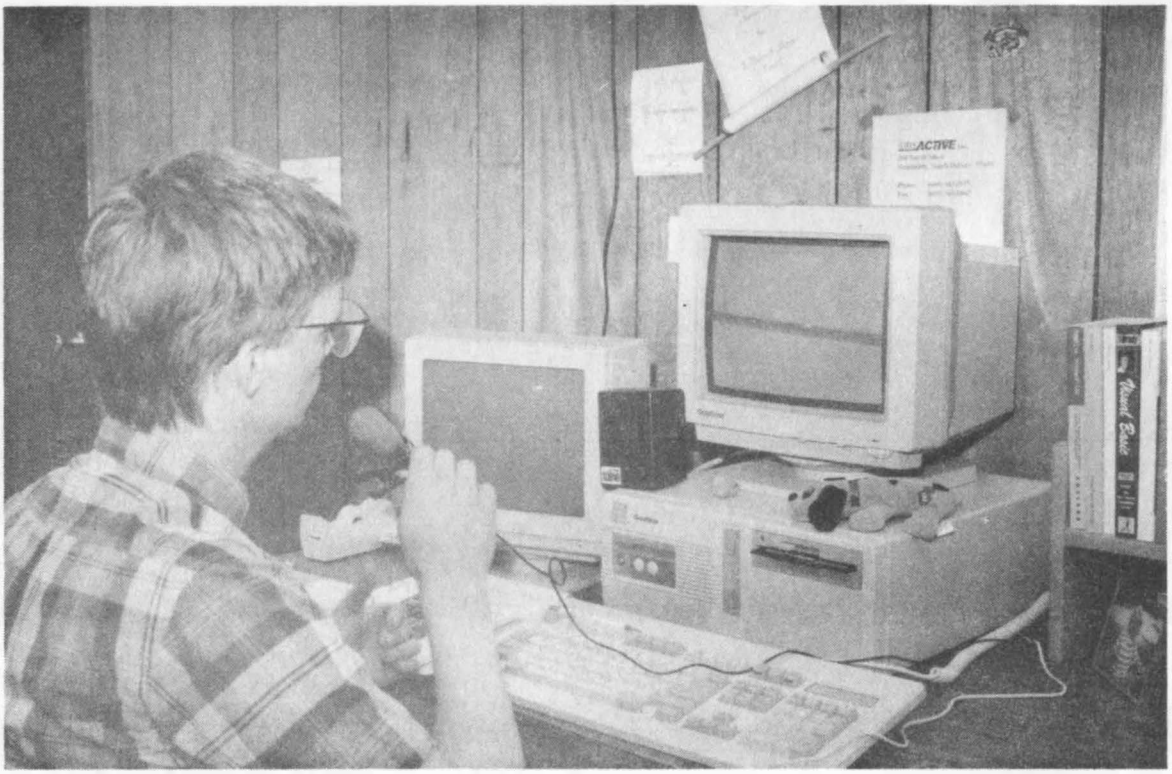
The April 1992 issue of Entrepreneur covered InterActive's M-Mail introduction with nearly half a page. Under the heading "GREAT DELIVERY," the story started with "What better way to get your electronic mail message read than to make it into a multisensory experience?"

Multimedia Industry Week wrote in Dec. 23, 1991: "The Bottom Line: This tiny developer is on target with a hot package — among the first in the multimedia e-mail category. . .Expect the big boys to follow their lead."

Carol Flickinger, office manager, sums it up: "Even though we're a little company, we handle business as if we're a big company," she said.

InterActive markets all over the world, with distributors in Australia, Germany, Mexico, Austria and Belgium. France is currently evaluating the product for distribution. So far, the company has no U.S. distributors, although it has several medium-sized dealerships which have picked up M-Mail for re-sale.

"U.S. people are intrigued," said Michael Pulizzi, director of sales and marketing at InterActive. "We field hundreds of leads a month. They know that multimedia is coming, but with the current business climate in the U.S., they are moving much slower. Dealers and distributors in Europe are more aggressive. They find a product their clients will want, get it and bring it to their clients. The U.S. is more cautious — curious, but cautious."



Jim Weier, assoc. software engineer, tests the voice command software which is based on software developed by SDSU associate professor of electrical engineering, Doug Miron.

interACTIVE

SDSU-InterActive link producing new voice command system

The InterActive project is an example of one of the many ways UITS can provide technical assistance to companies, businesses and government in South Dakota

A cooperative link connects South Dakota State University and InterActive Inc., a link that is helping the company produce text to voice computer software.

Through University/Industry Technology Service (UITS), SDSU helped InterActive secure a grant through the Center for Innovation, Technology and Entrepreneurship (CITE) of the Governor's Office of Economic Development. Douglas Miron, associate professor of electrical engineering at SDSU, will work with InterActive in developing the product. The project runs through Dec. 31, 1992. This is the second project UITS has arranged with InterActive. Miron first worked with the firm from Aug. 1, 1991 to Feb. 1, 1992 to develop the basic algorithms for a vocal word recognizer for personal computers. Through the second CITE grant, Miron is working with InterActive full time this summer, furthering his work by developing the text to speech software.

Gary Kappenman, president and chief executive officer of InterActive, said the company hopes to have a product based on the voice recognition software developed by Miron this fall. It plans to introduce this new voice command software in Las Vegas, Nev., this November at Comdex, the biggest computer show in the world.

The InterActive project is an example of one of the many ways UITS can provide technical assistance to companies, businesses and government in South Dakota, UITS Director LaDell Swiden said.

"The mission of UITS is to link university resources to industry in solving technological problems," Swiden said. "We create projects to assist industry through technology transfer and utilization of university resources. We also do symposiums on total quality management."

Initial contacts with businesses happen two ways: industry contacts UITS seeking help; or members of the UITS team contact the industry to offer services. Members of the UITS team are Swiden, Steve Turner, Jolene Vaselaar and Mary DeVries.

In the case of InterActive, Swiden first called on the company "to introduce them to the services that were available through the university," he said. On a second visit to InterActive, Swiden took along Miron and Dennis Helder, assistant professor of electrical engineering at SDSU, to discuss the technological requirements of the voice command recognition system.

UITS was established through a University Centers Grant from the U.S. Department of Commerce, Economic Development Administration and SDSU. UITS assistance to industry ranges from simple telephone contacts to facilitating research and development projects between industry and university faculty.

"Everybody's friendly, whether you know them or not. People trust people."

These projects have resulted in the design or improvement of products and processes that enhance the competitiveness of South Dakota industries.

In the 3 1/2 years since it was formed at SDSU, UITS has:

- made 251 on-site visits and over 2,530 contacts with S.D. industry.
- conducted 21 symposiums and video teleconferences;
- published 16 issues of the Infogram, a quarterly newsletter directed toward South Dakota's manufacturers, processors, businesses, industry, economic development specialists and legislators;
- conducted 129 assistance cases, including 65 projects involving faculty from 21 departments on campus. This has included 10 student design projects; 21 significant research projects by faculty and students, nine of which received partial funding from the South Dakota Future Fund; 16 NASA Central Industrial Applications Center database searches; more than 6,800 student hours of classroom time; more than 1,300 hours of research by graduate students on design projects.

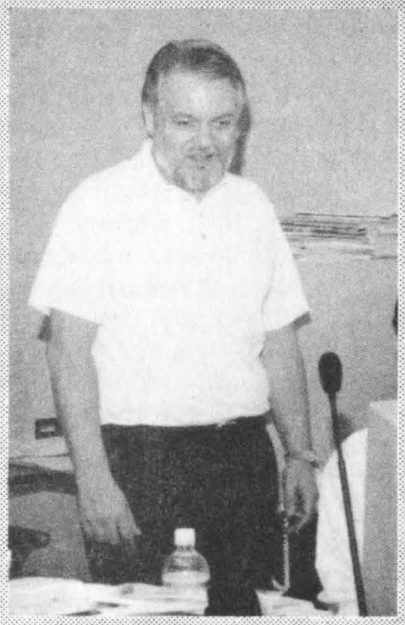
"UITS is available to help new companies or companies that may be interested in starting a business in South Dakota," Swiden said. "If you have a project involving research or technical needs that will enhance economic development in South Dakota, we stand ready to assist."

For more information on how UITS links university resources to industry, business and government for the purpose of solving technical problems and enhancing economic development in South Dakota, contact: Engineering and Environmental Research Center, SDSU, P.O. Box 2220, Harding Hall, Brookings, S.D. 57007-2220. Phone: (605) 688-4184. Fax: (605) 688-5878.

South Dakota climate nurtures life

South Dakota's climate has a nurturing effect — on personal life as well as on business. It's what brought InterActive president and chief executive officer Gary Kappenman back to his home state. It's what brought his core group of company managers right along with him.

Kappenman was born and raised in Montrose, graduating from high school there in 1962. He went on to earn a bachelor of science degree in physics from South Dakota School of Mines and Technology in 1966 and took graduate level courses in computer science at the University of New Mexico. After a stint in the Army, he worked for computer companies in Massachusetts and California and spent a few years flying around the world fixing PDP-11 mini-computers.



Gary Kappenman
President and Chief Executive Officer
InterActive, Inc.

When Kappenman moved to Orange County, Calif., 20 years ago, the area was ripe with fruit trees. But no more. Now, he describes the area as "paved over."

"So I moved back to the country, basically," he said. "And it's great to be back."

South Dakota is a better place to live, Kappenman said, and a better place to do business.

"It's a great business climate, overall," he said. "California has so many laws, rules and regulations, it's impossible to do business out there. It's expensive to live. There's a poor quality of life. Here, I think people want the business. It's almost anti-business in California."

Three years ago, Kappenman started InterActive, his computer sßoftware firm, in the second floor of an old house in Montrose. He moved the business to Humboldt in May 1991.

InterActive's 22,000 square foot building on Main Street Humboldt proved to be another South Dakota bonus. The town of Humboldt secured a Community Development Block Grant, then provided Kappenman a five-year, low-interest loan to buy the building. To rent the same building in southern California would cost between 75 cents and $1 per square foot per month. "This building cost us less than two months rent in California," said Dave Feather, InterActive vice president of operations.

CONTINUED PAGE 6

"It's very stimulating. It's revitalizing. I mean, it's the American dream."

South Dakota climate nurtures life

CONTINUED FROM PAGE 5

"The town's been wonderful," Kappenman said. "That's one reason I moved back. Everybody's friendly here. From the local cafe to the gas station, they've just been wonderful."

Kappenman's key managers are people he worked with in Massachusetts and California. They agreed to move to South Dakota to forge new careers and new lives on the prairie. And they're glad they did.

"It's nice," said Jan Carnahan, InterActive electronic arts manager. "There's no earthquakes. The traffic can't be beat." Carnahan moved to South Dakota two years ago, after living in California for 17 years. In California, it took her 45 minutes to drive five miles to work — "that's stress to your emotional and physical being," she said.

Scott MacGregor, director of manufacturing at InterActive, moved to South Dakota just over a year ago — and couldn't say enough good things about his new life in his new state. "I love the people. I love the area," he said. "Everybody's friendly, whether you know them or not. People trust people. I love the fresh air. I love the storms. I grew up in Massachusetts and lived in California 10 years. I've never had such a panoramic view. The thunder and lightening storms are almost like fireworks."

MacGregor recently bought a country home in the mid $30,000 bracket that he said would have sold for a quarter million dollars in California. South Dakota also provides a more nurturing climate for raising his two small children. "It's a nice place to bring them up," he said. "I love it out here. It's refreshing. It's like taking a step back in time."

Feather echoed those sentiments. Originally from San Diego, Calif., Feather has found a most comfortable tone of nostalgia in South Dakota and its people.

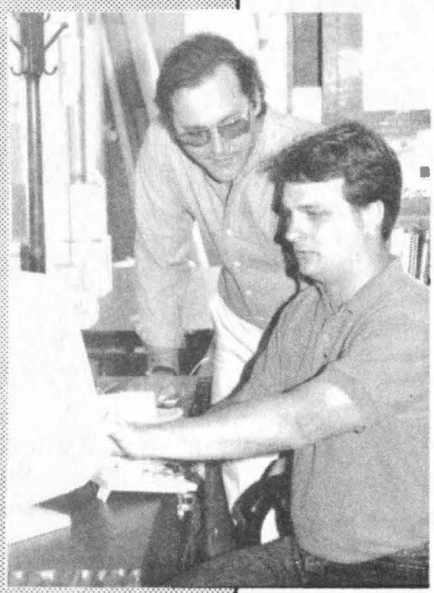
"They drop by; and every time they want to come in, we invite them in and give them a demo. I think the people and the town are very excited for us," Feather said.

"It's very stimulating. It's revitalizing. I mean, it's the American dream. The value system in South Dakota is more like the value system of the country in the 50's. Many who migrate are wanting to keep in touch with those values," he said.

Michael Pulizzi, director of sales and marketing, came to InterActive from California. His answer to, "How do you like living in South Dakota?" came this way:

"My parents came for a visit," he said, "and when they got here, I told them, 'Welcome to heaven.'"

David Feather, vice president of operations for InterActive.



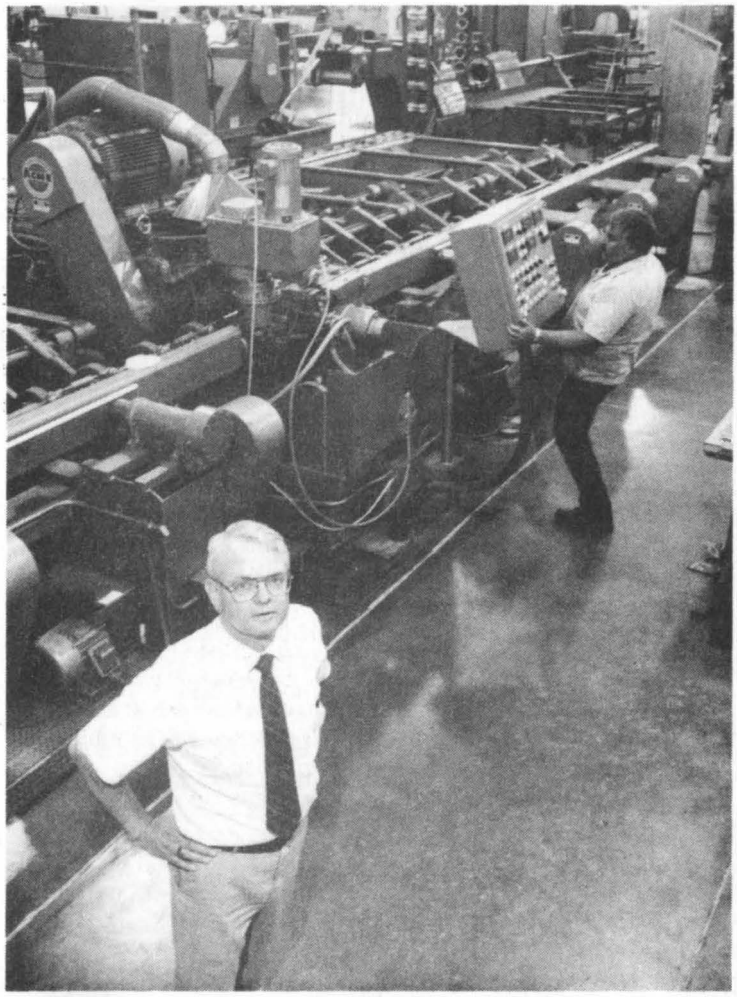
Scott MacGregor, director of manufacturing, and Joseph Krizan, software engineer, are discussing a project for InterActive.

"How do you like living in South Dakota?" – 'Welcome to heaven.'"

Dakota Mobile Hydraulics

continues to expand

A Brookings company that makes hydraulic cylinders for heavy-duty uses like construction and mining is continuing to expand.



Don Patrick, general manager of Dakota Mobile Hydraulics, stands in front of some of the equipment used to make cylinders.

"The company is very close to going over the hump and becoming profitable, which is a great accomplishment for a manufacturer under two years old."

Dakota Mobile Hydraulics started business in February 1991 and has been growing ever since. The company's general manager, Don Patrick, is a 1962 mechanical engineering graduate from SDSU and a native of White.

Patrick said a year ago the company targeted key customers and has now taken orders from most of them. The three main customers of Dakota Mobile Hydraulics are the three largest construction manufacturers in the country.

"Recently, we flew to see one of our customers and we're evaluating our first order. They indicated that as things look now, they will probably give us a great deal more business, so we're very optimistic," he said.

Based on backlog figures, Patrick said he anticipates continued growth. Right now, the company has 20 employees, but it is looking for more machinists to start a second shift within a few months. He said the company is very close to going "over the hump" and becoming profitable, which is a great accomplishment for a manufacturer under two-years-old.

However, the company is not satisfied with resting on its laurels. Patrick said he would like to see more international involvement so the company can be a world-class manufacturer. "That means we hope to build things as well as they're built anywhere in the world. So it would really be great if we could start exporting to Japan and some of the more competitive countries that have been taking more of the American market," he said.

Dakota Mobile Hydraulics has already positively affected the economy, Patrick said. "The customers I have mentioned are presently buying a number of their cylinders for American use from foreign countries. So by simply taking more of that business, we can do a better job of improving the balance of trade right here in the United States."

Patrick encourages others to become entrepreneurs and start new businesses. He said it is very challenging and sometimes even difficult, but the rewards are worth the effort.

As the company develops its programs further, Patrick said he hopes to hire more SDSU graduates, especially in the engineering field.

He said he is glad to be back in the area after spending 30 years away. "My family and I enjoy living in Brookings and find it is a very nice community."

Special Teams

president puts SDSU minor to good use

"One of the real reasons the company is successful is because we have a great deal of support from SDSU and the community of Brookings."

Developing University Card Access Systems is the main area of expertise for Special Teams Inc., a Brookings computer software development firm.

The president of the company, Don Endres, is a 1983 SDSU animal science graduate who had a computer science minor and decided to put it to good use.

Special Teams created the program SDSU now uses for its food service and athletic events. The system uses wand scanners and machines similar to credit card scanners to read the cards. Food service employees need only to touch a register screen in order to enter the desired purchase.

Currently, the company has a one-campus card system which allows people to use their student identification card to access food service, the bookstore, the library, the gymnasium, copy machines, vending machines and even washing machines.

Paul Bettmeng is performing diagnostics on a system work station.

Endres began his interest in software development with an internship with Marriott Food Service at SDSU. His job was to look at the card access system and try to make it more user-friendly. He then worked at the SDSU computing center as a business systems programmer/analyst, but continued to get feedback on the card access system concept.

During this time, he began to receive requests from colleges interested in developing a card access system similar to SDSU. Augustana College in Sioux Falls was the first to make its request official.

At that point, Endres decided to form Special Teams. He found SDSU student Eric Sandven to assist with the development process. By the fall of 1987, the first version of the Access Control System was installed for Augustana. Now the system is in use at more than 50 colleges and universities around the country.

Since several systems are now in place, Endres said a successful approach to selling new systems is to let the customers see a current system in use on a campus. "That way they can talk to the people operating the system and ask them any questions. It's been very beneficial for us," he said.

The system can be adapted to the needs of the particular customer. For example, Endres said some schools just need a food service access control system while others need expanded capabilities for special events admission or check cashing. The system can store the number of people attending events and separate that information into categories, such as on-campus and off-campus students. It also can track product movement in food service so managers can feature specific items.

The advantage to this system, Endres said, is that managers don't have to manually track products because they are automatically counted by the system. Additionally, managers can try new items and track how well they are selling in a very short time.

Staying ahead of the competition is the goal of the research and development division of Special Teams. Sandven, the division manager, graduated from SDSU in 1990 in computer science and is now

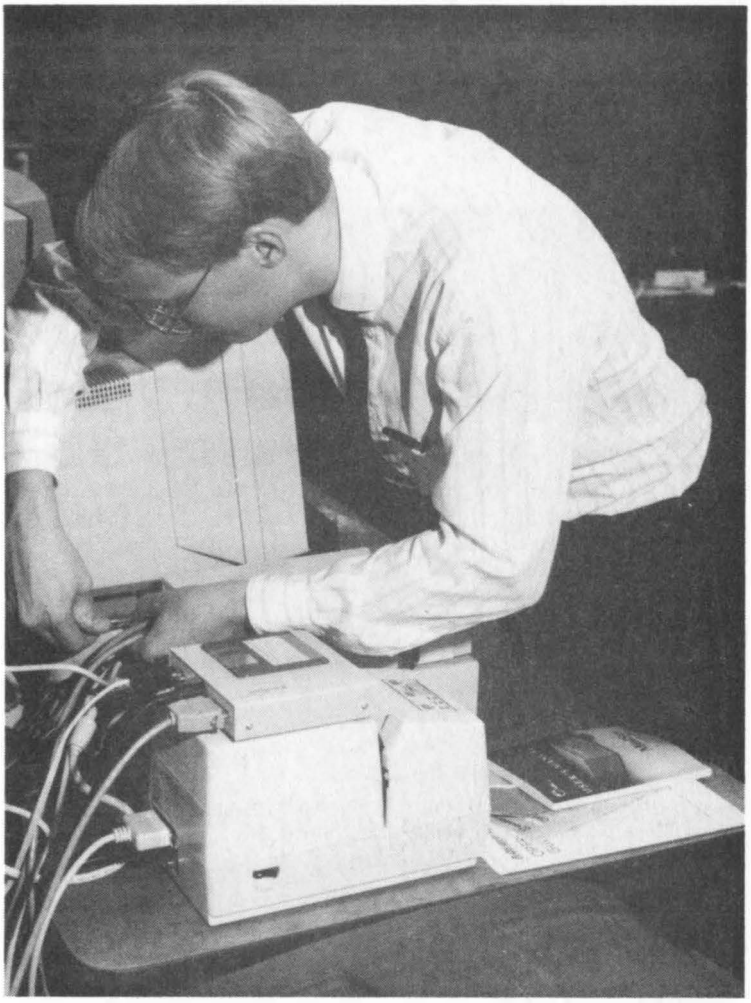
The CITE (Center for Innovation, Technology and Entrepreneurship) program at SDSU helped us develop the all-campus card system, which keeps us ahead of the competition."

working on his master's degree. Sandven said his department is always working to improve the products. He said he listens to customers to see how to best help them and tries to make changes according to their needs. The department also develops prototypes of software and allows the customer to use it to see if it works for them.

Being on the cutting edge of technology is exciting for Sandven. "We have a really good group of people working here, which allows us to create software that is definitely leading the industry at this time. We're working to keep that title. It's a competitive industry and that makes this work exciting," he said.

The company has 16 full-time and 12 part-time employees in the areas of sales and marketing, research and development, administration and technical support. The company has products in 25 states, but is developing contacts in the rest of the nation. The demand for this software is increasing, so Endres said the need for additional employees should continue.

"One of the real reasons the company is successful is because we have a great deal of support from SDSU and the community of Brookings," Endres said. "We continue to find well-educated students from the university. The CITE (Center for Innovation, Technology and Entrepreneurship) program at SDSU helped us develop the all-campus card system, which keeps us ahead of the competition."



Above: Jeff Kohlmeyer is assembling and testing a touch screen register.

Left: Jim Honomichl and Brenda Mehling are evaluating a schematic diagram for George Mason University in Fairfax, Virginia.

Eleanor Baum

Challenges for women in engineering

Engineering is a challenging, interesting career, but for women, there are hurdles to overcome, Eleanor Baum said during a lecture at SDSU March 19.

Baum is dean of the Albert Nerken School of Engineering at the Cooper Union for the Advancement of Science and Art in New York City. She has worked in the aerospace field and consults for industry and government. Her visit was sponsored by the SDSU College of Engineering with funding provided by the Bush Foundation Faculty Development Project.

When Baum graduated from high school, the choices for women were "very, very clear," she said. "You went to college to become the kind of woman that an educated man would marry." Women primarily pursued degrees in nursing or teaching.

When Baum told her parents she planned to become an engineer, "They gasped, they turned green and said, 'You can't do that. People will think you're weird.'"

Her high school guidance counselor confirmed her parents' doubts, she said; but she remained determined. She applied to two schools. One turned her down because it didn't have enough ladies' rooms.

Top: Eleanor Baum, Dean of the Albert Nerken School of Enginnering at the Cooper Union for the Advancement of Science and Art in New York City. Above: Baum listens to three College of Engineering students from SDSU, Anita Kotschegarow, Jill LaPlante and Michelle McCarville.

After earning her bachelor's degree from City College of New York, Baum earned a doctorate in electrical engineering from Polytechnic University. But it wasn't always easy. For one thing, Baum said, the performance of a woman in a typically male field is often used to judge the performance of all women.

"It's very hard to be a symbol for all women," she said. "There is the feeling of being enormously conspicuous."

Course work leaned toward men, with professors using comparisons of common male things, like how a carburetor works.

"If I was having any problems understanding something, that didn't really clear it up for me," Baum said.

The women's movement and the economy has changed some of the problems Baum faced. Two-income families are common. Women think of their work as careers, not just jobs, and are more apt to choose non-traditional fields than before.

Yet the number of women entering the engineering field remains low. In the early 1970s, 2 percent of engineering students were women. In 1984, the number peaked at 14 percent, but has since declined. While half of the students in law schools, medical schools and dental schools are women, "They're still not flocking into engineering," Baum said.

Part of the problem, Baum said, is that people don't really understand what an engineer does. One-fourth of the women engineers have an engineer in the family, so they have a better image of the field and more respect for it. But most people just don't know, she said. "We've all met a doctor, a lawyer or a businessman, and we've all seen them glamorized on television. If you do see an engineer portrayed on Saturday morning cartoons, it is very negative," Baum said. "It has evil connotations. And if that engineer is female, she has long, claw-like nails and is going to take over the world."

Baum said, "Engineers are problem solvers. We use math and we use computers, but really what we do is solve problems. And the problems we solve and the devices we design hopefully improve the quality of society."

Most of the women who go into engineering, Baum said, are excellent high school

"Engineers are problem solvers. We use math and we use computers, but really what we do is solve problems. And the problems we solve and the devices we design hopefully improve the quality of society."

students; they have very good math and science skills are assertive leaders.
Baum suggested holding a career day open house for high school teachers, counselors, students and their parents. "We need to role model female engineering students," she said. "It sends the message you can do it."

To help women already enrolled in engineering colleges, she recommended that colleges form support systems.

"Clustering really works," Baum said. "It's a good thing. Institutions should encourage women students to get to know each other and other women faculty members in other departments."

Baum shared the results of a survey she conducted. Of the 4,000 working women engineers and 4,000 female engineering students surveyed, well over 50 percent responded. "I found out there are a lot of women engineers out there that wanted to be heard and wanted to know someone cared about them," she said.

The respondents reported that:

They chose the engineering field because they wanted interesting work that allowed them to solve problems, learn and grow, earn a decent salary and transfer around the world. The majority do not regret their choice.

Two-thirds are married; three-fourths of them to another engineer or scientist. Three-fourths are under the age of 35.

Two-thirds feel they have to work harder than men to prove themselves. But Baum said this seems to be a problem with all young engineers, male or female.

More than half feel they have been subjected to some form of harassment, varying from an overly protective boss to serious harassment. With only 6 percent of the engineering work force women, Baum said, women engineers will work mostly with men.

"And one of the things you have to do is raise your antenna high enough that every little thing won't set off a full-scale attack response," she said. "Other people will have power over you, if you do. Learn to laugh about lots of things and not get upset about everything."

Serious harassment must be dealt with, Baum said. But women can expect to pay a price for reporting an incident, even when it's justified, she said.

The biggest concern of most respondents was how staying home a few years to raise children would affect their career. It can be done with little damage, Baum said, depending on how long a woman is home and what she does there.

"Technology moves fast," she said. "You've got to stay technically up to date. Read the technical journals, attend meetings of your professional society. If you have access to a university, take an occasional course. Stay on the company's mailing list.

"Yes, it will hurt your career somewhat, but you've got to live with it and just go a little faster later on, maybe. We're allowed to have lives, professional and personal."

Baum serves on numerous engineering education boards and committees. She is married to Paul Baum, a physics professor at Queens College, and is the mother of two daughters.

Baum talks with SDSU College of Engineering Dean Duane Sander.

Baum visits with students, faculty

A visit to SDSU by engineering pioneer Eleanor Baum was part of an effort to strengthen recruitment and retention of women engineering students.

During a reception with female engineering students and faculty members, Baum discussed the strengths and weaknesses of the College of Engineering relative to its treatment of women. She met with SDSU and College of Engineering faculty to discuss campus-wide support mechanisms needed to help with recruitment, retention and placement of female engineering students. She shared some specific strategies she has observed that have been effective in breaking down barriers to the participation of women in engineering.

One of the few female deans of engineering in the United States, Baum is a frequent speaker and writer on the topic of increasing the number of women and minorities in the engineering profession. She recently completed two widely-disseminated national surveys dealing with demographics, attitudes and personality traits of women engineers and of female engineering undergraduates. (Please see related story.)

Baum's SDSU visit was funded by a $2,000 Bush Grant. The grant proposal was written by MaryJo Benton Lee, an instructor in the SDSU College of Engineering.

Engineering schools nationwide have low numbers of women students and faculty. In her grant proposal, Benton Lee cited a congressional Task Force on Women, Minorities and the Handicapped in Science and Technology, which reports that by the year 2010, the United States could suffer a shortfall of as many as 560,000 science and engineering professionals.

The National Science Foundation predicts that engineering jobs in the private sector will increase from 1.2 million in 1986 to nearly 1.7 million in 2000. At the same time, the number of engineering students is declining. The number of freshmen enrolled in engineering programs fell 17 percent between fall 1982 and fall 1989. Of the 1,252 students enrolled at the SDSU College of Engineering, only 146 are women; of the 78 full-time faculty members, only nine are women.

Crossman, Borhard

named 1992 Distinguished Engineers

Two SDSU graduates were named 1992 Distinguished Engineers at the College of Engineering annual awards banquet at SDSU April 24.

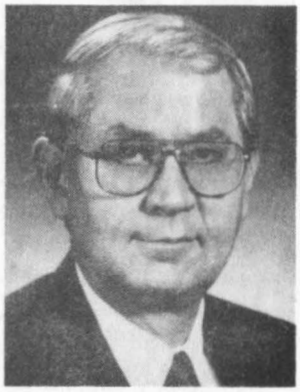
Honored were Leon Crossman of Midland, Mich., vice president and director, Science and Technology, for Dow Corning Corporation; and William Borghard of Nanuet, N.Y., registered professional engineer in New York and New Jersey.

Robert E. Roberts, secretary of the South Dakota Department of Environment and Natural Resources, was guest speaker at the Distinguished Engineer award program, held in Volstorff Ballroom of the University Student Union. The banquet, held in conjunction with Engineering Exploration Days, also honored Clara Ayers as Engineering Teacher of the Year and included numerous student awards and scholarship presentations.

Crossman, originally from Miller, received his bachelor's and master's degrees in engineering physics from SDSU and a doctorate in solid state physics from Iowa State University. Dow Corning named him manager of semiconductor silicon research in 1973; resins and chemicals unit manufacturing manager in 1981; director of technical service and development in 1982; manager of speciality elastomers business in 1984; commercial manager for high tech industries in 1987; director of central research and development in 1989; and director of science and technology in early 1991. He was elected corporate vice president in March 1991 and is responsible for ensuring that Dow Corning continues to expand its materials science base and accelerates its ability to work across the science-application interface, consistent with its global customer base and the globality of its technology.

Borghard, a native of New York City, graduated from SDSU in 1952 with a bachelor of science degree. Post graduate studies were done in civil engineering, labor relations and management. From 1953 to 1961 he was project engineer and assistant to the chief engineer of C.W. Lauman Company of Bethpage, N.Y. The company was involved in design and construction of water and wastewater treatment projects. He joined the International Utilities Corporation of Philadelphia, Penn., with responsibility for construction, operation and maintenance of 10 water companies in New Jersey, New York and Connecticut. In 1969 Borghard was appointed deputy commissioner of public works for Westchester County, N.Y. He was appointed commissioner in 1971. Now retired, Borghard is a member of numerous professional societies and is actively involved in community affairs.

Robert E. Roberts



Leon Crossman

William Borghard

Nominations encouraged for Distinguished Engineers

The SDSU College of Engineering encourages nominations for the Distinguished Engineer Award, presented at a banquet each year during Engineering Exploration Days.

Award recipients may be graduates of SDSU or persons who have provided significant assistance to the College of Engineering.

Nomination forms may be obtained by writing the College of Engineering, Crothers Engineering Hall, South Dakota State University, Brookings, SD 57007 or by calling the College at 605-688-4162.

Information requested about a nominee includes biographical history; extra curricular activities at SDSU; work history; special engineering or occupational honors and/or awards; civic or community activities; engineering association memberships and offices held; publications, books and patents; engineering projects; and contributions to engineering education.

1992 EED

includes inventors congress

Twenty inventors from across the Midwest displayed 25 inventions at the 1992 Inventors Congress, hosted by SDSU for the first time on April 24 and 25 in conjunction with the ninth annual Engineering Exploration Days (EED).

The purpose of the congress was to allow area inventors to display their ideas to industry representatives and to visit with high school students, engineering students, faculty and other inventors. At the congress, inventions were displayed by individuals and by local firms like 3M, Daktronics and Special Teams. Business representatives attended the session to evaluate the inventions for possible production. The congress was also open to the general public.

SDSU College of Engineering Dean Duane Sander said the College stresses entrepreneurship.

"It is an important option for engineers to consider," Sander said. "Entrepreneurship and the Inventors Congress fit together because an entrepreneur is someone willing to take a chance and has a vision of producing something for the good of society."

Inventors won awards, some with cash prizes, in six categories. Winners were:

Harold Fratzke of Cottonwood, Minn., won the Jack Hoffman Award for the invention judged to be the most marketable. Fratzke received a $500 cash prize for his Pickup Ramp Gate. Fratzke also won first place in the tools category for his Pickup Ramp Gate invention.

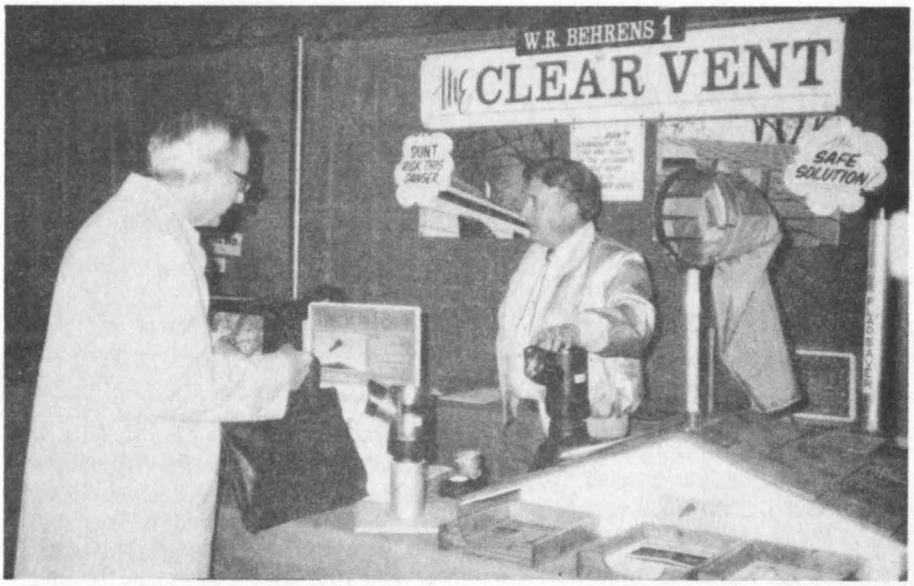
Marce Skorczewski of Ivanhoe, Minn., won first place in the agriculture category for his E-Z SlipLock Gate Fastener.

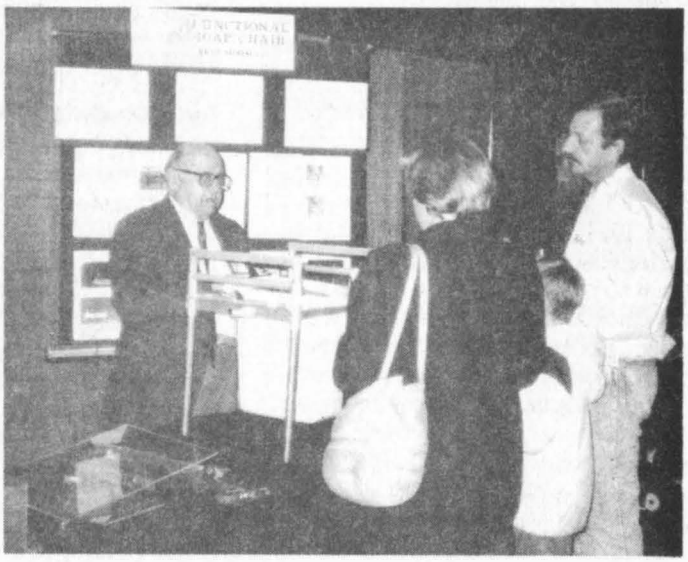
Motion Tables, Inc., of Rapid City, won first place in the household category for Motion Tables which are adjustable height tables. Motion Tables also won the People's Choice Award for the most popular invention, which netted the company a $100 cash prize.

Leon Boeck of Easton, Minn., won first place in the miscellaneous category for the Fastow Folding Tow Bar.

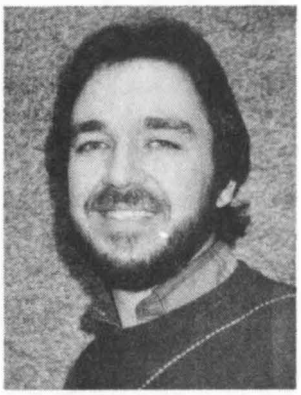
Below: Al Kurtenbach, president of Daktronics, examines the Clear Vent, an invention to protect sewer vents.

Below left and right: Inventors explain their products to the public during the SDSU Inventors' Congress.



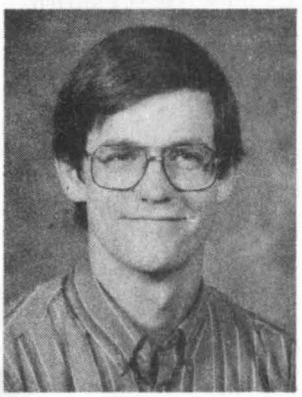


SDSU chosen for NASA JOVE project...



Stephen Schiller

Madeleine Rose



Dennis Helder

Three South Dakota State University professors have been chosen to participate in the pilot phase of the NASA/University Joint Venture (JOVE) Initiative.

The JOVE Initiative will make data from active space science missions available to the selected university professors through electronic links with research teams at NASA field centers and at mentor institutions.

Activities began this summer with two of the three professors spending up to 10 weeks at two of 14 NASA facilities. SDSU faculty participating are Stephen Schiller, Madeleine Rose and Dennis Helder in the areas of atmospheric monitoring, nutritional biochemistry and image processing.

JOVE is one of three major NASA projects in which SDSU is presently involved. "Our goal in the JOVE program is to develop a long-term research relationship with NASA over the three-year period."

Schiller, an assistant professor in the SDSU Physics Department, is working to develop an algorithm and a portable ground-based atmospheric monitoring system that will help correct atmospheric effects in visible and near infrared remote imagery of the Earth's surface. Schiller works in collaboration with Jeffrey C. Luvall at the Marshall Space Flight Center in Huntsville, Ala.

Participation in the JOVE program is a continuation of Schiller's work with NASA the past two summers. During the summer of 1990 he worked at Stennis Space Center in Mississippi through a summer faculty program. He continued his work in the summer of 1991 at Marshall Space Flight Center through a special contract with USRA, the same organization that is overseeing the JOVE program.

Because of his previous experience and interaction with NASA, Schiller was not required to spend the entire 10 weeks at Marshall Space Flight Center this summer. The first 10 weeks are designed to build a solid base with the mentor at NASA, he said. Schiller spent several weeks at the Marshall Space Center this summer continuing his work on refinement of imagery for monitoring of global change. The remainder of his time will be spent working from the university, he said, putting his link with NASA to good use.

"The main thing is the interaction with the expertise and the resources available through NASA," Schiller said. "The JOVE program provided the funding to build a communication network, a computer link between here and the NASA centers. It allows us to spend time at the NASA centers to work with the people we were assigned to."

Schiller received a bachelor's degree in physics from Walla Walla College in 1977, a master's in astromony from Ohio State University in 1981 and a doctorate in astrophysics from the University of Calgary in 1986.

Schiller has been involved in research and teaching at Ohio State University and the University of Calgary. He has been assistant professor at SDSU since 1987. The past two summers, he worked as a faculty fellow, as well as a research consultant for NASA.

Rose, an assistant professor in the SDSU Nutrition and Food Science Department, is at the Johnson Space Center in Houston, Texas, assisting with research in the area of human nutrition. She is working in collaboration with Helen Lane at the Johnson Space Center and will be there until Aug. 2.

Though the hot, humid Texas weather is testing her Midwestern fortitude, Rose said her work at the Johnson Space Center has been stimulating. Along with the research she's assisting in and the reports she's writing, she said seminars and tours are

giving her "a more in-depth view of what's going on here."

Rose said she's looking forward to an in-depth look at regenerative life support, where researchers study methods of growing food on the moon. "They just harvested wheat grown in soil similar to the moon," she said. "I really want to take a look at that." She's also anticipating a lecture on space debris and a study of the mission control used for the shuttle mission — " things the normal tourist doesn't get to see," Rose said.

Rose earned a bachelor's degree in dietetics and food science from the University of California in 1970, a master's in institution administration from the University of Maryland in 1972 and a doctor of philosophy in nutrition from Texas Woman's University in 1985.

She worked as a dietician, assistant chief and chief of clinical dietetics at Walter Reed Army Medical Center in Washington, D.C., Tripler Army Medical Center in Honolulu, Hawaii, Fitzsimons Army Medical Center in Denver, Colo., and Brooke Army Medical Center in Fort Sam Houston, Texas. She was research dietitian at the U.S. Army Research Institute of Environmental Medicine in Natick, Maine. She has been assistant professor at SDSU since 1990.

Helder, an assistant professor in the SDSU Electrical Engineering Department, will develop image processing algorithms for biomedical applications. Helder will work in collaboration with Robert Green, James Conel and Robert Selzer at the Jet Propulsion Laboratory in Pasadena, Calif. Helder's participation in the JOVE program will begin in 1993 with a 10-week stint at the Jet Propulsion Laboratory and continue with research at the university for three years. He said his work with NASA will be similar to the work Rose is doing this summer.

Helder earned a bachelor's degree in animal science in 1979, a bachelor's in electrical engineering in 1980 and a master's in electrical engineering in 1985, all from SDSU; and a doctorate in electrical engineering from North Dakota State University (NDSU) in 1991.

At SDSU, Helder has been an undergraduate research assistant, a research/teaching assistant and instructor. He has been assistant professor since 1988 and has been self employed in the farming business since 1982. He was a design engineer for the E.F. Johnson Company and a graduate teaching assistant at NDSU.

Helder's present field of research is calibration of image data, noise reduction, image restoration and information extraction. He developed a research program in information processing in conjunction with the EROS Data Center near Sioux Falls and has done some original and significant image enhancement work with EROS. He has also developed an image processing laboratory on the SDSU campus for both research and classroom use.

. . .a valuable way to increase the new knowledge returned from NASA space science missions and can play a key role in the use of the space program to stimulate science and engineering education.

The JOVE Initiative will provide support to the professors for their summer research orientation at a NASA or collaborating institution and pay for equipment, travel and some student support.

This is the first year SDSU has participated in the JOVE program, which is beginning its fourth year. SDSU is one of the 24 participating universities.

This fall, electronic network links will be established between the universities and the research teams at the 14 facilities. The joint research, curriculum development and outreach will begin during the winter and continue for three years.

The JOVE Initiative involves more universities in space science and increases their abilities to compete for other grants in the future. It can also be a valuable way to increase the new knowledge returned from NASA space science missions and can play a key role in the use of the space program to stimulate science and engineering education.

"Our goal in the JOVE program is to develop a long-term research relationship with NASA over the three-year period," said LaDell Swiden, director of the Engineering and Environmental Research Center at SDSU. "Participating in JOVE will help develop ongoing funding for research projects with NASA and NASA subcontractors. One of the reasons for having faculty actually at NASA is to make contacts."

Swiden was a member of a steering committee that attended a JOVE workshop at the Marshall Space Flight Center, then made a presentation to SDSU administration and faculty. Eight faculty members expressed interest in participating in the program, with the resulting three chosen.

SDSU will grant Rose, Schiller and Helder one-quarter release time during the school year to focus on research. The JOVE program will also be the main focus of their research during the summer for the next three years.

Over the three-year period, NASA will provide $110,000 in funding, which will also be matched by SDSU, to develop these research interests, Swiden said. The program also includes a $15,000 equipment grant.

JOVE is funded by the NASA Office of Space Science and Applications with support from the Office of Equal Opportunity Programs and the Education Division.

JOVE is one of three major NASA projects in which SDSU is presently involved. The others are the South Dakota Space Grant Consortium, and Schiller's ongoing research. with NASA.

Retiring professor to run for legislature, finish book on family history

Retirement will mean anything but idle hours for Dr. Donald Clark Moore, assistant professor of electrical engineering at SDSU.

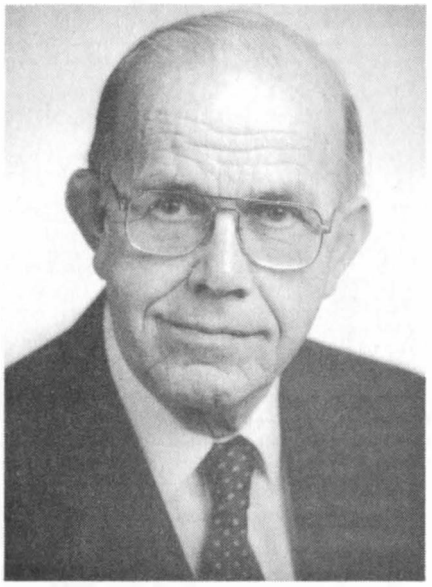
Moore, who retired with the end of the 1991-92 term, is a candidate for District 7 of the South Dakota State Legislature. He also plans to finish writing a book. "So I don't really expect to be bone idle," he said.

The book traces U.S. history through the eyes of Moore's ancestors — a full 10 generations' worth.

"When they first came to America, we were still a colony of England," Moore said. "When my mother died in 1965, she represented the last of 10 generations in North America. This will be a history of the United States and how it related to my ancestors over the last 150 years."

Moore's mother witnessed the arrival of the first telephones; the central office was located in her home. She saw the arrival of the first automobiles, the first televisions, the first radios and the first airplanes — "all in one lifetime," Moore said.
Ann Marbury Hutchinson, a first generation ancestor, attracted her share of trouble as a religious dissident. She went to Massachusetts as a Puritan and became a religious dissenter. Ann and her six children were killed by the Mohicans in what is now a part of New York.

In 1862, when President Lincoln called for 600,000 more volunteers, Moore's great grandfather, Albert J. Clark, signed up. Just after he was sworn in at Fort Snelling, the Sioux Uprising erupted in New Ulm. With no training whatsoever, the men were given uniforms and ammunition "and told to proceed," Moore said. Proceed, they did, through the Battle of Wood Lake and the Battle of Birch Coulee.



"My ancestors were in on the Erie Canal and most of the wars," Moore said. "An interesting thing about the family was apparently they didn't stay anywhere." Moore has tracked family members through Massachusetts, Connecticut, New York, Wisconsin, Minnesota, Nebraska and California.

"I've always been interested in history and it's interesting to see where your people come from," he said. "They were mostly farmers, some tradesmen, a mill owner, occasionally."

Moore has completed about one-fourth of the book. He wrote the sixth and final chapter first because the stories and anecdotes contained there are stored in only one place — his memory. "I wanted it down on paper because once I'm gone, it will be lost," he said.

Gathering his family history has involved generous doses of time and research and a bit of "sheer luck," Moore said. He had gone back five generations when he placed an ad in a Minnesota paper asking for information on the family. A man contacted him who had an unpublished document prepared by a distant cousin who had located 24 ancestors before 1630.

"I've been building on that," Moore said. "Once you know where to go, it gets much easier." Moore also pulled information from land records, school and church records and cemetery records. "Oh, you meet lots and lots of dead ends, but you keep plugging," he said.

Moore, a native of Omaha, Neb., received a bachelor's degree in physics and mathematics from the University of Nebraska in 1942 and a doctorate in physics from the University of California in 1948. He did graduate and undergraduate work in higher education, geology, computer science and applied mathematics at Teachers' College of Columbia University, Mesa College, Grand Junction, Colorado, and Memphis State University.

He has taught at the University of Nebraska, the University of California, Rensselaer Polytechnic Institute and Christian Brothers College in Memphis, Tenn. He was Fulbright Lecturer at Universidad Nacional de Cuyo in Argentina and dean at Houstonic Community College and at Otero Junior College. He began teaching at SDSU in 1987.

"I thoroughly enjoyed my five years here," he said. "I've had pleasant colleagues and administrative advisors and a number of students that were a real joy to work with."

Moore and his wife, Bridget, have three grandchildren and five grown children: one in Washington, D.C.; one in London; and three in California.

UITS
hosts successful TQM symposium

The 1992 Total Quality Management (TQM) Symposium was a success, drawing 143 participants to the Holiday Inn City Centre in Sioux Falls March 5 and 6.

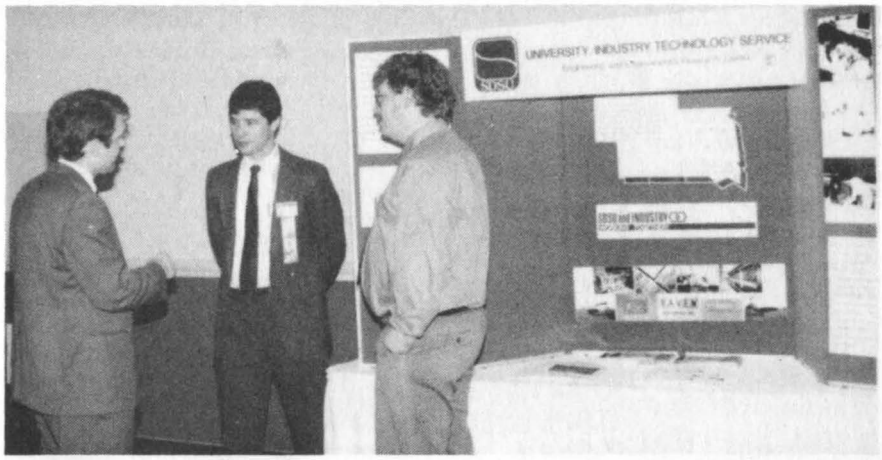
More than 50 industries, education institutions, governmental agencies and other organizations in South Dakota and adjacent states were represented.

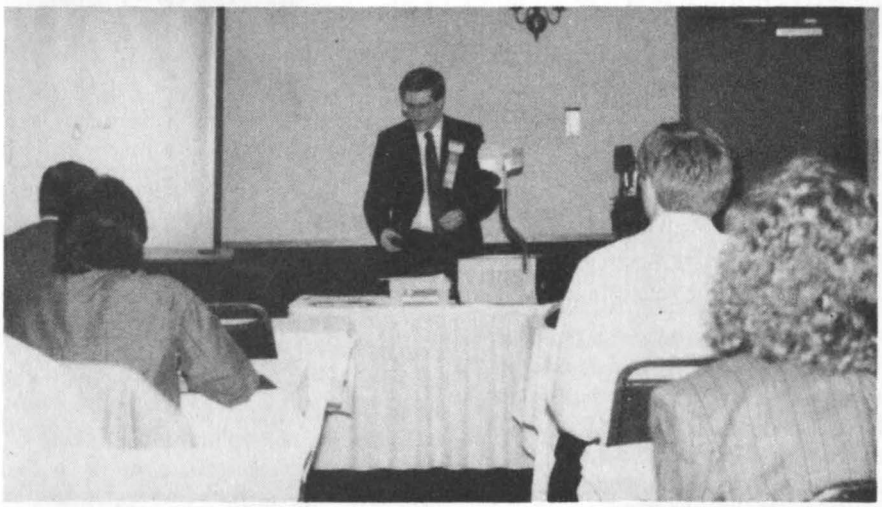
The symposium began with a presentation by Bruce Bleeker from the Zytec Corporation, headquartered in Eden Prairie, Minn. Bleeker graduated from SDSU in 1983 with an electrical engineering degree. His presentation described the company's quality journey that resulted in Zytec's selection as a 1991 winner of the Malcolm Baldrige National Quality Award.

Allan Mendelowitz, director of International Trade, Energy and Finance Issues at the Government Accounting Office in Washington, D.C., provided information on a recent GAO study of 20 Malcolm Baldrige Award applicants. The study concluded that their TQM efforts resulted in better employee relations, higher productivity, greater customer satisfaction, increased market shares and increased profitability.

Robert Lacher, professor of mathematics and statistics at SDSU, was keynote luncheon speaker. Other symposium presenters were Rita Emmet of 3M in Brookings and Roland Potter and Jeff Sims of Prime Process Management in Edina, Minn. Potter graduated from SDSU in 1959 with an electrical engineering degree.

The interest expressed in TQM by participants at the 1991 symposium prompted this year's symposium, which was hosted by the University/Industry Technology Service (UITS) with support provided by Hutchinson Technology Inc. and the American Society for Quality Control.





Top: John Mahoney, BSME '82, of Raven, Ind., talks with Keith Muhl, BSME '84, from the Schott Corporation and Roger Moore of Huisken Meat Center.
Above: Tracy Noldner, BS Math of Raven Industries teaches one of the classes at the TQM symposium.

Teleconference series brings TQM closer to industry

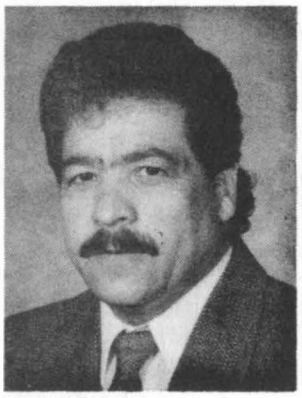
Due to the positive response from South Dakota industry concerning the need for Total Quality Management (TQM) in the state, a series of videoconferences addressing the various aspects of (TQM) was held in March, April and May.

The University/Industry Technology Service (UITS) partially sponsored the teleconferences, with co-sponsorship from the Sioux Falls Development Corporation, Northern State University, the Yankton Office for Economic Development and the First Planning District. The teleconferences were held in Sioux Falls, with four of them also downlinked in Aberdeen, Yankton, Watertown and Brookings. The teleconferences originated from Continuing Engineering Education at The George Washington University. The series was coordinated by Steve Turner, UITS program assistant.

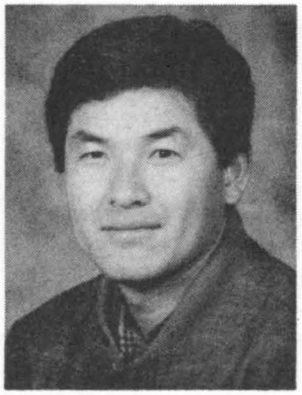
The teleconferences were: TQM - Magic Words or Hard Work: A View from the Real World by Joseph Juran and A. Blanton Godfrey; Teamwork in the Quality Era by Peter Scholtes; The New Economics by W. Edwards Deming; Completeness: Managing for the 21st Century by Philip Crosby; Business and Management: The New Challenges; Do You Know Where You Belong? by Peter Drucker.

Computer science professors make mark in academic world

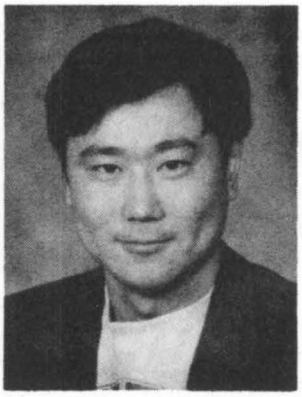
Three computer science professors are making their marks on the academic world in the short time they have been at South Dakota State University.



Alireza Salehnia



Sung Shin



Bin Cong

Associate professor Alireza Salehnia and assistant professors Sung Shin and Bin Cong have collaborated on eight papers in the year since Shin and Cong have joined the SDSU faculty. Six of those papers have been accepted into journals, publications or proceedings of meetings and two have been sent to journals for review. They have also made three presentations for the South Dakota Academy of Science.

The papers related to software engineering, expert systems, information systems and networking.

Salehnia has been at SDSU for three years. During that time, he has authored or co-authored 20 papers. Currently, he is working on a survey of South Dakota high school computer use and is writing grant proposals to the National Science Foundation.

Besides the previously mentioned collaborations, Shin has written seven papers in the last year. He has one grant in conjunction with his Ph.D. advisor for $300,000, his share of which is $83,600. He has submitted a request for a $30,000 grant to the U. S. Air Force in the area of fault tolerance, which means finding errors in software.

Cong has also written 10 other papers, a few of them co-authored by students. He has talked to EROS Data Center about submitting a $30,000 grant to NASA in the area of data compression and parallel processing.

Stephen Gold ties in with WAPA

Industry and education are joined in a cooperative effort which may lead to a closer working relationship in the future.

Stephen Gold, associate professor of electrical engineering, started working for the Western Area Power Administration (WAPA) office in Watertown in September. WAPA serves the western United States (except for Washington, Oregon and parts of Idaho and Montana) with electric power transmission. Gold re-arranged his teaching schedule so he works in Watertown part-time and teaches in Brookings the rest of the week.

The opportunity for Gold to work in industry came about because of contacts through South Dakota State University's Center for Power Systems Studies, which is directed by Wayne Knabach, professor of electrical engineering.

Gold said a recent project involves the relationship between inadvertant power flow and frequency deviations. The results of the project may mean a change in the control algorithm of the hydroelectric facilities on the Missouri River, which can be quickly adjusted to produce more or fewer megawatts, as necessary, to meet the required load.

He also worked on another project to see what happens when power lines are removed. "Once in November all four of the 230 kilovolt lines that go between Oahe Dam and Fort Randall had to be taken out of service at the same time because of high winds. That's the backbone of the system in that part of the country, and so we had a skeleton without a backbone; but the customers hardly noticed. Fortunately, there weren't any widespread outages from that."

Stephen Gold

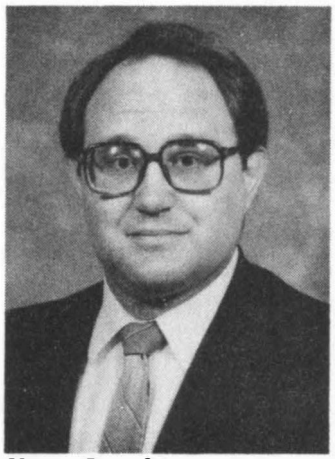
This fall at the WAPA office, SDSU will be conducting a university course about computer analysis of power systems. Gold said he hopes this will only be the beginning of the university's continuing education efforts there.

Society names Schaefer Outstanding Young Civil Engineer

Vernon Schaefer, associate professor of civil engineering and acting director of the Northern Great Plains Water Resources Research Center at SDSU, was named the Outstanding Young Civil Engineer for 1991 by the Eastern Branch of the South Dakota Section of the American Society of Civil Engineers (ASCE).

ASCE presented Schaefer with the award at the society's annual banquet Feb. 22 in Sioux Falls.

Schaefer is an associate member of ASCE, is active in Eastern Branch activities and currently serves as a member of the National ASCE Soil Improvement Committee and the Standards Committee on Artificial Recharge.



Vernon Schaefer

Schaefer received his bachelor of science degree at SDSU in 1978, his master of science at Iowa State University in 1981 and his doctorate from Virginia Polytechnic Institute and State University in 1987. He has authored or co-authored 10 publications relating to geotechnical topics. Originally from Bismarck, N.D., Schaefer lives in Brookings with his wife and three children.

The Outstanding Young Civil Engineer award, presented annually to a member of the Eastern Branch, recognizes activity in the society and achievement in the civil engineering profession. Recipients from the previous four years serve as the selection committee. Schaefer's selection this year marks the fifth consecutive year that the award was presented to an SDSU graduate.

Each year since 1973 the Eastern Branch of the South Dakota Section of ASCE has also recognized an eastern South Dakota consultant for Outstanding Civil Engineering Achievement of the Year. To qualify for this award, projects must be essentially civil engineering-related, be substantially completed during the award year and the design team must be located within the border of South Dakota. The award recognizes innovative engineering design which presents an unusual set of design constraints that were solved in a particularly effective and cost-efficient manner.

Of the three projects submitted for this year's award, the Huron Wastewater Treatment Facilities in Huron was selected. The design team for this project was Banner Associates, Inc., of Brookings. Project manager was Dave Odens, who earned a bachelor's degree in civil engineering from SDSU in 1973 and his master's in 1974. Odens was also a graduate research assistant at SDSU from September 1973 through May 1974. Project engineer was Jim Housiaux, who graduated from SDSU with a civil engineering degree in 1982 and was a civil engineering instructor at SDSU from fall 1984 through spring 1988.

Unique aspects of the design included the use of the largest artificial wetlands treatment system, 370 acres, constructed in South Dakota; very low plant operating and maintenance costs; and a system capable of treating an average of 5.25 million gallons of wastewater a day. The total cost of all improvements to this system was more than $4.9 million. Funding came from an EPA Construction Grant, the State Revolving Loan Fund and Wastewater System Revenue Bonds. Treated water will be introduced into the James River from the Huron Wastewater Treatment Facilities at a quality which exceeds EPA standards.

Ayers named Engineering Teacher of the Year

Clara Ayers, associate professor of mathematics and statistics, was named Teacher of the Year for the College of Engineering during SDSU Student Association elections in March.

Ayers, a native of Velva, N.D., has been at SDSU for 28 years and has been an associate professor of mathematics since 1977. She received her bachelor's degree from Minot State College in North Dakota and her master's degree in math from the University of Minnesota.

College of Engineering Dean Duane Sander said Ayers is one of the professors mentioned most often by senior students in exit interviews as being an outstanding professor.

Prior to joining the SDSU staff, Ayers taught at Minot State and at the University of Minnesota at Duluth. From 1969 to 1971 she studied at the University of Iowa under a National Science Foundation Faculty Fellowship.

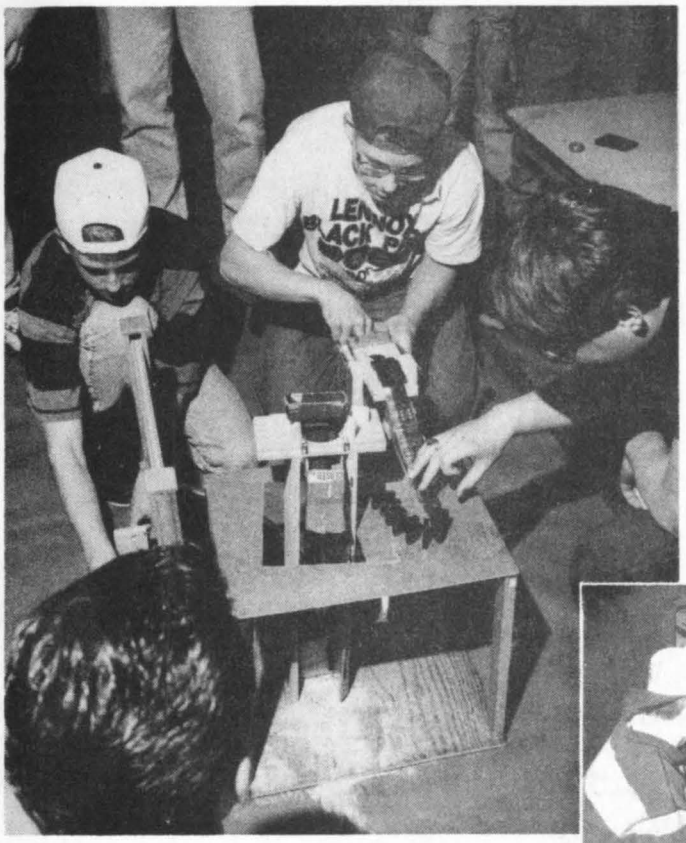
Ayers was also named SDSU College of Engineering Teacher of the Year in 1985.

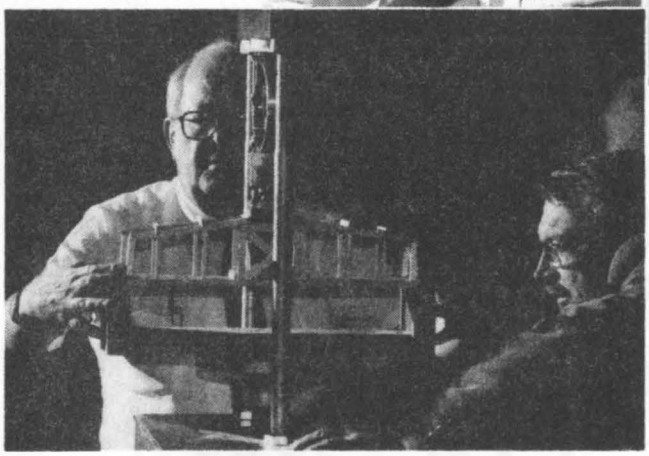
Ernest L. Buckley award

The second recipient of the Ernest L. Buckley Award for Innovation in University/Industry Related Economic Development is Dr. Royce Engstrom, professor of chemistry at the University of South Dakota. The award was established to honor individuals who, through their initiative, innovation and vision, have helped enhance the state's research capacity. It commemorates Dr. Ernest Buckley, former dean of the SDSU College of Engineering, for his efforts in utilizing the resources of our state universities in establishing technology- based industry.

EED

Hundreds attend Engineering Exploration Days





Above left and above: High school students demonstrate their mousetrap for the EED competition.

Left: SDSU civil engineering professors, Arden Sigl and Paul Koepsell, judge the bridge building contest.

Hundreds of people came to SDSU April 24-25 to observe Engineering Exploration Days (EED). EED is dedicated to engineering college students and high school students interested in math and science.

EED Chairman Rod Fischer of Goodwin said the event gives students a chance to show the public what projects they have been working on during the school year.

"Senior students display their design projects and other students get involved in special events like the miniature sailboat race and the mechanical catapult. For the high school students, the event shows them engineers do more than play with their slide rules. It also gives them a chance to have hands-on experience with contests like bridge building and the pentathlon," Fischer said.

When people view the displays and projects, they might not realize the planning that goes into EED. Fischer said he and the EED committee started planning the event in late September. The group met with Dean of Engineering Duane Sander to determine what events would take place based on new ideas and what worked the previous year. By December all events were decided.

To inform high school students and the public about EED, advertising and promotion is needed. That is where the engineering promotions class comes in.

According to the class instructor, Mary Jo Benton Lee, the purpose of the class is to train engineering college students in the skills necessary to promote an event like EED. She said studies show most engineering students are well-trained technically, but in the job market, communication skills like those taught in the class are very important.

Between 15 and 20 students are chosen for the class by an application process and evaluation by a selection committee appointed by the dean. Lee said the class is composed of representatives from all of the departments in the college and is very diverse in age, sex and race. She said the most important attribute the committee looks for is leadership.

David Sutton of Flandreau co-chaired the promotions class with Steve Johnson of Flandreau. Sutton said during the fall semester of 1991, the class learned how to communicate to various media, come up with new ideas and run a total promotional campaign. In spring, newspaper and radio ads were placed and flyers distributed to area businesses and to all high schools within 120 miles of Brookings.

"By drawing people to the event, we can show them what it's like at SDSU," Sutton said.

Professional awareness conference
offered to electrical engineering students

professional ethics, career planning, professional communications and graduate education

Electrical engineering students explored non-technical subjects with experienced engineers during a Student-Professional Awareness (S-PAC) Conference at SDSU April 14.

Topics addressed included professional ethics, career planning, professional communications and graduate education as a career path, subjects not normally explored in the regular classroom.

The conference audience included electrical engineering students, faculty and members of the Siouxland Section of the Institute of Electrical and Electronics Engineers (IEEE). Afternoon sessions were held in the Volstorff Ballroom in the SDSU Student Union. The IEEE/Eta Kappa Nu Electrical Engineering Honor Society Banquet took place that evening at the Brookings Holiday Inn.

The conference began with a welcome by Duane Sander, dean of the SDSU College of Engineering. Afternoon speakers were:

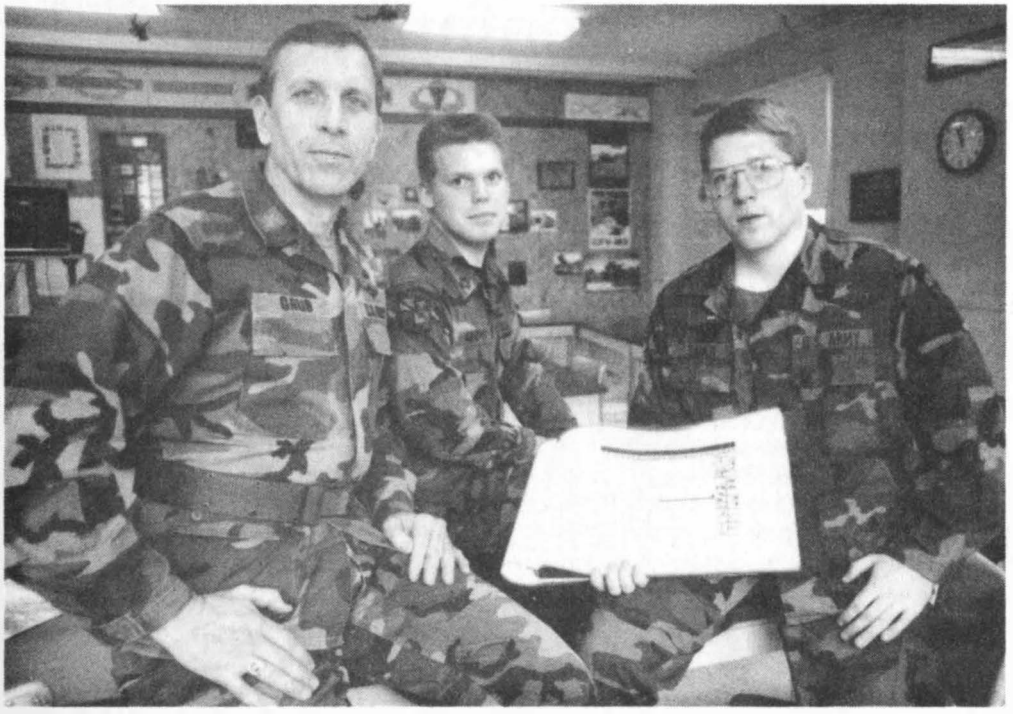
Charles Alexander, presenting "Should You Try for an Advanced Degree?" Alexander is acting dean of the College of Engineering, Computer Sciences and Architecture and professor of electrical engineering at Temple University. He has been consultant to 23 companies and governmental organizations. He was named distinguished professor at Youngstown State University in recognition of outstanding teaching and research.

Jim Morgan, presenting "Trends in the Work Place." Morgan earned bachelor's and master's degrees in electrical engineering from SDSU. He joined Daktronics in 1970 as a graduate student. As manager of the systems division, he has been responsible for incorporating microprocessor and minicomputers into existing company products as well as large systems. Morgan is currently vice president of engineering and is responsible for all custom contract projects and new product design and development.

Valdemar Bodin, presenting "Job Hunting Strategies." Bodin is senior engineer with the Department of Information Technology, which administers the State of Virginia's telecommunications network. Bodin has held many engineering and management positions during a Bell System career from 1945 to 1983. He worked as a consultant with the Electrical Distribution Company of Conshohocken, Penn., and as an associate of Payne-Lendman, Inc., an executive out-placement firm based in Virginia Beach, Va.

Electrical engineering scholarships were awarded at the Spring IEEE/Eta Kappa Nu Banquet. Alexander gave the keynote address. Virgil Ellerbruch, head of the SDSU Department of Electrical Engineering, provided closing remarks.

The conference was sponsored by the SDSU IEEE student branch. Committee members were Todd Schaefer, son of Nilus and Margene Schaefer of Scotland; Dion Johnson, son of Dennis and Fountell Johnson of Canistota; Chuck Richter, son of Charles and Jackie Richter of Colman; Jayme Huber, son of Orville and Julie Huber of Freeman; Lance Day, son of Leslie and Lois Day of Onida; and Ken Timmerman, son of Dennis and Shirley Timmerman of Boyd, Minn.



Major Leroy Gaub, Adam Aberle and Charles Hauck display a computer-aided design from Hauck's internship project with the DASE Army ROTC cooperative program.

ROTC

engineering students completing second half of 26-week internship

. . . their internships showed them how their coursework in college applies in the real world.

Corporations don't have to look any further than South Dakota State University in Brookings to find top-notch engineers. Two Army ROTC students from SDSU's College of Engineering are proving that South Dakota's largest university produces some of the finest engineers in the country.

Charles Hauck of Watertown, a sophomore mechanical engineering major, and Adam Aberle of Sioux Falls, a junior physics and electrical engineering major, are completing the second half of a 26-week DASE (Department of the Army Scientific and Engineering) Army ROTC Cooperative Program. The program is designed to recruit science and engineering students into government service through participation in Army ROTC.

Hauck and Aberle were two of five students selected for the program from a regional competition that included all Army ROTC schools in 19 western states.

Hauck spent 13 weeks last fall and is completing 13 weeks this summer in the Computer Aided Design division of the U.S. Army Tank/Automotive Command in Detroit, Mich., doing engineering drawings of each part of an Armored Personnel Carrier, transferring them to a computer and putting them together.

Aberle spent 13 weeks last fall and is completing 13 weeks this summer working with the Optical Guidance Group at the Army Missile Command in Huntsville, Ala. He works mainly with fiber optic guided missiles and laser detection of flying targets. Much of the work he is involved with is classified.

Both men said their internships showed them how their coursework in college applies in the real world.

"The biggest thing that I realized," Aberle said, "is that there really is a practical application of the things you learn going through the courses here at the university. Down there we did a lot of practical application of physics and electrical engineering."

"It showed me the engineering process," Hauck said. "In school you don't learn the process — what contractors want and then going through and actually doing what they want."

Both Hauck and Aberle are paid salaries based on the number of years of schooling they have completed. The DASE Program pays all their college expenses. In return, the men are obligated for at least eight years in the U.S. Army Reserve or National Guard.

"This is a unique program," said Maj. LeRoy Gaub, liaison officer with Army ROTC and the SDSU College of Engineering. "The openings are very, very limited, but we're always keeping tabs on openings and who is eligible. With both the College of Engineering and Army ROTC at SDSU, we were able to put that opportunity together. It takes both."

The fall performance reports on both students "were really complimentary," Gaub said. "I think we've shown them the quality of students we have."

When he previewed the DASE program, Gaub said he knew the students would be doing something meaningful. And when Duane Sander, dean of the SDSU College of Engineering, reviewed the drawings Hauck had done during his internship, he agreed.

"They're not getting just make work, obviously," Sander said.

Rather than offering a narrowly-focused program, Sander said the SDSU College of Engineering gives students a broad and practical engineering background.

"Students can specialize when they get into graduate school," Sander said. "We've had really good reports coming back from our students going into graduate school. That's no problem for them. And many companies come to SDSU for our graduates because we provide a quality education with emphasis on practical engineering solutions."

Both Hauck and Aberle were looking forward to their return visits this summer, to renew friendships and to return to work they enjoyed.

"The group I was working with was really nice and made me feel at home," Aberle said. "I was a part of it. I wasn't just sitting off in a corner being ignored. And this summer we'll do captive flight testing in other parts of the country."

"I met a few people out there that became my friends," Hauck said, "so I'm anxious to see them again. And just being in a big city, too, is a whole lot different than Brookings. Plus, I enjoyed myself at work. I liked what I was doing. I'm looking forward to going back out there."

Hauck, a 1989 graduate of Watertown High School, is the son of Don and Rosemary Hauck of Watertown. Aberle, a 1989 graduate of Sioux Falls Lincoln High School, is the son of Eugene and LouAnne Aberle of Sioux Falls.

SDSU Arnold Air Society

serves as national headquarters

South Dakota State University's Arnold Air Society was the 1991-1992 national headquarters for the organization. Of the 32 members of the SDSU Arnold Air Society, 21 are from the College of Engineering.

Arnold Air Society is a division of the Air Force ROTC program.

Mike Headley, a computer science major from Brookings, was national commander. He said the experience was highly challenging. "I had the opportunity to be cadet commander at SDSU and was over 75 cadets." he said. "At the national level, I was in charge of 3,200 people. I also had the opportunity to meet several upper level people in the armed forces, like the secretary of the Air Force and several generals who have a lot of influence in the Air Force."

Jeff Klein, an electrical engineering major from Dell Rapids, was national director of operations. He and national public affairs officer, electrical engineering major Scott Koopman of Baltic, were in charge of coordinating a national POW/MIA vigil during Veterans' Day weekend. The vigil involved Arnold Air Society squadrons at nearly 140 colleges and universities. More than 100 television stations and newspapers covered the event, as well as the CBS "Morning News" and "Evening News" programs.

Klein said the experience was very rewarding. "It really helped out my organizational skills, especially working at the national level," he said. "It also helped me to learn how to deal with people a lot more."

The SDSU Arnold Air Society will be the national publications headquarters during the 1992-1993 school year. Computer science major Amy DeBates of Russell, Minn., is the publications commander. She and her staff will be responsible for publishing the *Arnold Air Letter* in the fall and spring.

On the local level, Arnold Air Society members are involved with adaptive aquatics and ADVANCE, an organization for mentally and physically disadvantaged people.

Arnold Air Society National Headquarters for 1991-92. Front: Mike Headley, computer science; Bill Rittershaus, electrical engineering; Doug Daniels, electrical engineering; Beth Nold, math. Back: Andy Muser, mechanical engineering; Jeff Klein, electrical engineering; Amy DeBates, computer science; Justin Boldenow, electrical engineering; Scott Koopman, electrical engineering and Lt. Col. Tony Schafer.

NEWS SHORTS

ASME students attend conference

The American Society of Mechanical Engineering (ASME) students from South Dakota State University attended the ASME Regional Student Conference April 30 and May 1.

Eight students and two advisors participated in the various activities of the conference, which included two major competitions, the Old Guard contest and the Technical Poster contest. The Old Guard contest gives students an opportunity to make oral presentations on their design projects or student section projects. Besides honing their presentation skills, students vie for a chance to participate in the national competition. Jean Vosberg, a junior from Westbrook, Minn., presented her design for a Water Displacement Device.

The technical poster competition, a new event this year, gave students an opportunity to practice their visual presentation skills. Senior Steve Poessnecker of Atkinson, Neb., received second place and a $75 check for his design project "Conceptual Design of an Executive Seven-Seat Long-Range Aircraft." Also, the SDSU student section won an award and a $100 check for the highest percentage of members attending.

Conference participants were also invited to tour Ellsworth Air Force Base to see a KC-135R refuelling tanker aircraft and a B-1B bomber — the highlight of the trip, according to many of the students attending.

Officers for the 1992-93 school year are: Vosberg, president; Don Horkey of Heron Lake, Minn., vice president; Kristi Podzimek of Armour, secretary; and Poessnecker, treasurer.

ASCE—American Society of Civil Engineers

Faculty adviser for ASCE is Chuck Tiltrum.
President is Nathen Will of Brewster, Minn.
Vice president is Jeff Wessels of Brookings.
Secretary is Kevin Heiman of Bridgewater.
Treasurer is Kristi Williams of Trent.
Membership Chairman is Brad Sudbeck of Dimock.
Corresponding Secretary is John Ladson of Spearfish.

Sigma Pi Sigma Physics Society Members

The advisors for the society are Teresa and Warren Hein.

Members are Adam Aberle of Sioux Falls; Terry Ackerman of Eureka; James Barnett of Aberdeen; Dallas Bridges of Spearfish; Melissa Christie of Bruce; Lishi Chu of Brookings; Jeff Clauson of Brookings; Hyoung Jin Kim of Brookings; Loren Knutson of Platte; Todd Marzinske of Janesville, Minn.; Eric Moser of Lake Preston; Michele Neyers of Redwood Falls, Minn.; Corey Plender of Brookings; Gary Rezek of Brookings; Bill Rittershaus of Brookings; Weixing Shen of Brookings; Michael Stoos of Lemars, Iowa; and Thomas Tien of Brookings.

Pi Tau Sigma

Faculty adviser for Pi Tau Sigma is Hassan Ghazi.
President is Mark Glissman of Brookings.
Vice president is Reed Mc Kee of Sioux Falls.
Secretary is Becky Sterzinger of Ivanhoe, Minn.

Other students involved are: Terry Ackerman of Eureka; Blake Anderson of Sioux Falls; Michael Benning of Madison; David De Smet of Cottonwood, Minn.; Yasmine Ghazi of Brookings; Rick Heirigs of Menno; Jay Hulscher of Artas; Brian Mundt of Agar; Jodi Muntefering of Tripp; Kristina Podzimek of Armour; Steven Poessnecker of Atkinson, Neb.; Galen Streich of Ortonville, Minn.; Chad Teply of Elk Point; and Jean Vosberg of Westbrook, Minn.

Chi Epsilon—Civil Engineering

Faculty adviser of Chi Epsilon is Paul Koepsell.
President is Del Poppinga of Lennox.
Vice president is Joe Duncan of Ivanhoe, Minn.
Secretary/treasurer is Jeff Kortan of Tabor.
Marshall/editor is Peter Longman of Willmar, Minn.

Students involved in Chi Epsilon are: Nathen Will of Brewster, Minn.; Kris Baum of Brandon; Donald Duncan II of Ivanhoe, Minn.; Patrick Sigl of Brookings; Ann Teply of Tyndall; David Bentler of Glenwood, Minn.; Darren Hartman of Tripp; Brent Anderson of Elkton; Steven Gramm of Sioux Falls; Nicole Archer of Brookings; Bradley Letcher of Mitchell; William Lohr of Brookings; Mark Cotter of Colton, Patrick Schwebach of Sioux Falls; Gregory Rothschadl of Tyndall; Kevin Carlson of Lake Preston; Scott Servis of Sloan, Iowa; Jerry Stevens of Worthing; and Timothy Wicks of Custer.

Six send mathletes to 1992 MATHCOUNTS

Seventh and eighth graders from Brookings, Aberdeen, De Smet, Elkton, Roslyn and Volga competed at SDSU Feb. 15 in the Southeast Chapter MATHCOUNTS, organized by the

South Dakota Engineering Society. The program consists of written tests and fast-paced oral matches.

Physics Bowl attracts 17 high school teams

The 18th annual Physics Bowl attracted 17 high school teams from around the state to SDSU April 2. The event, set up in quiz bowl format, gives students a chance to answer questions on physics concepts, history, identification of scientists, estimations and other physics areas. The bowl is held in conjunction with the Eastern South Dakota Science and Engineering Fair.

Competing concrete canoes

South Dakota State University ASCE members grabbed high award honors during the ASCE Midwest Regional Concrete Canoe Competition March 28 in Ames, Iowa.

John Ladson of Spearfish and Kenny Pietz of Parker took first in the mens' sprint while Joy Cordier of Allen and Kristi Williams of Trent placed second in the women's race. Despite a day of rain, SDSU placed third overall.

Competition requirements included a paper and presentation on the canoe, aesthetic merit and four race divisions.

Chairpersons of the SDSU concrete canoe were Kevin Heiman of Bridgewater and Ladson.

Bridging the gap

The 18-member SDSU team placed third at the steel bridge contest during the American Society of Civil Engineers Midwest Regional Conference at the University of Wisconsin at Platteville Feb. 27-29. The contest advances the construction of stronger yet lighter bridges. Chairing the SDSU team were Nathen Will of Brewter, Minn. and Mark Cotter of Colton.

Negative tests mean positive news for Paulos

Negative tests are positive news for an SDSU graduate diagnosed with cancer.

Paulos Mebrahtu, who received his master's in physics in December 1991, was diagnosed with chronic myelocytic leukemia in spring 1991. His sister, Azeb, donated bone marrow for a transplant in January. She travelled from their home country of Eritrea, which recently became independent from Ethiopia, Africa.

Mebrahtu said a recent bone marrow biopsy and skin test show the transplant is working well. He is out of the hospital, but still has a catheter in his chest so doctors can give him medicine and take blood samples.

His strength is growing, but he needs assistance, so Azeb stays with him. Doctors said it will take at least a year for Mebrahtu to fully regain his strength. But he is optimistic that he will be able to go school in the fall to start working on his doctorate.

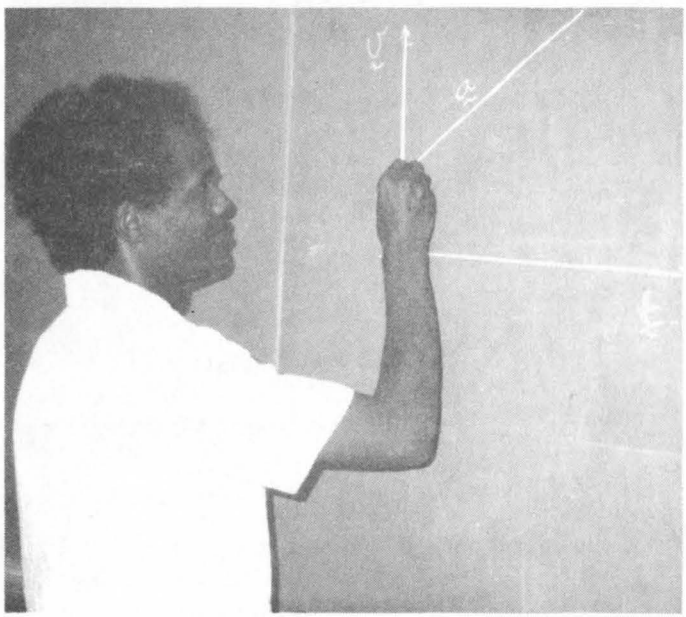
"My long-range plan is to stay here in the United States and work so I can help people and pay back those who've helped me," Mebrahtu said. He is grateful to all who have written and supported him, especially those in Brookings.

Others across the country have also pitched in to help Mebrahtu. University students in Corvalis, Ore., organized a blood drive and asked African students to volunteer as potential bone marow donors.

SDSU physics instructor Teresa Hein said, "The work that is being done is not only for Paulos, but for other people who might benefit from the path he's paved."

Mebrahtu is well enough now to write back to people who send him letters. His new address is:

Paulos Mebrahtu
% Simon Tewolde
1075 S. Jefferson St. #206
Arlington, Va. 22204



College of Engineering alumnus recasts 'movie stars' to SDSU

"I'm always interested in seeing if there's something I can take advantage of out here to benefit the College of Engineering or South Dakota State."

They're movie stars, of sorts, and they've been recast in new roles in the SDSU College of Engineering.

Meet Enterprise, Thag and Thor, three data acquisition and analysis workstations that were donated to the College by Ford Motor Company. The donation is due to the efforts of Don Ufford, who graduated from SDSU with an agricultural engineering degree in 1987. He went on to earn a mechanical engineering degree from Purdue in 1989 and has been a research engineer with Ford Motor Company in Dearborn, Mich., ever since.

Enterprise, Thag and Thor starred in a national television commercial with Bill Cosby in 1981, when Ford introduced the Taurus as an acoustically quiet car. In the commercial, Cosby introduced the machines by name.

"He got up and said, 'My friends at Ford Motor Company are helping us design better vehicles,'" Ufford said. "It was done to promote high technology implementation in vehicles and to attach the importance engineering has in vehicles."

The workstations are combination hardware/software packages worth well over $300,000. They will serve many purposes in various departments of the SDSU College of Engineering, said Don Froehlich, professor and head of the Mechanical Engineering Department at SDSU.

"It's a great thing for us," Froehlich said. "They'll be used as vibration sensors and acoustics sensors by faculty in several departments. We'll make extensive use of these units for class instruction and research projects involving vibration concerns and fracture and damage mechanics of systems and components."

Ufford said that Ford eventually bought replacement equipment and Enterprise, Thag and Thor found themselves headed into storage.

"I thought, 'That's a crying shame. I know a place we can utilize them,'" he said.

So Ufford got the ball rolling. His request instigated a corporate-wide change in Ford's depreciation schedule, a process that took time. But a year later, the good deed was done and Enterprise, Thag and Thor arrived at their new home in the SDSU College of Engineering in May.

"I'm always interested in seeing if there's something I can take advantage of out here to benefit the College of Engineering or South Dakota State," Ufford said. "I'm trying to foster as many ties as I can. I'd like to see additional opportunities anyone else has directed to the school."

The Hewlett-Packard 5451C Fourier Analyzers solve measurement problems in mechanical vibration analysis, signature and modal analysis, acoustics, control systems analysis, communications and more.

Hamid Hamidzadeh, professor of mechanical engineering and Neddy Sawaya, graduate teaching assistant for mechnical engineering, stand in front of the Hewlett-Packard 5451C Fourier data acquisition and analysis workstations from the Ford Motor Company.

Space Grant Consortium awards scholarships, fellowships

The South Dakota Space Grant Consortium at SDSU awarded a 1992 summer faculty fellowship at EROS Data Center, two $6,000 graduate fellowships and 10 $1,000 scholarships for the 1992-93 academic year.

The Space Grant Consortium, composed of SDSU, the South Dakota School of Mines and Technology and EROS Data Center, is in the second year of a four-year grant from NASA with matching monies from the South Dakota Future Fund. Its goals are enhancing aerospace capabilities within South Dakota and creating links between business, government and higher education.

Educational outreach to promote studies in the science and mathematics fields on the college, secondary and elementary levels is a major goal for the consortium. It is administered at SDSU by the Engineering and Environmental Research Center (EERC) in the College of Engineering.

John Miller, an assistant professor in graphic design, was assigned for 10 weeks at EROS Data Center to work with staff to develop user interfaces for use by EROS. He also consulted in the areas of video animation and multidimensional visualization. Miller said relating areas of research such as graphic design to aerospace-related fields opens up career opportunities for many students at SDSU.

Miller has worked extensively in the graphic design field as a computer animator, designer and programmer. He has received numerous national awards for his work.

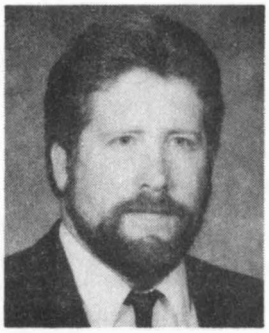
Gregg Price of Brookings and Brian Steward of Chelsea were each awarded $6,000 fellowships by the Space Grant Consortium. Both students are working on master's degrees in electrical engineering. The fellowships are given to encourage studies related to aerospace fields and encourage students to identify ways to enhance aerospace capability in the state.

Price, a 1985 graduate of SDSU with a bachelor's degree in electrical engineering, is focusing his graduate studies on the development of Application Specific Integrated Circuits, which may resolve certain deficiencies present in older design processes. He is also a research assistant at the EERC.

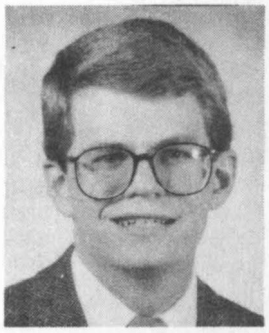
Steward, a 1989 graduate of SDSU with a bachelor's degree in electrical engineering, worked for Raven Industries in Sioux Falls and continues to work part time there. Steward is a teaching assistant at SDSU and hopes to pursue a doctoral degree and teach at the university level.

Ten SDSU upperclassmen were selected to receive the $1,000 Space Grant Scholarship awards for 1992-93. They are Eric Gengler, electrical engineering major from Adrian, Minn.; Tricia Gillen, mathematics and computer science major from Jasper, Minn.; Timothy Jensen, electrical engineering major from Sioux Falls; Brian Miller, mechanical engineering major from Pierre; Andrew Muser, mechanical engineering major from DeSmet; Jason Otto, mechanical engineering major from Sioux Falls; Kristi Podzimek, mechanical engineering major from Armour; Michael Rechtenbaugh, electronic engineering major from Salem; Michael Stoos, electrical engineering/ engineering physics major from LeMars, Iowa; and Minna Vainikka, computer science major from Brookings.

John Miller



Gregg Price



Brian Steward

Consortium focuses on outreach in second year

The South Dakota Space Grant Consortium (SDSGC) is focusing on education outreach during its second year.

An Aviation Career Education Academy is being co-sponsored by the SDSGC July 19 through 24 on the SDSU campus in Brookings, with field trips to aviation-related businesses in Sioux Falls. The camp will offer 30 high school students an opportunity to learn about careers in aerospace and aviation areas. The Federal Aviation Administration and South Dakota Office of Aeronautics are providing partial funding for the academy.

The SGC conducted an aerospace capability study during its first year, contacting industries, universities and government in South Dakota to assess existing aerospace activity. The study, which also lists NASA contacts for contracting and information, is available for review from the Space Grant Consortium office, Harding Hall 228, Box 2220, SDSU, Brookings, SD 57007-2220.

Efforts to conduct outreach at SDSU and the South Dakota School of Mines and Technology are under way. Promoting interest in science and math fields in general, as well as aerospace careers specifically, is the goal. The outreach efforts will include sending faculty to area schools to make presentations on science and to create enthusiasm for the study of science and mathematics.

Ninth annual phonathon surpasses $100,000 goal

The ninth annual fundraising phonathon conducted by the SDSU College of Engineering Feb. 17 through 21 was a resounding success, exceeding its goal of $100,000.

Teresa Hein, faculty chairman for the phonathon, said the money will be used to buy computer materials and lab equipment and to fund projects in the various College of Engineering departments. "All alumni were sent individual letters before the phonathon that listed in detail the goals of each department," she said.

Students manned phones in the basement of Pierson Hall for five days. Hein said it's difficult to estimate exactly how many students made up the phonathon crew.

"When you take 52 phones at two shifts a day for five days, that's 500 bodies," Hein said. "Granted, a lot of them repeated shifts, but it's 500 bodies. And that's not counting the people involved in setting it up."

The phonathon is organized by a committee of students and faculty members from each department in SDSU's College of Engineering. Carmon Dunn of Hartford was student chairman for the 1992 phonathon. Student committee members were: Casey Berg of Fairmont, Minn.; Rob Cameron of Sioux Falls; Judie Chen of Brookings; Joy Cordier of Allen; Lance Day of Onida; Jamie Devine of Brookings; Steve Fink of Mitchell; Jeff Fondy of Anchorage, Alaska; Eric Gengler of Adrian, Minn.; Roxie Harms of Milbank; Paula Heitzman of White Bear Lake, Minn.; Prashobh Karunakaran of Brookings; Cindy Lambing of Willmar, Minn.; Kristi Podzimek of Armour; Scott Servis of Sloan, Iowa; Dustin Simonson of Rapid City; Mike Twedt of Mitchell; Scott Vander Heiden of Mitchell; and Jean Vosberg of Westbrook, Minn.

Hein has been faculty chair of the phonathon for the past five years. Faculty committee members were: Jerry Bergum, Tom Drackley, Byron Garry, Hamid Hamidzadeh, Dan Humburg, Dan Kemp and Chuck Tiltrum.

Once the five days of calling were over, the phonathon work didn't end. The phone lines were simply transferred to the University Foundation.

"When we finished the end of the five days, we hired the Foundation office to do follow-up calls," Hein said. "That's why it went over $100,000. Money is still coming in."

The College of Engineering raised more than $90,000 during the 1991 phonathon.

Mechanical engineering alumnus shares diverse aeronautics experience

Have you ever telephoned overseas? Watched a live broadcast from across the country? Seen satellite weather maps? It's just possible that one of the many communication links you've received have been a result of Merland Moseson's notable career in aeronautical engineering.

Moseson, who has been a part of 200 unmanned satellite launches at Goddard Space Flight Center in Maryland, was born in Howard on Dec. 11, 1920. As a child, he had wanted to be a pilot and was interested in airplanes. Unfortunately, his childhood dream was shattered when an early accident caused him to lose his vision in one eye.

That didn't stop Moseson from pursuing the mystery of flight.

"Try to get as much experience as you can and do your homework. You'll need it later to have a thorough understanding of the subject."

"I was always interested in machines, so I started to get into more of the research and development viewpoint (of aeronautics)," he said.

He graduated from South Dakota State in 1943 in mechanical engineering and taught at SDSU for two academic years.

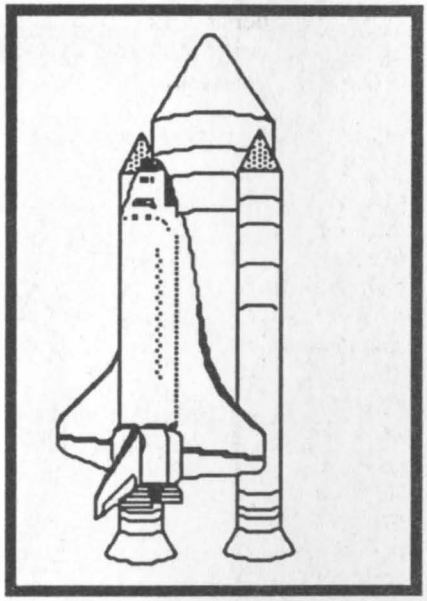
Moseson next worked for the National Advisory Committee for Aeronautics' (NACA) engine research laboratory in Cleveland. His job was to "debug" World War II piston engines for fighter and bomber aircraft.

During this time, Moseson went to night school to begin his masters in aeronautical engineering at the Case Institute of Technology in Cleveland. Moseson earned his masters in 1950.

Near the end of WWII, Moseson's lab began to design jet propulsion aircraft. Moseson said the United States had neglected work in creating jet propelled aircraft. (Jet propulsion has a power plant with no propeller. The jet itself gives the thrust to fly with, he said.) Already the Germans and British during WWII had jet planes, including the early model I-40s and J-47s.

Moseson said he was fully prepared to work the rest of his life in jet propulsion. He would take the research results from different divisions, such as the combustion section, and bring it together into a single experimental design.

His long-term plans were stopped short by



the Russians' launch of the satellite Sputnik. Moseson's next assignment: to "catch-up" the Americans in the space program.

In 1959, Moseson, along with seven others in his group, was transferred to Goddard Space Flight Center in Maryland. The group became part of the Spacecrafts Systems Branch when NACA and several other aeronautical agencies officially became NASA.

This branch had one launch vehicle program, the Delta Launch Vehicle, which was the workhorse for five spacecraft: the scientific satellite observatory, the orbiting astronomical observatory, the geophysical observatory, the solar observatory and the advanced solar observatory. Moseson said these spacecraft were not large for their day.

Unlike his prior in-house work experience, the work load at the Goddard Space Flight Center was extremely large. Consequently, most of the projects were constructed by outside contractors in the aerospace industry rather than in-house. Moseson said it was not uncommon for there to be 20 flight-orbital programs happening at once.

In 1981, Moseson became an aerospace consultant for private companies and the military. With eight to 14 other people, he performed flight-readiness reviews, which included analyzing the design and performance system and operational testing. Moseson would then write a final report for the company on the results.

Most of the consulting Moseson performs is exclusively for companies that deal with large communication satellites, he said. These satellites are built by U.S. industries and sold to Japanese companies or government.

Students and graduates need to keep up on upcoming technology. Also, English skills allow engineers to communicate effectively.

Although Moseson is "working on retiring," he still performs occasional consulting work.

"The phone rings and I go back to work," he said. Moseson currently recruits aerospace consultants for a firm in California.

To be successful in any engineering field, Moseson said students and graduates need to keep up on upcoming technology. Also, English skills allow engineers to communicate effectively.

"It (English) is a weakness in my field and it is difficult for many engineers," Moseson said. "Ultimately, engineers need to write reports succinctly, clearly and correctly."

To young mechanical engineers, he advises: "Try to get as much experience as you can and do your homework. You'll need it later to have a thorough understanding of the subject."

Ticket to "see the world"

For Bruce native Larry Rudebusch, a degree in civil engineering was his ticket to "see the world."

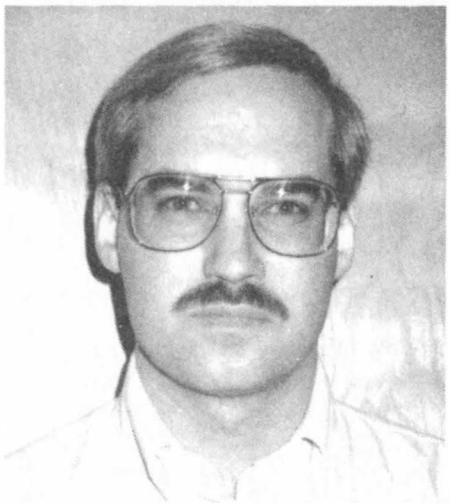
Following his December 1983 graduation from SDSU, he began his career as a construction project engineer with the Morrison Knudsen Corporation in Boise, Idaho. His first trip outside the country was Cairo, Egypt, where he spent two years on a water resources project.

He worked at the company's headquarters in Boise for a year and moved to one of the major regional offices in Cleveland, Ohio, and was there for two years.

Subsequent trips found him traveling to various locations throughout the United States and Europe.

In April of 1987 he moved to Watertown, N.Y., to work on the construction of a new Army base at Fort Drum. This $517 million project was under construction for three and one-half years, and he spent the first two and one-half years in the cost and scheduling department.

In July 1989 he moved to Valdez, Alaska, where he worked on an oil terminal project near Valdez, where oil from the Alaska Pipeline is loaded into the tankers heading for California. A consortium of companies own shares of the oil fields and pipeline, he said, and each company has its own loading terminal.



Larry Rudebusch

When this job was completed in February of 1990, he spent the rest of the year in Boise working as an estimator, getting bid documents from company owners, handling price estimates of costs and submitting bids.

In November of 1990 the company sent him to Hungary to work at an automobile factory for General Motors, where he served as a consultant, advising the owners on concurrent design and construction of the plant. "This requires more cooperation and communications when both design and construction are going on at the same time," he said.

He was in Hungary for 13 months before returning to the United States for a visit to South Dakota earlier this year. He is now in Saudi Arabia for at least a two-year period.

Rudebusch advises beginning civil engineering students at SDSU to "get a well-rounded technical education and get the most of the general base of knowledge here." He added that the industry is so diverse, and the College of Engineering offers an excellent base for engineering professions.

Rudebusch is the son of Melvin and Darlean Rudebusch, who farm east of Bruce.

Tolstedt doubles as cartoonist

Jonathan Tolstedt, a 1988 SDSU electrical engineering graduate, not only uses his engineering knowledge, but his artistic talents, as well.

Tolstedt works at Rockwell in Cedar Rapids, Iowa. He is one of two chief software engineers who are designing and implementing the software for the three Standby Indicators for the new Boeing 777 airplane. He also draws cartoons, like the one shown, for the company newsletter.

SDSU grad, students design computer chips

State-of-the-art computer chips are being designed by a South Dakota State University graduate and his students.

Marwan Hassoun, who received his bachelor of science degree in electrical engineering from SDSU in 1983 and his masters and doctoral degrees from Purdue University in 1984 and 1988, is an assistant professor at Iowa State University. He developed a laboratory which uses Very Large Scale Integration (VLSI) technology to design computer chips with the capability of 100,000 transistors per chip. However, he said the designs typically include between 5,000 and 30,000 transistors.

The advantage of these chips, according to Hassoun, is that they can hold more information and process data at much higher speeds than regular chips.

Hassoun was the only professor in the VSLI program when he started it at Iowa State in the spring of 1989. Due to the success of the program, four newly hired professors will be involved by the fall semester. So far, five masters and one doctoral student have graduated from the VSLI program.

Students who have this training have a tremendous advantage, Hassoun said. "It gives them expertise and training. VLSI is state-of-the-art, so a lot of companies are interested in people with this expertise. Students also get training in CAD (Computer Aided Design) tools and in VLSI hardware design."

Currently, Hassoun is working on acquiring the capability to design Ultra Large Scale Integration (ULSI). He said ULSI would allow over 100,000 transistors per chip. Another of his goals is to increase the number of workstations from 15 to 30.

Hassoun's father, M. Nadim Hassoun, is a professor of civil engineering at SDSU.

Alumni, faculty gather at Burns & McDonnell

South Dakota State University faculty gathered with SDSU alumni employed with Burns & McDonnell Engineers, Architects and Consultants during a visit to the Kansas City, Mo., company in March.

Newton Campbell, Chairman of the Board and Chief Executive Officer for Burns & McDonnell, said in a letter to SDSU College of Engineering Dean Duane Sander:

"We were very pleased to have you and the members of your staff visit us here on March 13. It was a pleasure to get acquainted with you folks. You should be very proud of your graduates' performance here at Burns & McDonnell. We look forward to our continuing association with the fine engineering school at SDSU and encourage you to keep up the great work that you are doing at Brookings."

Pictured are, left to right, back row: John Riley, Burns & McDonnell vice president; Orin Quist, SDSU Department of Engineering Physics; Peter Quist, BSME '90; Mark Warnock, BSEE '91; Gene Sieve, BSME '90; Dan Niehus, BSCE '89; Delvin DeBoer, SDSU Department of Civil Engineering; Larry Hanson, BSME '85; Joel Cerwick, Burns & McDonnell vice president; middle row: Ronald Jenssen, BSCE '85; Steve Ashton, BSCE '91; Connie Ingle, BSEE '90; Tom Haensel, BSEE '91; Jeff White, BSEE '91; Greg Wirt, BSME '82; Dave Christianson, BSEP '72; Darrell Hosler, Burns & McDonnell executive vice president; front row: Robert Neath, BSCE '90; Newton Campbell, Burns & McDonnell Chief Executive Officer; Duane Sander, SDSU College of Engineering dean; Wayne Knabach, SDSU Department of Electrical Engineering; Sue Mabee, BSEE '78; John Knofczynski, BSEE '87; Clayton Knofczynski, SDSU Department of Mechanical Engineering; and Dave Ruf, Burns & McDonnell president. Not pictured is Mark Menke, BSME '81.

Hartford named president of company

A 1976 mechanical engineering graduate of South Dakota State University was elected president of a Fargo, N.D., firm.

Gerald Hartford Jr. is president of Henning, Metz, Hartford and Associates Inc., a consulting mechanical engineering firm. The firm designs the plumbing, heating, ventilating, air conditioning, fire protection and control systems for commercial, institutional, industrial, educational and governmental buildings.

Hartford has been an owner of the firm for six years and has been in private practice mechanical engineering for 16 years. His company has been in private practice mechanical engineering in Fargo for 35 years.

Rick Benson receives Interior award

A South Dakota State University graduate received the third highest award given by the U.S. Department of Interior.

Rick Benson, a hydrologist with the South Dakota District of the U.S. Geological Survey office in Huron, was presented with the Superior Service Award. He was recognized for his "exceptional professional reputation in the Bureau of Reclamation and the Garrison Diversion Unit Commission as well as through the reports authored or co-authored describing the ground and surface-water hydrology of the James River Basin in South and North Dakota."

Benson received a certificate, lapel pin and letter from the U.S. Department of Interior.

He has been working with the survey office since 1981 and is also the district reports specialist for South Dakota and Minnesota. He graduated from SDSU in 1969 with a bachelor's degree and in 1970 with a master's degree, both in civil engineering.

NOTES

Gary Nelsen '59 and Janet (Pfeiffer) Nelsen '61 live in Belmont, Calif., where Gary is a test pilot for United Airlines. He also accredits all of the new 747-400 from Boeing, continues to fly overhaul flights and evaluates aircraft to put them back into service. Gary writes: "Flying from London, Tokyo, Bangkok or Hong Kong is almost routine."

Vance L. Kohl '60 ended a 30-year engineering career in 1990 when he bought a golf course and supper club. He lives in Ladysmith, Wisc., and wrote that he "loves northern Wisconsin."

Roger L. Jones '65 has a son who graduated from Texas A&M and a daughter with one year left there. Jones lives in Irving, Tex., where he is a sales manager for computer systems for the Hewlett-Packard Company.

Thomas Moshier '65 has three children in college this year. His daughter, Robin, is a senior at Western Washington University, studying environmental engineering. His twin sons, Thomas and Tavis, are freshmen at the University of Alaska at Fairbanks, studying mechanical engineering. Moshier has worked on submarines for the U.S. Navy for 27 years. He lives in Poulsbo, Wash., and is employed by Trident Refit Facility.

LaVene R. Brenden '70-71 and Vivian J. Brenden '69 live in Salina, Kan., where LaVene is director of municipal services for Wilson and Company, Engineers and Architects and Vivian is financial secretary for First Presbyterian Church of Salina.

Steven K. Jones '86 is working as an electrical engineer and technician for Compu Voice in Sioux Falls.

Jon Puetz, BSEE '87, a safety consultant and electrical engineer with the OSHA On-Site Consultation program for South Dakota, presented training sessions on two of the newest OSHA regulations affecting the private employer: control of hazardous energy and working with live electrical energy. The seminars, sponsored by Engineering Extension (formerly STATE), were presented in February in Sioux Falls, Rapid City, Brookings and Aberdeen.

Corrections to Winter 1992 Impulse

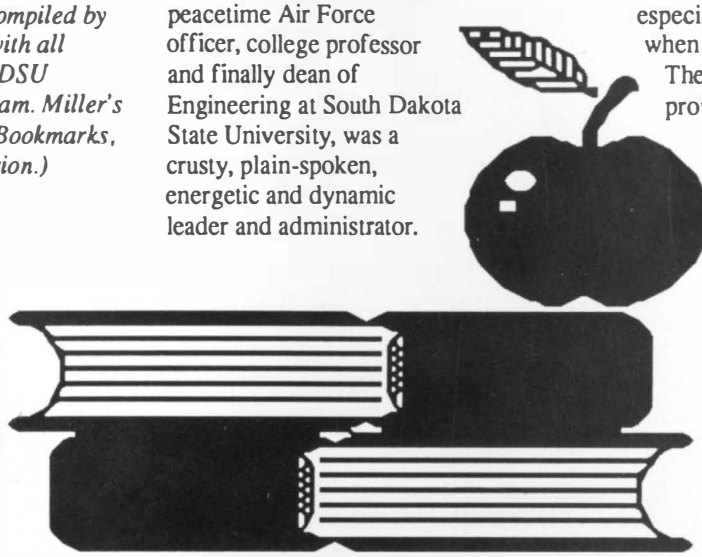
While at Courage Center, Don Maurer quality tested German TENS devices at night in his basement for a friend from graduate school. He saw many areas for improvement and expansion and designed his own TENS device. With $500,000 from investors in 1979, he began to expand his operation through product development and went public in 1980 with a company stock offering. The company experienced a 29 percent growth in net sales from 1989 to 1990 and a 93 percent increase in net income during that period.

BOOK REVIEW

"Write Me A Poem, Ernie!"

(EDITOR'S NOTE: Following is a book review written by SDSU History Professor John Miller about "Write Me A Poem, Ernie!", a collection of poems written by the late Ernest Buckley, former dean of the SDSU College of Engineering. The book was compiled by his wife, Betty Bob Buckley, with all proceeds designated for the SDSU College of Engineering program. Miller's review, recently published in Bookmarks, is reprinted here with permission.)

There was a time, not so long ago, when poetry was an integral part of our lives. We read it and memorized it at school; it appeared constantly in newspapers and magazines; it was recited at Memorial Day ceremonies, Christmas parties and at other communal events; and it fed our psychic lives — challenging us, sustaining us, reassuring us and entertaining us.



Admittedly, a lot of the old stuff was bad, but it was human, and it communicated — touching our lives at their most precious and vulnerable points.

Ernie Buckley's poetry may not match Whitman's or Eliot's, but it touches a human chord. The memories it echoes are the themes of daily life in one family. For the writer, his family was his most precious possession, and they provided most of the occasions for what probably was, to most of his friends, an unknown dimension of the man — his poetic side.

In this volume, Betty Bob Buckley has collected her husband's poetry, written over the years, and included drawings that he did to illustrate them. It was she who inspired him to begin writing when she said, "Write me a poem, Ernie," and over the years he frequently responded — on birthdays, anniversaries, Mother's Day, Christmas, at commencement ceremonies, or when the kids were acting up.

Ernest Buckley, born in Lemmon in 1924, was a South Dakotan through and through. This engineer, World War II bombadier, peacetime Air Force officer, college professor and finally dean of Engineering at South Dakota State University, was a crusty, plain-spoken, energetic and dynamic leader and administrator.

He was also, in his spare time, a poet.

There is little free verse here; this poetry was made to rhyme. Meter varies frequently, as does length. Buckley is more interested in the thought than in the style. If a line has more or fewer syllables than the reader might expect, she shouldn't be surprised.

You get to know a lot about wife Betty Bob and their daughter Betty Lynn, especially during her beauty pageant days when the family was living in Fort Worth. The three boys who came along later provide fewer occasions for poems.

The first offering in the book — "My Favorite" — is about the four children who meant so much to the author, all in their separate ways. It concludes in typical Ernie fashion: "So, which of these, my children, Is really my favorite one? My daughter, so sweet and delightful? Or one of my strapping sons? The answer is obvious, if one should read this, And you may believe it's true, Of all my blessed children, The favored one is you."

Read this book if you like to meet real people, if you like to smile, if you prefer beauty to ugliness, if you think affirmation is worth a poem.

I would like to purchase _____ copies of *"Write Me A Poem, Ernie!"*, the proceeds go to SDSU College of Engineering Scholarship Program.

Boxed and Mailed Book $18.45

Name_____

Address _____

City _____ State _____ Zip _____

Enclosed $ _____

Mail to: College of Engineering
South Dakota State University
P.O. Box 2219
Brookings, SD 57007

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