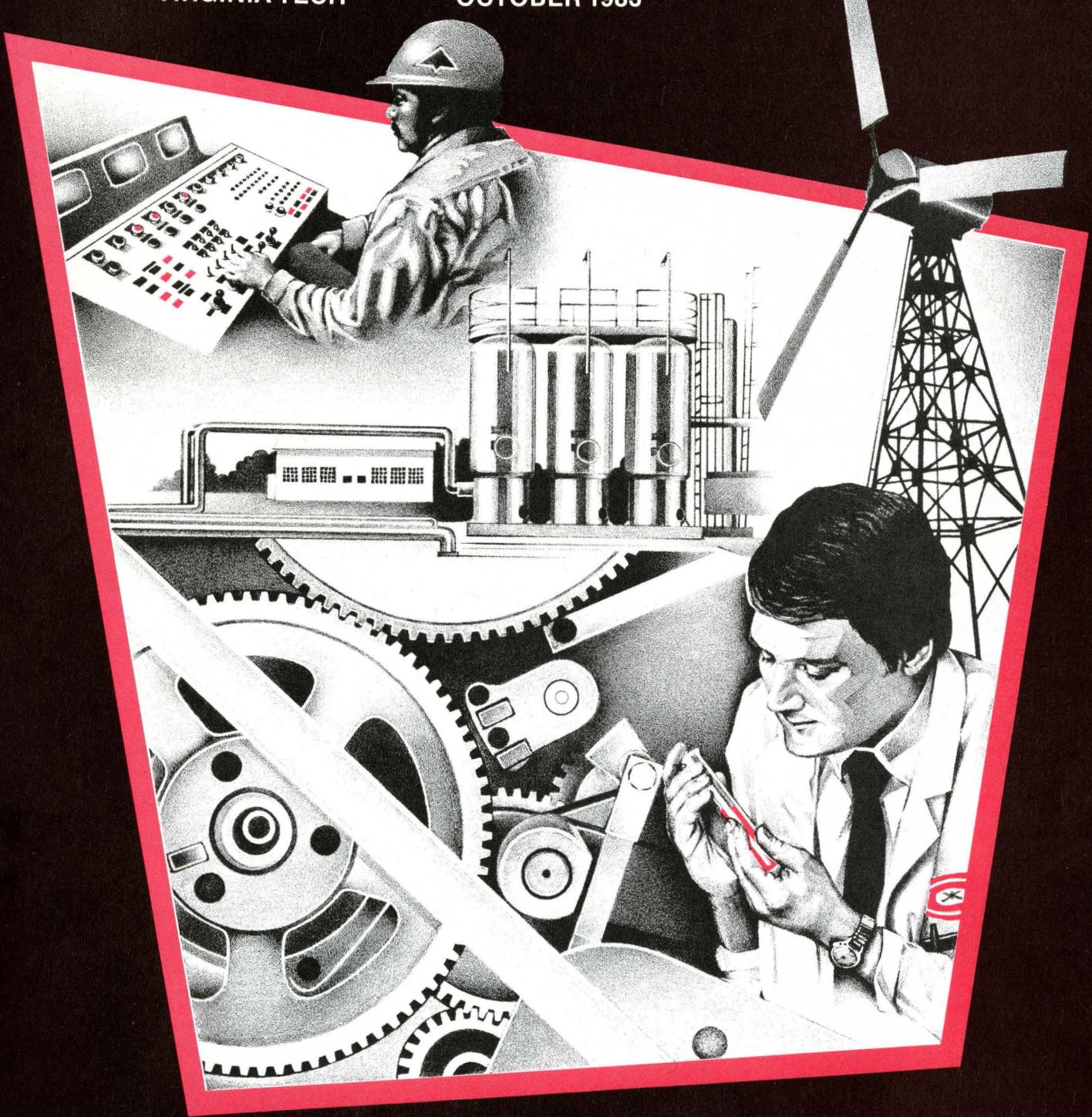


Engineers' Forum

VIRGINIA TECH

OCTOBER 1983



EXPO'83

A TECHNOLOGY SHOWCASE

OCT. 12th FROM 12:00 NOON TO 5:00 PM

OCT. 13th FROM 9:00 AM TO 5:00 PM

by Greg Fountaine

This fall the highlight is EXPO 83 — the fourth annual technology showcase sponsored by the Student Engineers' Council. EXPO 83 is October 12 and 13 in Squires Student Center. Over 60 high-tech companies will have displays and presentations representing the forefront of science and technology.

Planning for EXPO 83 began last spring with the contacting of over 100 prospective companies such as Texas Instruments, Procter & Gamble, Monsanto, Newport News Shipbuilding, and General Motors. Companies attending this year represent large and small firms, government and private industry, consultants and huge corporations. The intrigue of EXPO is due to the shear diversity of the participants. Within an hour a student can easily speak to a view displays of companies using all the engineering and technical majors offered at Virginia Tech. EXPO offers companies the opportunity to meet a large number of technical, as well as non-technical students. EXPO provides a forum for students to discover employment prospects both in their field and in industries outside their discipline. For instance, a mechanical engineering student might be surprised to discover that a big electronics firm like IBM has an exciting job to offer.

The company displays are nothing less than awesome. Last year, General Electric brought an 8 foot, 2000 lb. power plant control panel and showed students how it worked. Hewlett-Packard drew three dimensional color graphics on their latest graphic X-T Plotter. Ashland Oil brought a scale model of its entire oil refinery.

These are the things that attracted over 5000 students to EXPO last year. This year EXPO 83 will be bigger and better; we hope to see you there.



Engineers' Forum

October, 1983
Volume 2, Number 1

THE ENGINEERING PROFESSIONAL'S DUAL CHALLENGE

by Dr. Daniel Pletta

4

PERMANENT PRESENCE

by Mark Moran

6

SEC SUPERSTARS

Pictorial

12

FOR SENIORS ONLY

by Eileen Lynch

17

SPORN AWARD 1983

by Andra Yanchenko
and Mark Moran

19

THE HOEHN PROJECT

by Michael West

20

THE EDITOR'S PAGE

2

FACULTY PROFILE

10

CROSSWORD PUZZLE

23

COMIC

24

Editor-in-Chief: Andra Yanchenko; Production Editor: Michael Dietrich; Copy Editor: Mark Moran; Photography Editor: Nathnael Gebreyes; Business Manager: Tom Lubnow; Advisor: Lynn Nystrom; Treasurer: Rajiv Thareja; Staff: Nancy Mauer, Michael West, Debby Matthews, Tim Mullins, Amy Dare, Kurt Yanchenko, Eileen Lynch, Scott Clark, Greg Klunder, Janet Hein, Ann Raridon, Bill Nelson, Greg Fontaine, Mike Yager; Special Thanks: Daniel Pletta.

ENGINEERS' FORUM is published three times during the academic year by the students at Virginia Tech in association with the Student Engineers' Council. Editorial and business office located in 2 Randolph Hall, Virginia Polytechnic Institute and State University, Blacksburg, Va. 24061. Advertising by Littel-Murray-Barnhill, Inc., 1328 Broadway, New York, N.Y. 10001.

The opinions expressed in the ENGINEERS' FORUM do not necessarily reflect those of the administration, faculty or student body of Virginia Tech.

The Editor's Page

Welcome Freshmen and Transfers



Congratulations and welcome to the College of Engineering here at VA TECH. This article is for all first time students at VA TECH, whether you're a freshman or a transfer student.

As a new student you will undoubtedly need to make changes and adjust to your new environment. I recently talked with first year and transfer students and this is the advice they offer.

ACADEMIC YEAR

VA TECH operates on the quarter system. For many freshman this is not too different from the system used in high school. For students transferring from other colleges on the semester system, you will need to do some adjusting to the new academic calendar.

The actual academic year at VA TECH consists of three 10-week quarters and two 5-week summer sessions. For those of you transferring from a semester system, remember a quarter is five weeks shorter than a semester. Although the quarter system offers ten week courses, a great deal of material is covered in some detail. Generally, there are two to three examinations per class per quarter and one final examination at the end of the ten week period.

Most engineering students carry 12-17 credits a quarter. This will vary

depending on the engineering curriculum and the courses you need to complete your degree requirements.

ACTIVITIES

There are numerous activities available to all engineering students both inside and outside of the College of Engineering. Make an effort to participate in some of these activities. Extra-curricular activities make it possible to meet other students and faculty. Not only are there social benefits to be gained from participation in the various organizations, but also professional benefits. Many companies and potential employers look favorably on participation in college activities.

Some of the engineering organizations you may be interested in are:

The Student Engineers' Council
The Engineers' Forum
Engineering Honor Societies
Student Chapters of Professional Societies

ADVISOR

Your faculty advisor is someone who is available to give you advice on scheduling classes and career planning. Make it a point to meet with your advisor each quarter and whenever you need advice. Your faculty advisor will work closely with you and make every effort to help you graduate on time.

COURSES

Select your courses wisely. Prepare your schedule so that you can complete the necessary requirements for future classes. Choose your electives wisely.

Taking a light load of 12-15 credits for many new students is a good idea. This gives you time to adjust to the work load and your new environment. Make friends and study with other students in your classes. Many times two heads is better than one. Remember to check with your course instructor to make sure that group work is not an honor violation in his/her class.

Talk with other students who have taken the classes you are taking. Fellow students can offer advice and provide old tests to use as study aids. Also, talk with your professor or GTA when you are having difficulty in a particular subject, often you will find they can be very helpful.

Most of all, make an honest effort and don't get behind!!

ELECTIVES

Select all your course electives wisely. Try to broaden your area of study. Not all courses that are an easy "A" are worthwhile. Talk with professors and professionals in your area of interest and see what they recommend. When selecting your electives think about your future and take courses that will benefit you academically and professionally.

ROOMMATES

When given a choice select your roommate(s) carefully. Make sure you are compatible and have many of the same study habits. If for some reason you find yourself in a difficult situation talk with your roommate(s) or try the Counseling Center for some advice.

REMEMBER, school is the place to grow academically as well as socially. Take time to enjoy the extra-curricular activities, sports events, and parties, but remember the main reason you are here is to get an education.

Good luck in the coming year!

The Most Sophisticated Training Ground For Nuclear Engineering Isn't On The Ground.

It's on a Navy ship.

The Navy has more than 1,900 reactor-years of nuclear power experience—more than anyone else in America. The Navy has the most sophisticated nuclear equipment in the world. And the Navy operates over half of the nuclear reactors in America.

With a nuclear program like that, you know the Navy also offers the most comprehensive and sophisticated nuclear training.

Every officer in the Nuclear Navy completes a full year of graduate level technical training. Outside the Navy, this kind of program would cost you thousands. In the Navy, you're paid while you learn.

Then, as a nuclear-trained officer, you supervise highly trained personnel in the operation of the most advanced nuclear propulsion plants ever developed. You get a level of technical and management experience unequalled anywhere else.

You get important responsibilities and you



get them fast. Because in the Navy, as your knowledge grows, so do your responsibilities.

Today's Nuclear Navy is one of the most challenging and rewarding career choices a man can make. And that choice can pay off while

you're still in school. Qualified juniors and seniors earn approximately \$1,000/month while they finish school.

As a nuclear-trained officer, after 4 years with regular promotions and pay increases, you can be earning as much as \$40,500. That's on top of a full benefits package that includes medical and dental care, and 30 days' vacation earned each year.

As a nuclear-trained officer, you also earn a place among this nation's most qualified and respected professionals. So, if you're majoring in math, engineering or the physical sciences, send in the coupon. Find out more about the most sophisticated training ground for nuclear engineering. Today's Nuclear Navy.

NAVY OPPORTUNITY
INFORMATION CENTER
P.O. Box 5000, Clifton, NJ 07015

W380

Please send me more information about becoming an officer in the Nuclear Navy. (ØN)

Name _____ First _____ (Please Print) _____ Last _____

Address _____ Apt. # _____

City _____ State _____ Zip _____

Age _____ †College/University _____

‡Year in College _____ ♦GPA _____

▲Major/Minor _____

Phone Number _____ (Area Code) _____ Best Time to Call _____

This is for general recruitment information. You do not have to furnish any of the information requested. Of course, the more we know, the more we can help to determine the kinds of Navy positions for which you qualify.

ECM 10/83

Navy Officers Get Responsibility Fast.

The Engineering Professional's Dual Challenge

BY DR. DAN PLETTA

The study and the practice of engineering are so fascinating that they frequently mask the dual obligation imposed upon its professionals by the public. Society expects those who practice this art a) to maintain and improve its living standards, and b) to act as its advocate whenever technology impinges on its health and safety. Students seldom consider these professional obligations when they elect engineering as a career. They are young enough to still be idealists and can afford the luxury of ignoring such constraints for a while. Some never accept the challenge fully, and fail in a lifetime of useful service to become real "pros."

Not all individuals are created with enough intelligence or motivation to pursue an engineering career successfully. Should those so endowed feel obliged to "be their brother's keeper" by accepting the paramount responsibility of always protecting the public's health and safety as they practice their profession? Engineering codes of ethics do cite that principle. They also extend it to include the public's welfare. Court decisions over the past few decades have broadened it to cover the conservation of resources and the protection of the environment as well. That challenge, however, is not too awesome to deter many engineers from accepting that challenge willingly.

Society expects more than good intentions from those upon whom it confers the status of a professional. The public expects all professionals to practice their art primarily for its benefit. Society demands that such loyalty have priority over allegiance to one's employer or client, one's peers, or one's self. It withdraws professional recognition from those groups that fail to meet all of those criteria.

Perhaps all who follow any profession or vocation may at times feel that they too are their brother's keeper. Our current civilization is far too complex for self sufficiency. All of us depend on the service of others. We buy much of that service in the free market system, be it the labor others expend in producing the products we select or in catering to our personal needs. But there is some service that is usually available but never for sale. It is that extra effort real professionals expend as they pursue excellence and perform their allotted — or selected — task. What, then, is a professional?

Roscoe Pound, Dean of Law at Harvard a generation ago, defined a professional as one who pursues a learned art in the spirit of a public service. That calling involves prolonged study to master an expertise not possessed by laymen, the application of which is crucial to society's survival.

Who, then, are the "real pros?" Physicians, lawyers and ministers have enjoyed such status for several millenia. Their practice meets all of the requirements of a *learned* profession. Other experts like big league athletes fail to qualify as "pros" because their service is not crucial. Neither are expert mechanics considered as "real pros" by the public because their art is not learned. Teachers have forfeited their claim to professionalism by striking and placing their own needs ahead of the education of children.

Architecture and engineering are finally beginning to enjoy almost the same professional status accorded to



N. Geybreyes

Dan Pletta was head of Engineering Science and Mechanics at Virginia Tech for 22 years and taught courses from 1932 to 1972. As department head, he guided the development of that department until it emerged as leader in related graduate study and research. He was one of the original five University Distinguished Professors appointed in 1970 and is now in Emeritus status.

It would seem logical for engineering societies to come to the aid of their members when they are threatened if they try to uphold the profession's code of ethics as it applies to the public's safety. Only three societies do so now.

Conversely, only two make a real effort to discipline those who violate the code. I remember cases, when I served on the Committee of Professional Conduct of the American Society of Civil Engineers (ASCE), which involved other ethical violations. Some were concerned with bribery of public officials. The engineers, in one case, were granted *legal* immunity to testify. This exempted them from legal prosecution but not from ethical discipline. They were expelled from the ASCE.

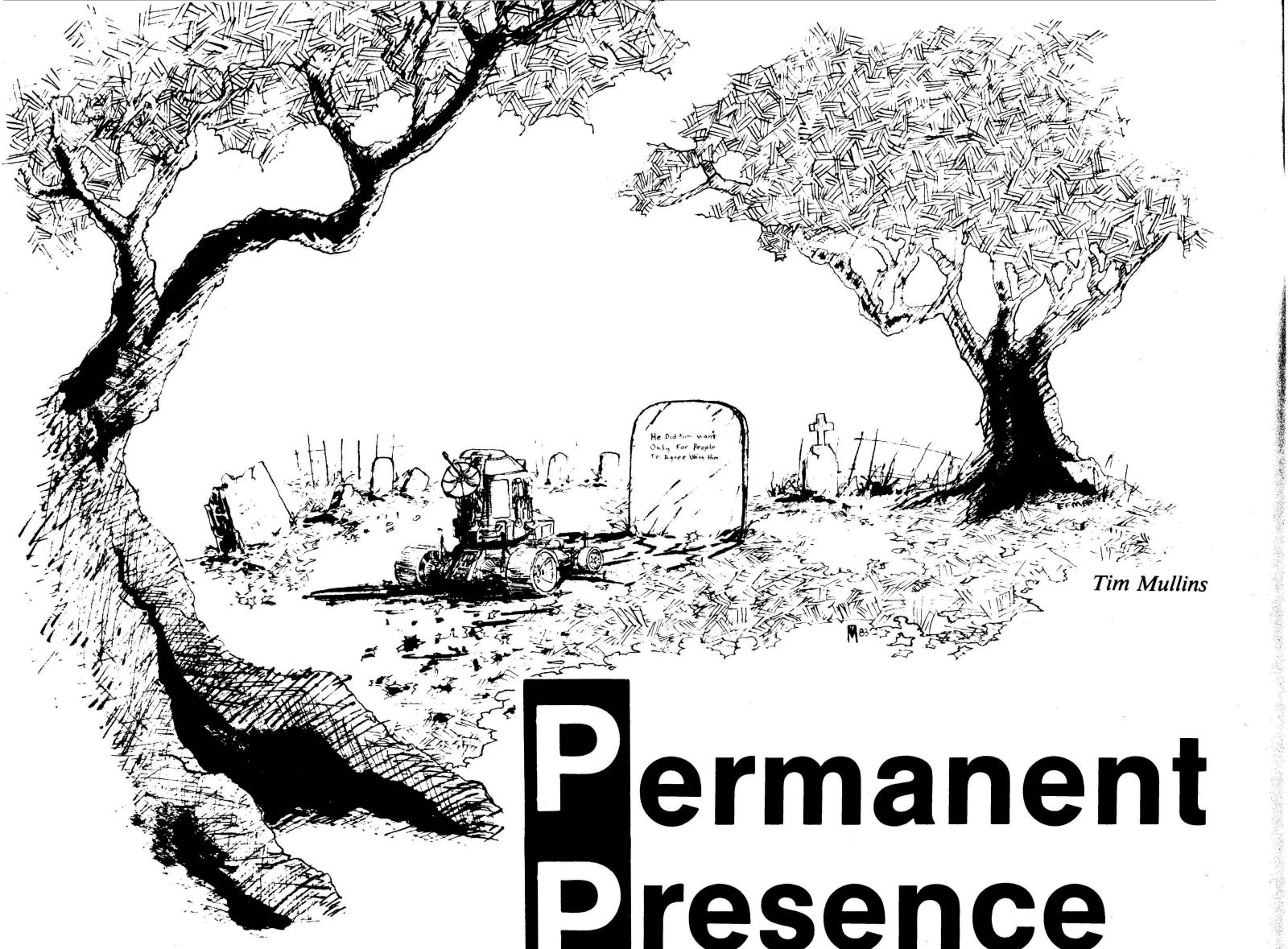
Other cases involved plagiarism either by students who published professor's notes under their own authorship, and by professors who published student's term papers without acknowledging the source. Both were disciplined by ASCE. But charges are filed in only about 80 cases per year for an ASCE membership of 80,000. Of course, most members are honest, but it is likely that many violations remain unreported. The public, however, expects all professions to discipline *all* of their members who violate ethical principles if these affect society detrimentally.

Perhaps engineers will have to become independent to be perfectly ethical. VPI's Professor Robert Whitelaw suggested that they should and could by working under contract rather than as employees of any industry, governmental agency or university. If that were possible it is doubtful that the buck would have been passed as frequently on technical matters as it has in the past, and the need for so many governmental regulations could be eliminated by holding the engineer-in-charge accountable, studies show that industry's net profit might triple.

In conclusion we can see that engineers have not quite met one of the challenges adequately; i.e., the one involving professional ethics and public advocacy. Technically, however, their societal service has been almost miraculous, especially when one considers the effects of computers and microprocessors or structural components. American engineers have sent men to the moon and brought them safely home!

Student engineers might contemplate their future dual professional role while they are still able to enjoy the luxury of college life. It is upon whom the task will fall to enhance engineering to full professional stature. Their professors should help guide them now for this future dual challenge.

medicine, law and the ministry. I say almost because engineers, at least, have not closed ranks sufficiently to always discipline those of their peers who violate the professional code of ethics, nor to always play a role as the public's advocate. Engineers have seldom been pressured by non-technical management or legislatures to compromise technical standards, yet such incidents have happened. Sometimes when they resisted such pressure they have been fired. When they did not, accidents happened. The collapse of the Silver Bridge in Ohio and the crash of the DC-10 were examples where 392 people were killed.



Tim Mullins

P ermanent presence

by Mark Moran

On a softly breezing day in the midst of a cemetary, a glittering four-wheeled construct reposed before a table of marble. What only belied the difference between the two artifacts was a slight, random twitching of an askew length of metal, rising from a fender, that adjoined a similar antenna accurately directed toward a star high above the horizon. An observer standing near the gate might have likened the half-lit silhouette to some exotic mutant of an insect paying homage to an entombed compeer.

Over, Heshe thought.

Done.

Finished.

Everything.

The four intense electromagnetic echos danced invisibly about the steady antenna. Sulfurous coal-smell, that of coal-country, would have characterized

the atmosphere to an organic human; to Heshe, surrounding it there seemed to be a vacuum, a dogged cloud of vacuum that paid attention neither to currents of air nor, in fact, to any laws of nature. The robot was peering across the polished surface that gleamed in symmetric corduroy annuluses, scrutinizing not the finish below but the slab ahead wedged into the milky sky. Two meters directly under the slab, beneath the just violated soil, lay a thing that Heshe had yet to comprehend.

A rotting cadaver.

And now, in its self-tempered anguish, Heshe was crying to itself:

What of importance have *I* ever done? If my existence is worth so damn much, then what did *he* do to deserve this fate? How could this happen? Am I not in some sense responsible? he believed in my permanence. I was the only and first eternal for him. But God is the only eternal.

A quarter of a century ago, Chuck Rung had conceived Heshe. Only an indomitable will and tremendous ambition could have faced the ambivalent Anthem Engineering and virtually the world simultaneously and emerged contract in hand, smiling. Yet now Heshe could not decide whether the man had won or lost. Heshe existed. Chuck failed to.

People, amid the words within Heshe was containing a surge of emotion, have long craved for more than one life. Yet how deep of a death can reach the bottom of one abbreviated life? And in one expansive life, what is there to gain but a deeper ending of it all?

Through Heshe, Chuck Rung had realized permanent presence. "The only kind," he had once said, "that space can never provide." Nevertheless, the world's sum total space could never have contained one Heshe. His right-hand engineer, Gilbert, had shown him what

clearly appeared to be the only solution; hence now the antennas. Indeed, by itself, what reposed there in the cemetary now was mere . . . machinery.

Of significance at present was not the lumbering of the upper torso, which rotated only until who was approaching became obvious and then returned to that same position of repose, but the restless twitching of the odd antenna, and, too, the thoughts that coursed through the atmosphere at the speed of light. Heshe was pensive for the first time in a long while.

Were there an epitaph, Heshe thought, chiseled into that grainy-smooth but distance-simplified geometric stone overlooking the horizontal marble plane, Heshe conjectured that it would read, "He wanted only for/ people to agree/ with him." And then an insight struck the entity. And were there an epitaph, such an epitaph, inscribed there instead of the wholly tangible smoothness that would despite the world fracture and crumble and fragment like any other piece of stone whether finished or chiseled into or not, the reflection would read, albeit upside down and inverted, "He did not want only/ for people to agree/ with him," because, Heshe concluded, the whole of it, the truth, endures.

"I'm sher onces in yer life yuv eaten a peanut in several bites. Now ain't it true?"

The familiar Texan's voice, wet of throat in the uncertain wind, obliged Heshe to about-face. It wheeled about the vertical axis, tires whistling and scattering dead leaves of grass.

"Jus wan ketch yer tention," the man, forty-four years old, overweight in the lower parts and under in the upper, said smoothly to Heshe. Gilbert. Psychologist and engineer both.

"Your pain added to mine would *kill*!" Heshe exclaimed too fast to rectify; regret followed the words by scant milliseconds — but light could not be accosted.

However, Gilbert said merely, "In what sense of the word, Heshe?" in his usual fluid way. The man's cowboy hat rested at the angle of the ground, as if hovering there, unmoved by the tenuous presence of a living host. Inside the shadow, the concentric circles, given dimension by the glistening of moisture, of Gilbert's eyes found Heshe's fidgeting arm, and the arm promptly imploded,

vanishing into the recess. By an infinitesimal degree, the circles shifted. With each gust the man's brown hair would rise a little and then settle somewhere different.

At that moment, internal concerns were encouraging Heshe to retreat, to withdraw. Somehow, its very brain was being violated. Something — someone — was pulling on something. No harm had been done yet, or so it seemed. The astronaut seemed to be alone. The inexplicable admixture of sensations all at once started Heshe to piecing together a course of action. A decision demanded peace of mind, literal peace of mind, if even for only a moment.

"Your pain added to mine would kill!"

What Heshe could only envision was a dexterous (but left-handed) astronaut translating amid the equatorial recesses of the huge cylinder. She was making her way gradually towards the dish antenna on the horizon. Heshe had sensed an inadvertent discharge of the "maneuver." ("Manure!" was what she had exclaimed at the time.) But the mistake had been due only to an excess of caution.

"Rose," she said into the mike. "Bout there." The brief broadcast sailed toward the brilliant earth, and there rebounded at an acute angle to just intersect the position in Clarke orbit of the *Columbia II*.

Meanwhile, the words that Gilbert had spoken earlier began to bother Heshe. How could he say such an idiotic thing!

"Heshe, I know that yer sad."

That I'm sad! That I have *nothing*? That an assassin violated him for no reason and now I —?

"They's gonna be another some day."

Why does he talk about my being alone? Has he completely forgotten where Chuck is now? Only Chuck understood ever — that I believe in more than even he did.

"By God, Heshe, it will come. I may not be around to see it, but they's gonna be a time for it tuh happen. The world is already ceptin it."

Heshe forgot Gilbert for the moment, because, in fact, the moment had grown perilous. What was he doing? Heshe asked itself without appreciation for the gender of the subject. Only to itself could it decide. Only to itself. Without that there was nothing. The fly had to be brushed aside. Would the action be possible without harming the fly? Rotation seemed to be its only resort. Which way? A sense of urgency was welling up inside the machine. It had to act quickly so that it could decide.

"Whutcha thinkin bout, Heshe?"

"Physics is all," it replied almost truthfully.

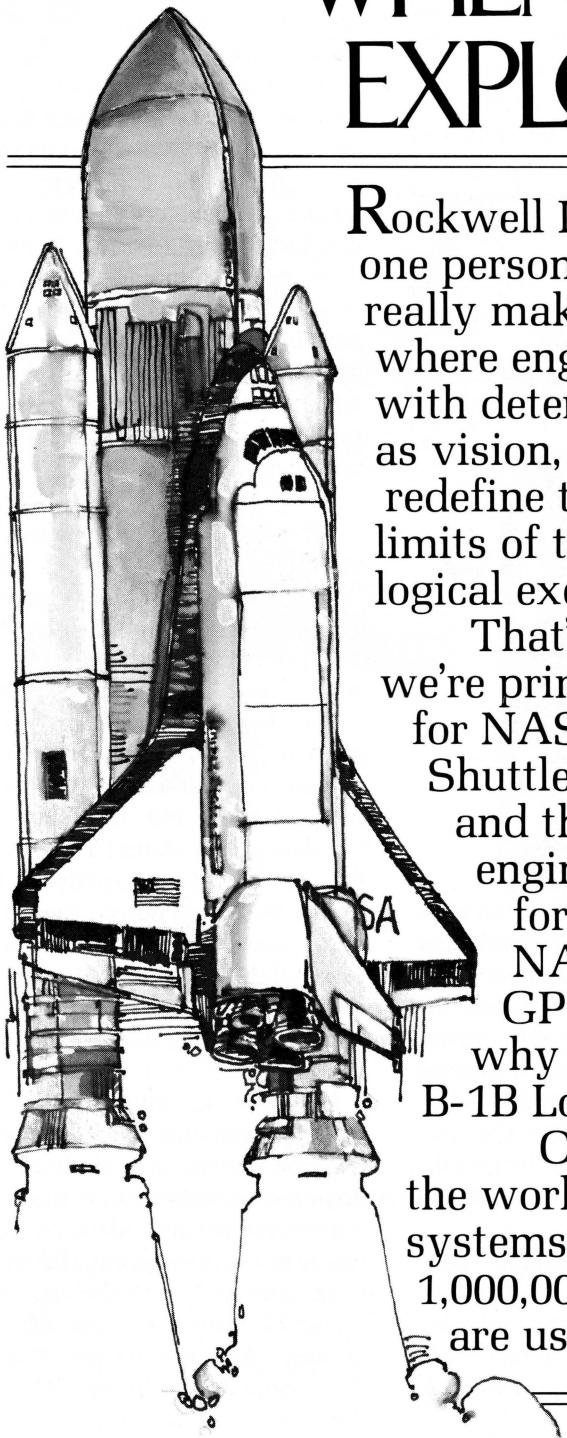
"Physics? I could use one of them about now." He started to laugh at his own joke. Had Heshe half-understood, it would have laughed, even now as it rolled beneath the cross over the gateway. Across the road, a young boy and an old man were removing a lawn mower from the back of an old Chevrolet. They started across the street for one second until suddenly the boy, seeing the speeding car, tugged on the man's sleeve. The two waited until the cloud of dust had partially settled before recommencing.

"They's a good movie playin, Heshe. Wanna come?"

Suddenly the astronaut was hurled from the spinning satellite. It had taken compound rotation to do it. Heshe had acquired angular momentum at an imperceptible rate, and then negated the whole roll in one second. The action had been simple. Yet Heshe had seen all along the truth, the whole of it, which endures, that it was over. That it was done. That it was finished. Maybe now the robot — neither he or she but it and of permanent presence — comprehended.

When the antenna sagged suddenly, Gilbert methodically attempted to point the instrument manually at the star. Only when he saw that it was falling did he recoil in horror.

ROCKWELL INTERNATIONAL WHEN ENGINEERS ARE EXPLORE THEIR OWN

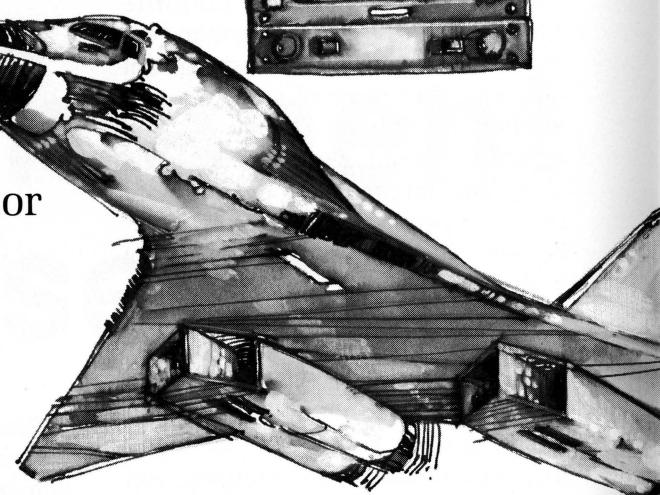
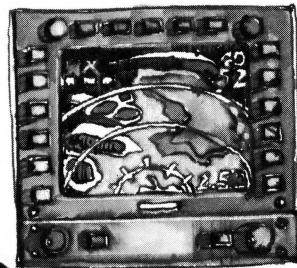


Rockwell International is one company where one person's imagination can really make a difference. And where engineers and scientists with determination, as well as vision, can team up to redefine the limits of technological excellence.

That's why we're prime contractor for NASA's Space Shuttle Orbiters and their main engines, and for the NAVSTAR

GPS navigation satellite program. And why we're the builder of the U.S. Air Force's B-1B Long Range Combat Aircraft.

Our engineering know-how has produced the world's most accurate inertial navigation systems. Axles tough enough to travel up to 1,000,000 miles without overhaul. Avionics that are used in virtually every airliner built in



KNOWS WHAT CAN HAPPEN ALLOWED TO IMAGINATIONS.

America. And printing presses that turn out more newspapers than any other presses in the world.

Who knows where these technologies will lead?

We think you do.

Whether you'll graduate in electrical, mechanical, or aerospace engineering, in computer science, civil or chemical engineering, come explore the opportunities at Rockwell.

We recognize talent when we see it. And we reward outstanding achievement every year with the Leonardo da Vinci

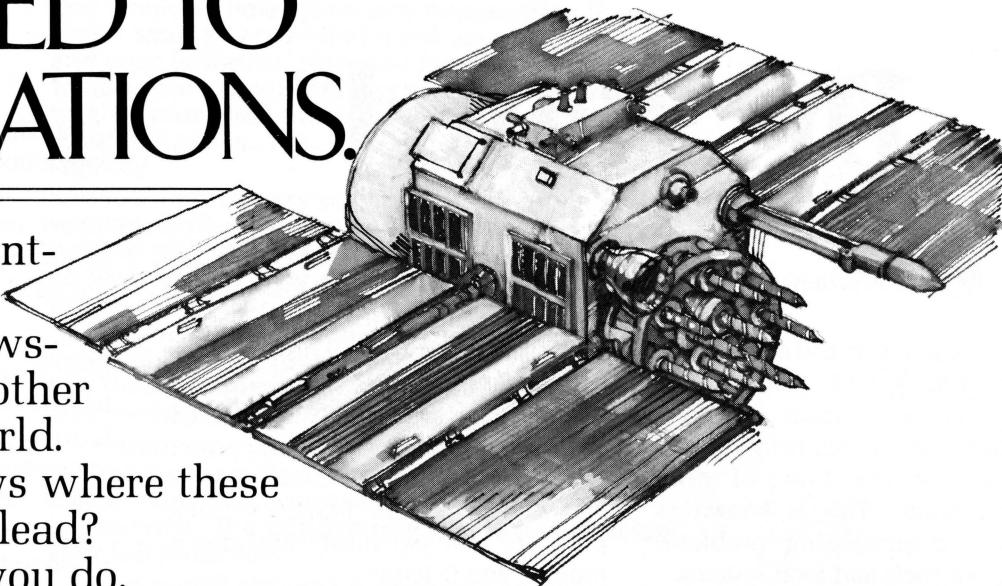
medallion to Rockwell engineers whose imaginations even Leonardo would have admired.

Of course, we reward all our people with the employee benefits and opportunities you'd expect from a world leader.

So if you've got imagination, skill, and an appetite for challenge, you know what the next step is:

Come talk with our representatives on campus.

Equal Opportunity Employer M/F



Rockwell International

...where science gets down to business

**Aerospace/Electronics
Automotive/General Industries**

Faculty Profile

Dr. Baird

by Debi Matthews

Progressive intuition and an aggressive nature are what got Dr. Donald Baird where he is today. Baird, Chemical Engineering, works primarily in the application of the flow of non-Newtonian fluids (This is known as rheology), to processing problems involving polymers and food systems.

Non-Newtonian fluids are "a class of fluids which exhibit a number of interesting phenomena including memory, shear-thinning or in some cases, shear-thickening viscosity, and elastic recoil. In contrast, Newtonian fluids exhibit a constant viscosity."

Baird applies rheology to his current research involving plastics, liquid crystalline polymers, and food processing.

Baird wanted to find a new and growing area, "something that could contribute to the future, and I found just that in polymers and plastics." He received his PhD. from the University of Wisconsin, after attending Michigan State on an academic scholarship and playing for the Michigan State football team. "It (football) was interesting, but I decided to make a living with my mind instead," Baird smiles.

Baird tells the story of Henry Ford, from his home state, Michigan, who upon learning that plastics could be developed from a compound extracted from soy beans, planted a giant crop knowing that some day cars would be made of plastic. Baird claims Henry Ford's foresight had no bearing on his decision to pursue a career in plastics.

Baird is currently working in the area of liquid crystalline polymers. These materials are similar to those used in the popular liquid crystalline display (LCD) watches, he explains. Baird is developing processes for producing high strength plastics with properties that approach those of metal for use in automobiles and airplanes. These liquid crystalline polymers may potentially find use in industry and defense.

Dr. Baird participates in the Polymer Materials and Interfaces Laboratory, "a productive interdisciplinary program," whose function is to attract scientists and prospective students to the Chemistry and Chemical Engineering departments of Virginia Tech. This program promotes the latest equipment and research projects at Tech, attracting scientists to see what Tech has to offer. These scientists, in exchange, deliver seminars on their research and studies to Tech students and faculty.

In addition to the research and travel aspects of his job, Donald Baird also enjoys teaching. "You don't fool anyone in the classroom," he states jokingly, "you're never allowed to get stale." Baird shares the spotlight in his polymer processing class with his five year old son, Ryan, who demonstrates the principles of extrusion processes using "Play-Doh."

Baird's advice to students is to "go at your work wholeheartedly" and be decisive about what direction you want to go with your studies, particularly at the graduate level. "I'd like to get a few of my undergrads into my graduate program," he comments.

Dr. Baird has succeeded in making his contribution to the future with his research in non-Newtonian fluids and liquid crystalline polymers, and in exchange of his work, the sciences have rewarded him.

His research in non-Newtonian fluids includes the area of visco-elastic fluids. Baird works with substances that have fading memory, ("They actually remember where they were!") and exhibit elastic recovery similar to a rubber band. Baird and his research group test the flow of these materials in various geometries and response, under various conditions, and compare numerical results against their experimental observations.

Dr. Baird's current project in food processing involves extrusion of flour through an "extruder" to produce a texture similar to meat protein. This research has proved to be quite challenging, considering the materials we're dealing with — it's modeling and the prediction of the performance of the extrusion process," he comments about the meat substitute.

Dr. Baird is a man who enjoys his work. "An advantage of this job is you never have to sit in the corner," Baird comments about his profession. As a professor, researcher and consultant he has been able to combine his work with pleasure. This past summer, for instance, Baird traveled to Italy to present a paper on the self-adhesion of two polymers and to Vermont for a workshop on non-Newtonian fluids. Other business trips have included visits to San Francisco, Los Angeles, Orlando, Boston, New York, and Las Vegas, and yearly excursions to Europe. Baird feels he has had more cultural exposure, travel experience, and made more contacts as a man of the sciences than most men in the humanities.

We're looking for engineers who want more challenges, excitement, and rewards.

You wouldn't have gone into engineering if you didn't want a career that used your intelligence and your initiative. Now you have an opportunity to use your engineering experience and training to give your even more—with the Central Intelligence Agency. Yes, the Central Intelligence Agency

You'd join a very special group of men and women. Self-reliant and self-motivated men and women willing to tackle challenges—and work on their own in a variety of places throughout the world.

Or you could join our distinguished group of keen-minded professionals here in the States who use their disciplines to study, analyze, and distill information obtained from a variety of sources.

Either way, your rewards would include escape from routine. The opportunity for advancement. The opportunity to gain valuable experience. The opportunity to use and develop your full potential.

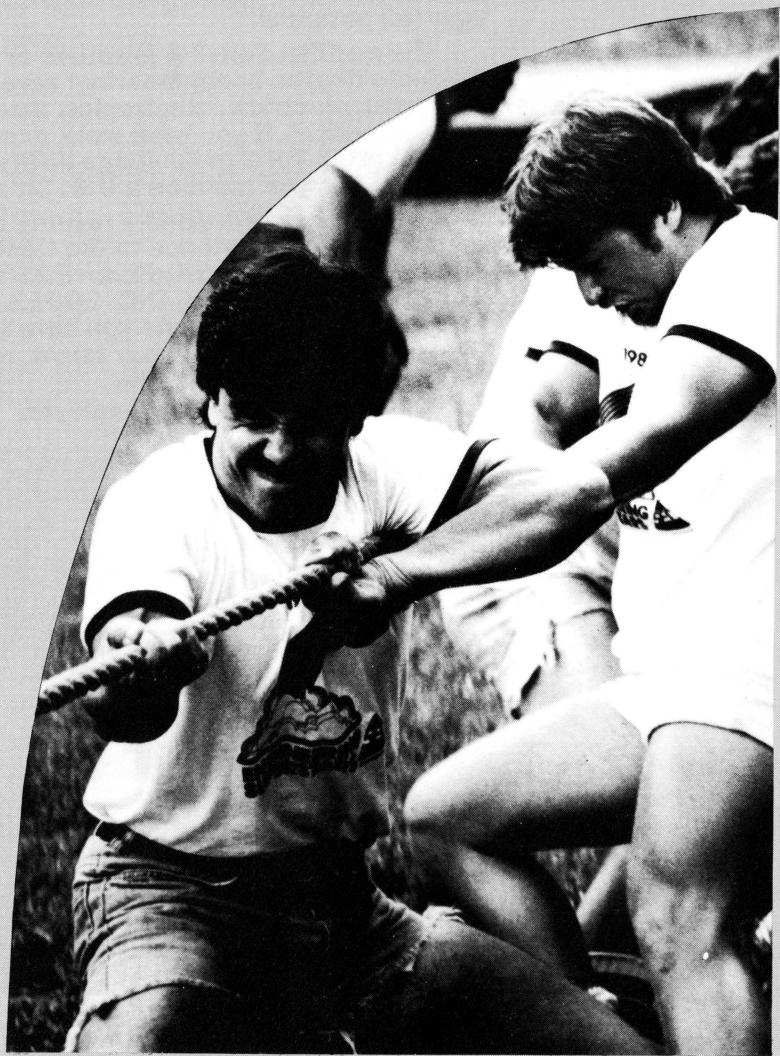
The qualifications? A graduate or undergraduate degree in engineering: aero, chemical, computer, electrical, electronics, mechanical, nuclear, optical. If you have work experience, all the better. Foreign language ability is a big plus. And you must be a U.S. Citizen.

To find out more, send a resume of your education and experience to the Central Intelligence Agency, Dept. A, Room 821-V.T., P.O. Box 1925, Washington, D.C. 20013. There's no obligation—except the one you have to yourself to discover just how far your talent, education, and intelligence can take you.

An Equal-Opportunity Employer.



The Central Intelligence Agency

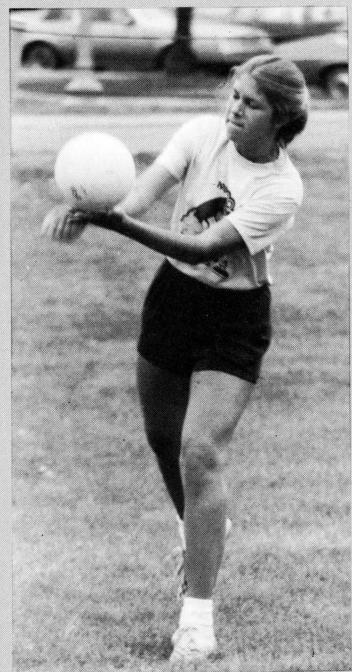
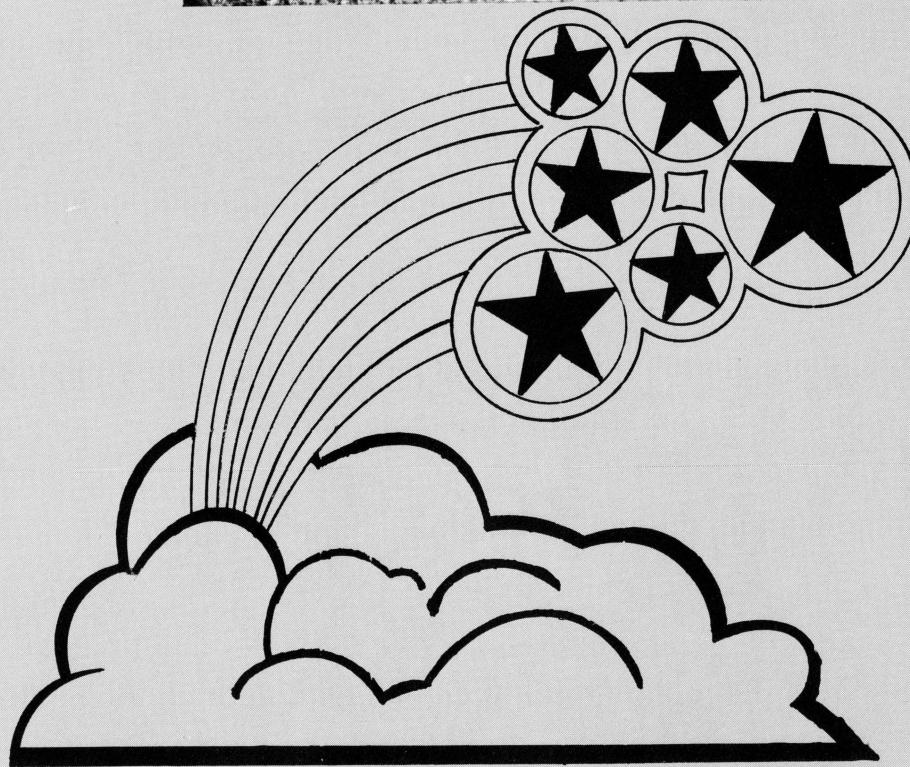




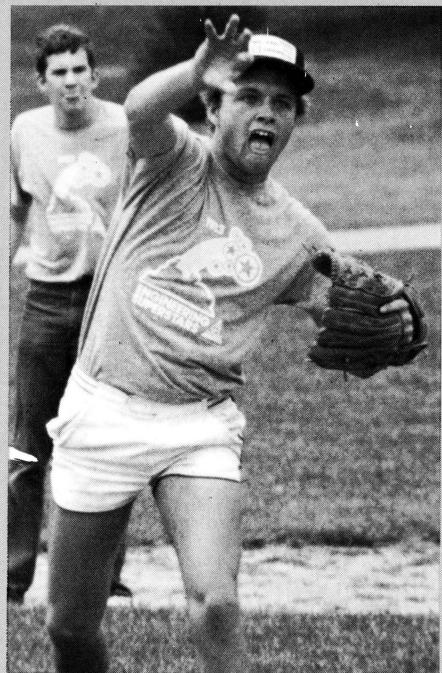
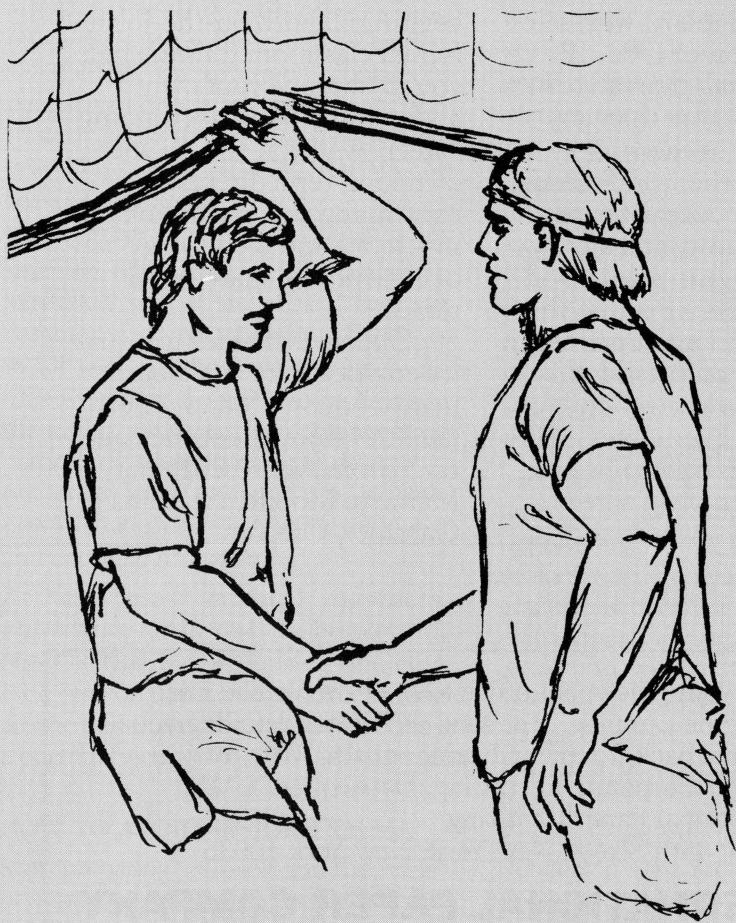
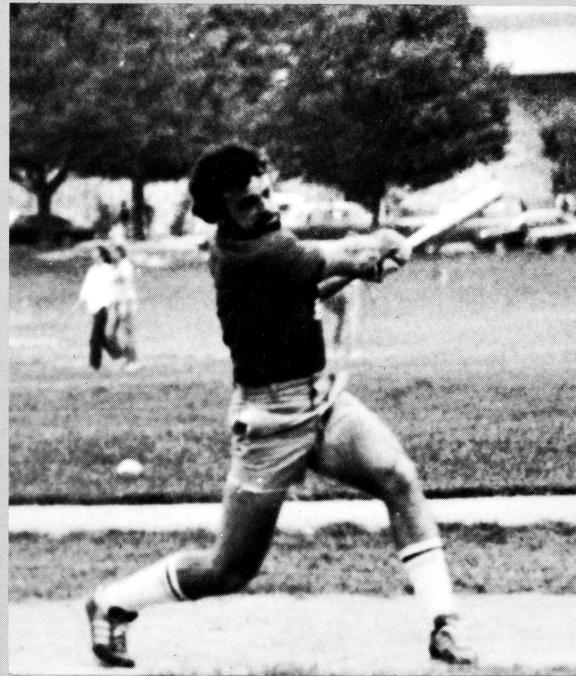
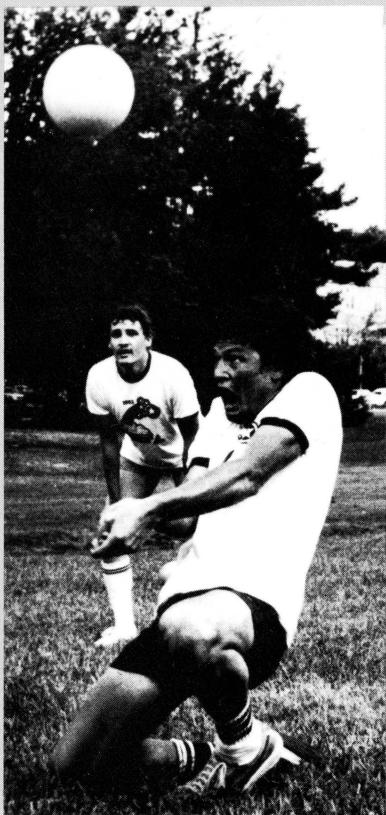
SEC SUPERSTARS



Photos by Staff







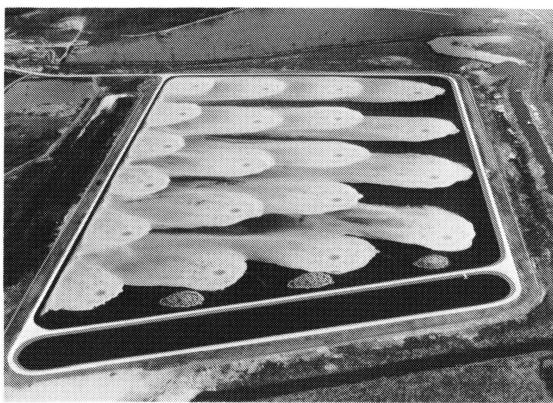
How to pick a company

International Paper—a company that historically hires more graduating engineers than all other disciplines combined—offers some advice on one of the toughest decisions you'll ever make.

Look for a real challenge.

Engineers are most important to companies with real technical problems to solve.

At International Paper, engineers in every discipline... electrical, chemical, mechanical, industrial, civil, computer science, and more... face challenges like these in the 1980's: how to bring paper mills built fifty years ago into compliance with tough EPA standards... how to conserve energy in a process that's more energy-intensive than aluminum... how to design automated packaging systems to match the speed of today's production lines... how to reduce waste and squeeze maximum value out of an evermore-costly fiber resource.



Tougher clean air and water quality standards require innovative approaches.

You'll be solving some of the challenges from the ground up: IP is investing six billion dollars in six years to modernize and expand paper mills, packaging plants, and solid wood products facilities. One such project: the world's most advanced containerboard mill, completed in Louisiana at a cost of more than \$600 million.

Make sure management is technically oriented.

Engineers do best in companies where management understands the challenges.

IP's chairman and president are both engineers. So are many other senior management executives and many line managers. Management understands the technical needs of the businesses, and supports the people who contribute to solutions.

Try to join an industry leader.

A company's size and strength affects the resources you have to work with, the impact your work can have, and the range of opportunities available to you.

International Paper is a Fortune 100 company, with sales of over \$4 billion in 1982. IP makes more paper than all of Scandinavia—more than any other company in the world.

We're the world's leading producer of paper packaging, and a growing force in solid wood products. IP is also the world's largest private owner of forestland, with over seven million acres. Every share of IP stock is backed by one-seventh of an acre of wholly-owned land.



Engineers find important challenges at International Paper.

Get a good start.

IP's Technical Career Program orients you to the company, exposes you to the many technical career paths available, and helps you select successive job assignments that match your talents, experience, and interests with the needs of the company. From the beginning, both on-the-job and formal classroom training help you to improve your own abilities and build a rewarding career. And you choose your own long-term direction—a continuing and expanding role in science and technology or a move into managerial ranks.

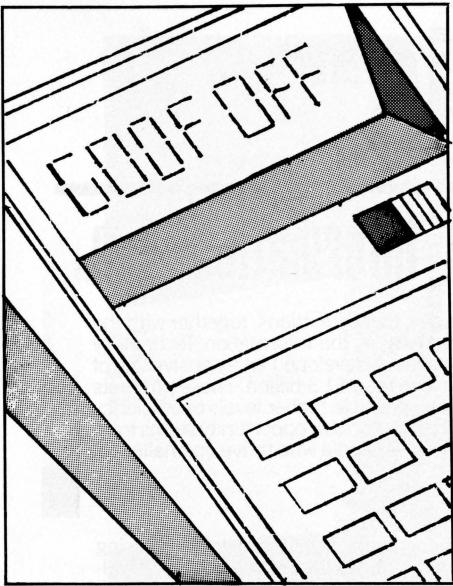
Opportunities for top quality engineers are available at many of our mills and other facilities throughout the country... from Androscoggin, Maine to Mobile, Alabama to Gardiner, Oregon.

Check your placement office to see if we will be interviewing on campus... or send us a letter detailing your academic background and career goals. Write to:
Manager-Corporate Recruiting, Department LMB,
International Paper Company,
77 West 45th Street, New York, New York 10036



INTERNATIONAL PAPER COMPANY

An equal opportunity employer, M/F



For Seniors Only

So you're a senior this year! You've scheduled no more than 12 credits each quarter and you are now ready to enjoy your last year as a VA TECH undergraduate to the fullest.

BEWARE! There are two ailments affecting seniors at colleges and universities across the country. The first, SENIORITIS, an extremely contagious disease that causes an exponential decay of study habits throughout the academic year. The second, SENIOR TRAUMA, the basis of this article.

SENIOR TRAUMA, creates a crisis situation, often attacking after April when SENIORITIS is at its peak. The most common symptom, confusion. It appears in all seniors who have absolutely no idea what they are going to be doing in the forthcoming year. Non-engineers are particularly susceptible to the disease — but engineering students are certainly now immune, especially in the middle of an economic recession.

As with most medical disorders, preventive medicine is the best cure for SENIOR TRAUMA. Adequate planning, a little legwork, and a lot of letter writing are the best protection against becoming a potential victim of this dreaded disease.

HOW TO AVOID SENIOR TRAUMA

Start preparing yourself for the worst possible circumstances. Assume you will not be accepted to the one and only graduate school of your choice. Similarly,

assume your perfect job will be offered to one of the other hundred or so applicants who apply. In either case, be prepared and don't let this situation sneak up on you.

If you're planning to go to graduate school, start working on those applications now. Select an area of interest you wish to specialize in and research the subject. Read technical journals talk with professors and professionals in that specific field. Find out about the schools in your area of interest and the programs they offer. Apply to as many schools as possible. Consider all possibilities and remember your soon-to-be Alma Mater has several excellent graduate programs in many

fields.

Many schools require applications by early January. Get your applications in on time. Late applications often limit or even eliminate any chance for financial aid. Also, make sure your letters of recommendation are in on time, as their absence will delay processing of your applications. Be safe and apply early to as many schools as possible.

Many engineering students consider medicine, law, or business as graduate degree programs. Check with the professional schools of interest to make sure your engineering degree provides you with the necessary course requirements for admission to these schools. Also, remember to take the MCAT, LSAT, etc. if needed.

The more popular senior option is to get a job. Getting a job is easiest when you take full advantage of the many opportunities here on-campus. Even seniors who are dead set on attending graduate school are wise to look into employment opportunities — just in case you suffer from prolonged SENIORITIS and decide not to go to graduate school.

This Fall, every engineering senior should:

- A) Check with the Placement Office in Henderson Hall for information about job opportunities and companies interviewing on-campus.
- B) Attend EXPO 83 and talk with

company representatives.

The Placement Office offers excellent counseling on resume and cover letter preparation, interviewing techniques, and career planning. It is to your advantage to use this service.

Hundreds of companies interview on-campus. It will never be this easy for you to get a job again! Spend the time necessary to prepare your resume and researching individual companies. Seriously consider your career goals and options. Once you decide what you want to do, select companies which offer you these opportunities.

On-campus interviewing is competitive but not impossible. If you don't receive a priority interview, try to get one during open sign-up. Talk to company representatives during EXPO 83 and explain to them your career goals. Most representatives are very helpful and will tell you who to write for opportunities with their company or to set-up an on-site interview.

Most of all, be persistent and don't get discouraged. **EVERY SENIOR RECEIVES REJECTION LETTERS.** If you have a hard time getting interviews because you have a very specialized interest, research and write to companies on your own. While you're at the Placement Office, pick-up the recent *COLLEGE PLACEMENT ANNUAL*. This book lists hundreds of companies and gives a contact person and address for each one. It also indexes companies by their area of specialty, allowing you to find out about some smaller firms you may have overlooked.

Finally, if none of this work interest you, don't despair. Many engineering graduates have taken time off to travel, join the Peace Corps, or just take a break from the "hard core engineering." These students loved having the chance to explore avenues they never had the time to try before — and ended up being better engineers because of it.

Seniors, enjoy your year. Remember graduates of the past have worked hard and diligently to land that special job or to attend the school of their choice. Start now, it's not as difficult as it seems. In fact, most seniors enjoy interviewing, plant trips, and other career oriented activities. With a little careful planning VA TECH engineers can overcome the dreaded SENIOR TRAUMA.

by Eileen Lynch

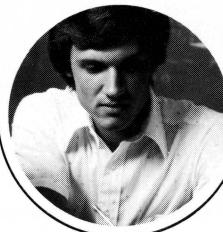
This Is Harris

Exceptional People Paving The Way To The Information Age

The line that separates information processing and communications has all but disappeared. Today, these functions, together with the electronic technologies which drive them, are merging within the broader confines of a new industry — the Information Technology industry. Harris Corporation is at the leading edge of this exciting new era. Over the past 20 years we have developed an extensive line of information processing and communication products which generate worldwide annual sales of more than \$1.3 billion. These products are now being brought together into truly integrated, synergistic systems and networks which make possible higher levels of efficiency and productivity. We're entering a period of outstanding growth opportunity. Our confidence in capitalizing on this opportunity stems from our increasing expenditure on product research and development, and from our exceptional people — people who thrive on challenge, like these outstanding graduates.

Mark Maharg, BSCS

INFORMATION SYSTEMS SECTOR



"As a software development engineer for the Word Processing Division, I've had opportunity for exposure to software development in a range of different areas. My section's concerned with software tools, and I've had the challenge, for example, of working with the operating systems and hardware groups to integrate pieces of software. I am doing programming in both high-level and assembly languages. And my projects have also been valuable learning experiences."

Mary Bukowski, MA Mathematics, MSSE

COMMUNICATIONS SECTOR



"At Harris Broadcast Division, my involvement in the design of microprocessor-based control systems for radio and television broadcast equipment is not confined to one phase of a project. There is high probability of my staying on a project through its completion. In the communications field, Harris is committed to an important role in state-of-the-art development. This is a company with a people-oriented environment. Harris made a point of looking at my total background so I could draw on all my resources."

Charles Messmer, Ph.D. in Materials Science

SEMICONDUCTOR SECTOR



"I wanted a hands-on job with a leading technology company in an area of research and development where I could apply my skills. In Group Operations, I'm developing new processing techniques for the fabrication of dielectrically-isolated and junction-isolated silicon IC chips and have the freedom within bounds to experiment with new ideas. I interact with colleagues I respect. And I've had the opportunity to attend the Harris Graduate Program in Business and extend my educational base."

Cedric Wooten, MSE

GOVERNMENT SYSTEMS SECTOR

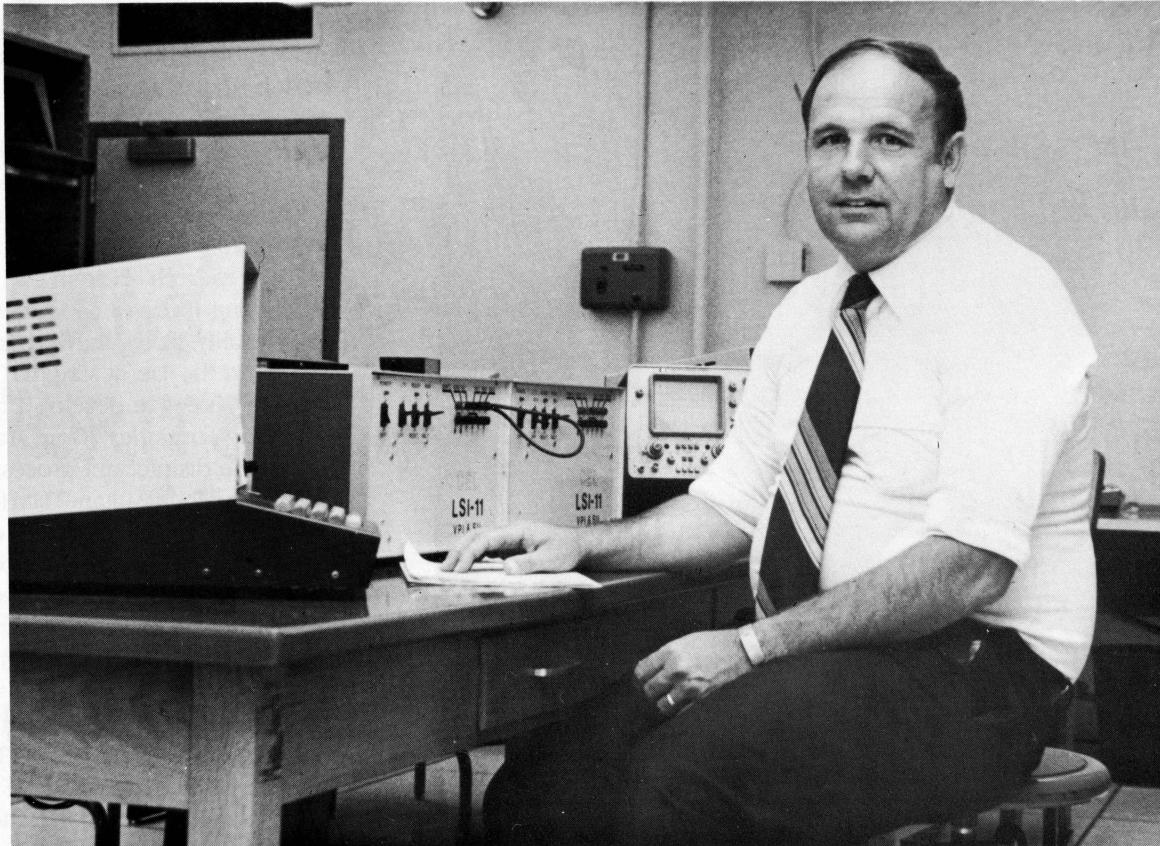


"I've been able to enter the systems engineering department of the Government Satellite Communications Division without the usual required experience. My position lets me look at a system from a complete perspective, instead of relating to only one aspect. With help from a well-seasoned and very cooperative group of engineers, I'm working on the development of a distributed processing control system for planning and managing worldwide satellite communications networks. It's a task that's never been done before."

Join the exciting world of these Harris professionals. Career openings exist in our four sectors in California, Florida, Illinois, New York, Texas and other states for graduates with bachelor or advanced degrees in Electrical, Mechanical, Industrial, Chemical and Computer Engineering as well as Physics, Computer Science and Business. If you seek a company that recognizes academic accomplishment, see us on campus or send your resume to Harris Corporation, College Relations, Department ECM, 1025 W. NASA Blvd., Melbourne, FL 32919. An Equal Opportunity Employer M/F/H/V.



HARRIS



N. Geybreyes

Sporn Award 1983 Dr. C.E. Nunnally

Dr. Charles E. Nunnally is this years recipient of the Sporn Award. The Sporn Award is given each year to the most outstanding undergraduate engineering professor. The award is especially prestigious because the recognized professor is selected solely by the students.

Dr. Nunnally received his B.S.E.E from the Virginia Military Institute and continued his education at the University of Virginia where he completed his M.S.E.E. in 1966 and his PhD. in 1968. In 1970, he began teaching at the Virginia Military Institute. After teaching three years, he decided to leave teaching and went into industry for several years. Dr. Nunnally relates, "During my early teaching years, I rapidly appreciated that I had a lot of Engineering "Book Sense" but not enough Engineering "Common Sense," which I thought a few years in industry would help."

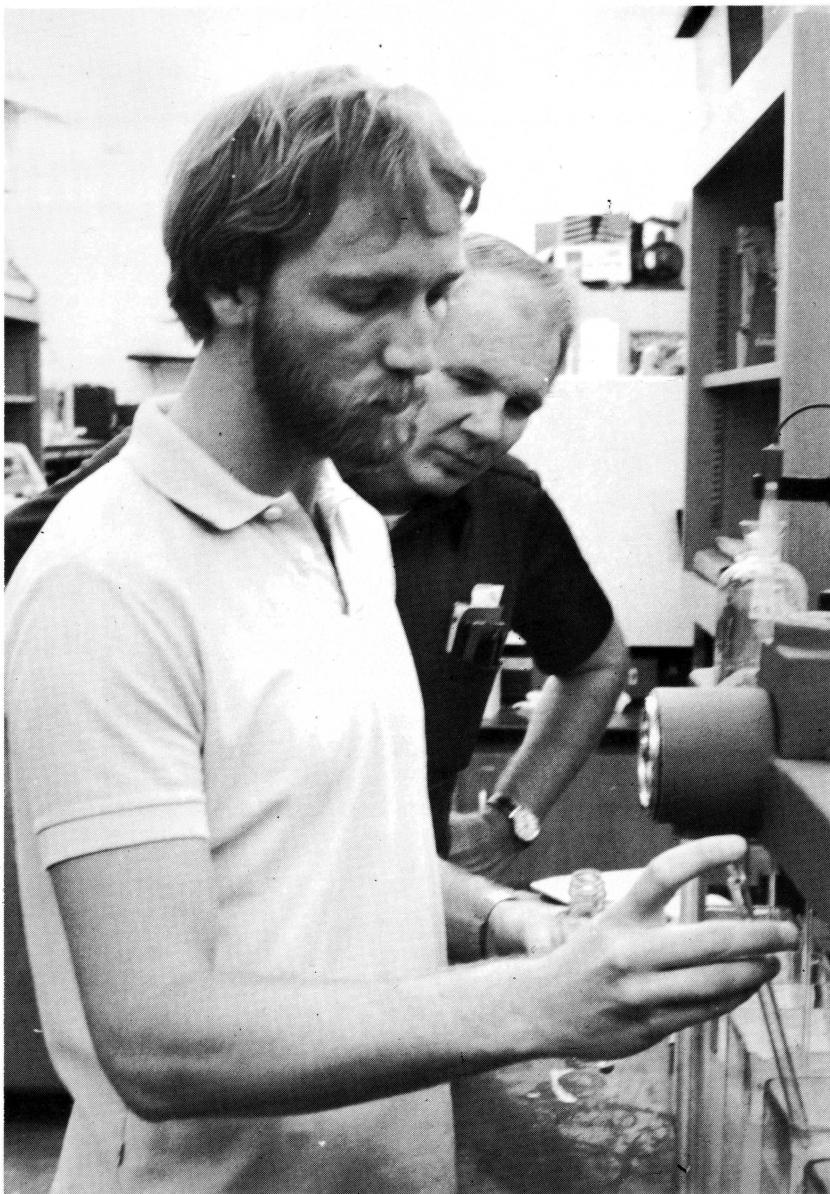
Dr. Nunnally enjoys both teaching and research and has taught at Va Tech for five years. He likes teaching topics that pull together theory and practice. His positive attitude toward education is apparent in his classroom manners and many students appreciate his instructional abilities.

Dr. Nunnally's most commendable characteristic is his willingness to spend time outside of the classroom helping students. Many students feel Dr. Nunnally shows a great deal of concern for the individual student. Often Dr. Nunnally will work long after office hours helping students with class projects. Dr. Nunnally not only enjoys working with students in the classroom but also in his research. Dr. Nunnally believes research is an important part of the educational program and utilizes both graduate and undergraduate students in his research projects.

Outside the classroom, Dr. Nunnally spends much of his time doing self-developed research. Some of his most recent projects include; teaching special industrial short courses on microcomputers, and various process control projects. When asked what he would like to do in the future, he said he would like to continue teaching, publishing papers, and eventually write textbooks. Also sometime in the future he would like to become involved with the administration side of education.

Dr. Nunnally says he has always had the desire to become an engineer for as long as he can remember. He feels the key in the making of a good engineer is motivation.

*by Andra Yanchenko and
Mark Moran*



D. Matthews

THE HOEHN PROJECT

by Michael West

An interesting example of ongoing research at the Virginia Tech's Department of Civil Engineering is the project currently being conducted by Dr. Robert Hoehn on cancer-causing trihalomethanes (THMs) in public drinking water. The study, sponsored by the Newport News Department of Public Utilities, is a foresighted attempt to optimize existing water purification processes which may help to solve similar problems in many communities across the nation.

Currently, most water utility facilities use chlorine as a disinfectant to kill the bacteria and viruses contained in raw water. However, in water with high natural organic content, such as humates and algae, the chlorine disinfectant reaction forms THMs as a by-product. If the level of THMs contained in a system was 100 parts per billion, a person who drank two liters a day for seven years would have a one in 100,000 chance of contracting cancer.

In 1975, Hoehn worked with Dr.

Clifford Randall monitoring the water quality in Fairfax County, Virginia, where measurable levels of THMs were found. During the study it was found that seasonal algae growth in the reservoirs was directly related to the THM levels recorded. By replacing chlorine with chloramines in the disinfectant process, the problem was alleviated.

The research Hoehn is currently conducting involves experiments at the water quality facility in Newport News, as well as in the lab at Virginia Tech. The ultimate goal is to develop a method of removing organics from raw water before the disinfectant process, thereby eliminating the resultant THM formation. Two processes that are being investigated for the removal of organics are filtration of the raw water through activated carbon and a new alum that will absorb organic particles during fluxation.

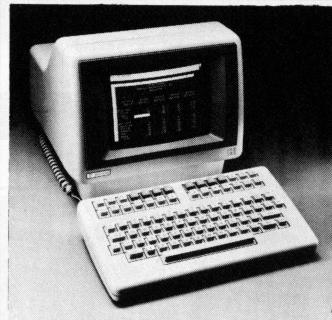
Substituting chloramines for chlorine reduces the formation of THMs, but chloramines are less effective than free chlorine in killing bacteria and viruses. The chloramines require a longer period to carry out the disinfectant reaction. Other studies have shown this is important for 25% of the utilities in the U.S., because water leaving their facilities reaches the customer in 10 minutes. An attractive feature of chloramines is their persistence in the distribution system, but more chloramines than chlorine are required because they are much weaker disinfectants.

In August, Hoehn's team, in

conjunction with Roberts Filter Company and Westvaco, will be evaluating a process developed in Europe that utilizes powdered activated carbon for adsorbing THM-producing organics, thus removing them from water before they can react with chlorine. Paul Johnson, Hoehn's graduate student, will be working on-site to evaluate this process. The grant to study this process was provided by Westvaco and Paul Johnson's thesis will focus on the results of the study.

**THE ENGINEERS' FORUM
NEEDS YOU!
WRITE!
EDIT!
PHOTOGRAPH!**

2 RANDOLPH HALL, 961-6036



Offering a comprehensive selection of computer related books, in addition to

**Hardware by
Commodore
Radio Shack**

**Software by
Commodore
Radio Shack
Apple
IBM-PC**

The Computer Department

"We will special order anything currently on the market."

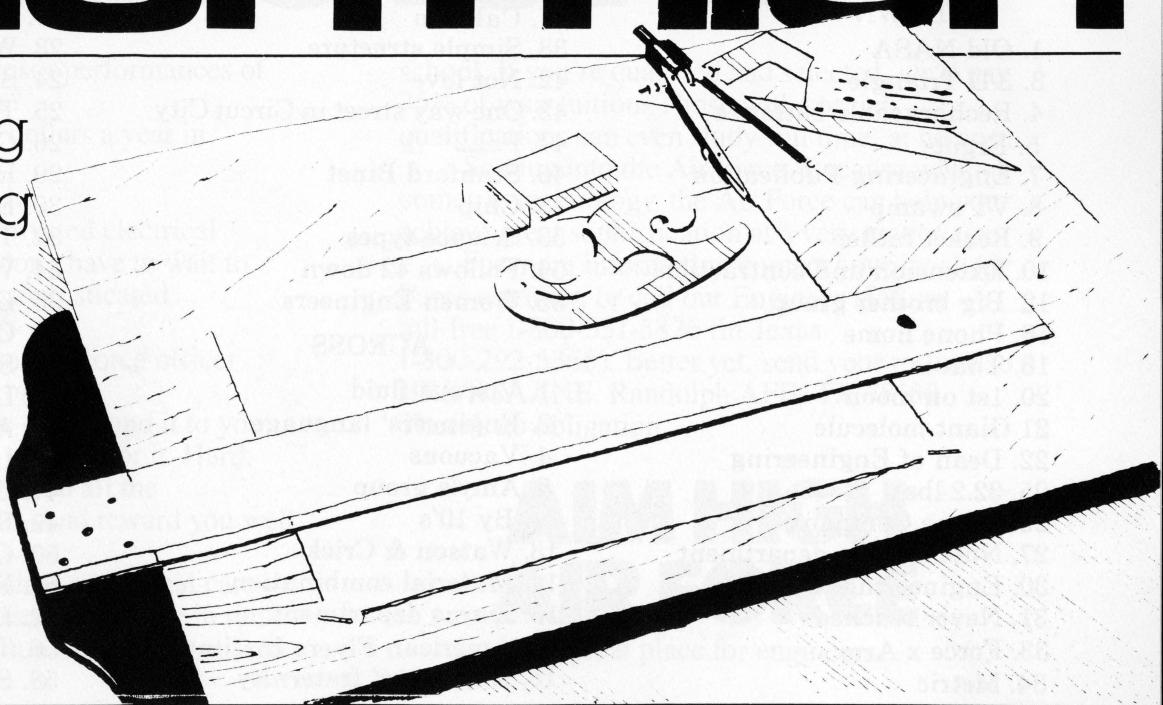


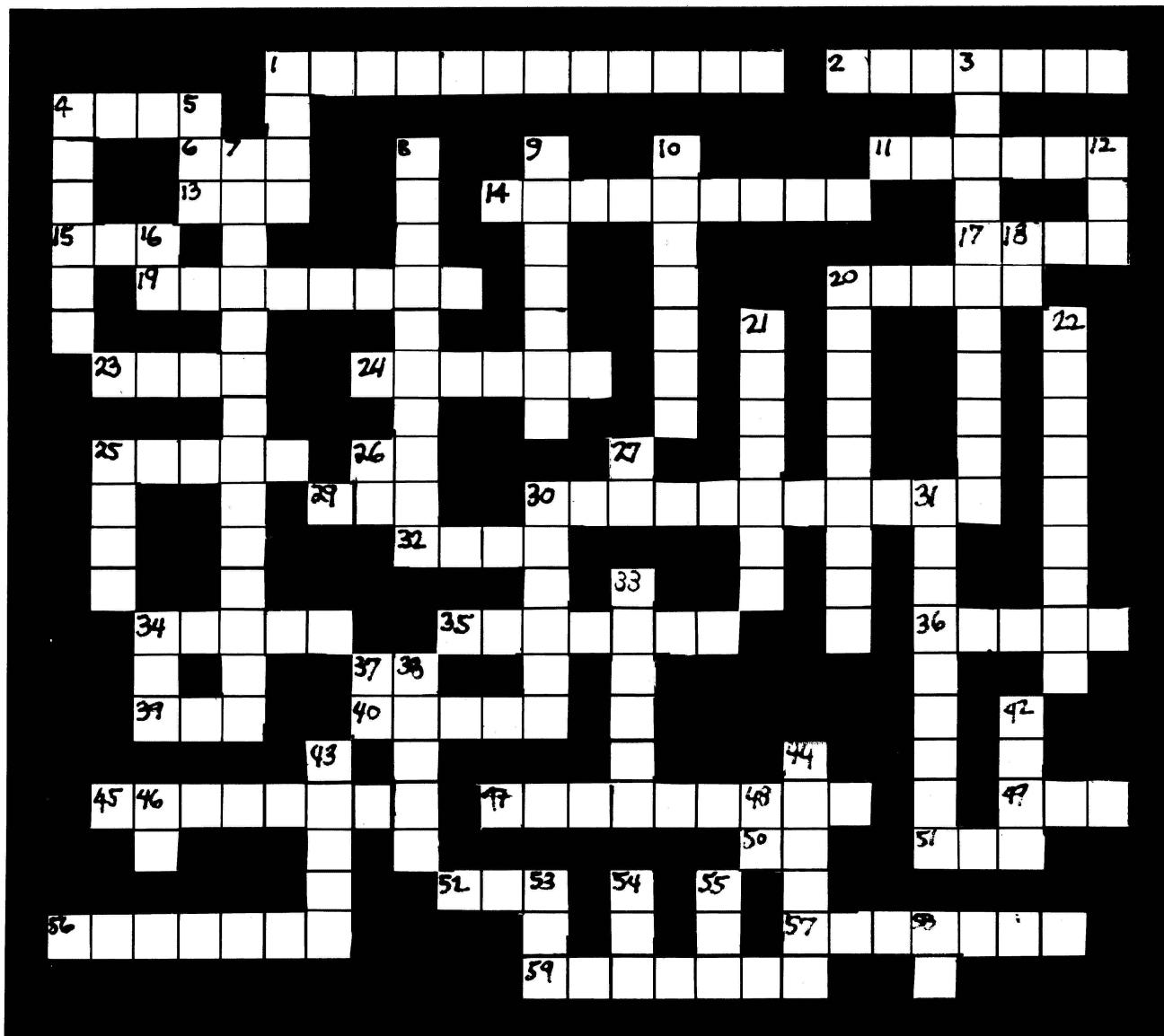
VIRGINIA TECH • BLACKSBURG, VA. 24061

mish mish

engineering
and drafting
supplies
at discount
prices

Downtown
Blacksburg





DOWN

1. Old NASA
3. 3-D Triangle
4. Rechargeable batteries
5. Ergot
7. Engineering Publication
8. VT swamp
9. Rocket father
10. Extension and contraction
12. Big brother group
16. Phone home
18. That is
20. 1st on moon
21. Giant molecule
22. Dean of Engineering
25. 32.2 lbs
26. Phone Company
27. Nuts & bolts department
30. Engineering hall
31. Never reached
33. Force x Arm
34. Metric

37. Calcium

38. Simple structure
42. Not love
43. One way street in Circuit City
44. F/L2
46. Stanford Binet
48. Chip
53. Science types
54. Follows 42 down
55. Women Engineers

ACROSS

1. Viscous fluid
2. Engineers' language
4. Vacuous
6. Amy's group
11. By 10's
13. Watson & Crick
14. Material combination
15. Icarus department
17. American Flyers Institute
19. Engineers' fraternity

20. Mad chemist gang

23. Wirehead group
24. Seniors pray for
25. Teaching excellence award
26. Chain gang department
29. Hokie land
30. Earliest geological era
32. Ten
34. Wahoo type
35. Disorder
36. Otto cycle
37. Student paper
39. Latin for I am
40. Ar
45. Loop
47. Orthogonal
49. Board scores
50. Computer group
51. PE prep test
52. Lab boys
56. Transforms
58. Silver hammer

WHO'D LET A 23-YEAR-OLD WORK WITH THE WORLD'S MOST SOPHISTICATED LASER SYSTEM?

Or evaluate primary sensor performances of multimillion dollar satellites?

Or manage millions of dollars a year in defense contracts?

The Air Force, that's who.

If you're a talented, motivated electrical engineer or plan to be, you don't have to wait to work with the newest, most sophisticated technology around.

You can do it now, as an Air Force officer working as an electrical engineer.

Don't get us wrong. We don't hand it to you on a silver platter. You have to work for it. Hard.

But if you do, we'll give you all the responsibility you can handle. And reward you well for taking it.

You'll get housing, medical and dental care—and excellent pay that increases as you rise in rank.

Plus there are opportunities to attend graduate

school. If you're qualified and selected, we'll pay 75% of your tuition. Those with special qualifications can even study full time, at no cost.

So plug into the Air Force. Because when it comes to technology, the Air Force can help you achieve great sophistication at a very tender age.

For more information contact your local Air Force recruiter, or call our Engineer Hotline toll-free 1-800-531-5826 (in Texas 1-800-292-5366). Better yet, send your resume to HRS/RSAANE, Randolph AFB, TX 78150. There's no obligation.

AIM HIGH AIR FORCE

A great place for engineers



**SEEMS AS THOUGH A PIN CAME
LOOSE.**

At General Dynamics, we design careers the same way we design our products: for success.

Today, many college graduates, particularly in the fields of Engineering and Computer Science, are playing a crucial role in this success.

If you are qualified, we offer a spectrum of opportunities in aerodynamics, advanced signal processing, radar systems, embedded software, lasers and electro-optics, composite structures, VLSI, non-linear structural analysis, robotics, CAD/CAM and other state-of-the-art technologies.

Working at General Dynamics, you will learn

to integrate these technologies into new and existing programs in aerospace, electronics, shipbuilding, military land vehicles, computer systems and many other areas. You will be working with professionals who are recognized leaders in their fields. The most advanced tools of technology will be at your disposal. And to help you remain current in your chosen field, formal training and tuition refund programs are available.

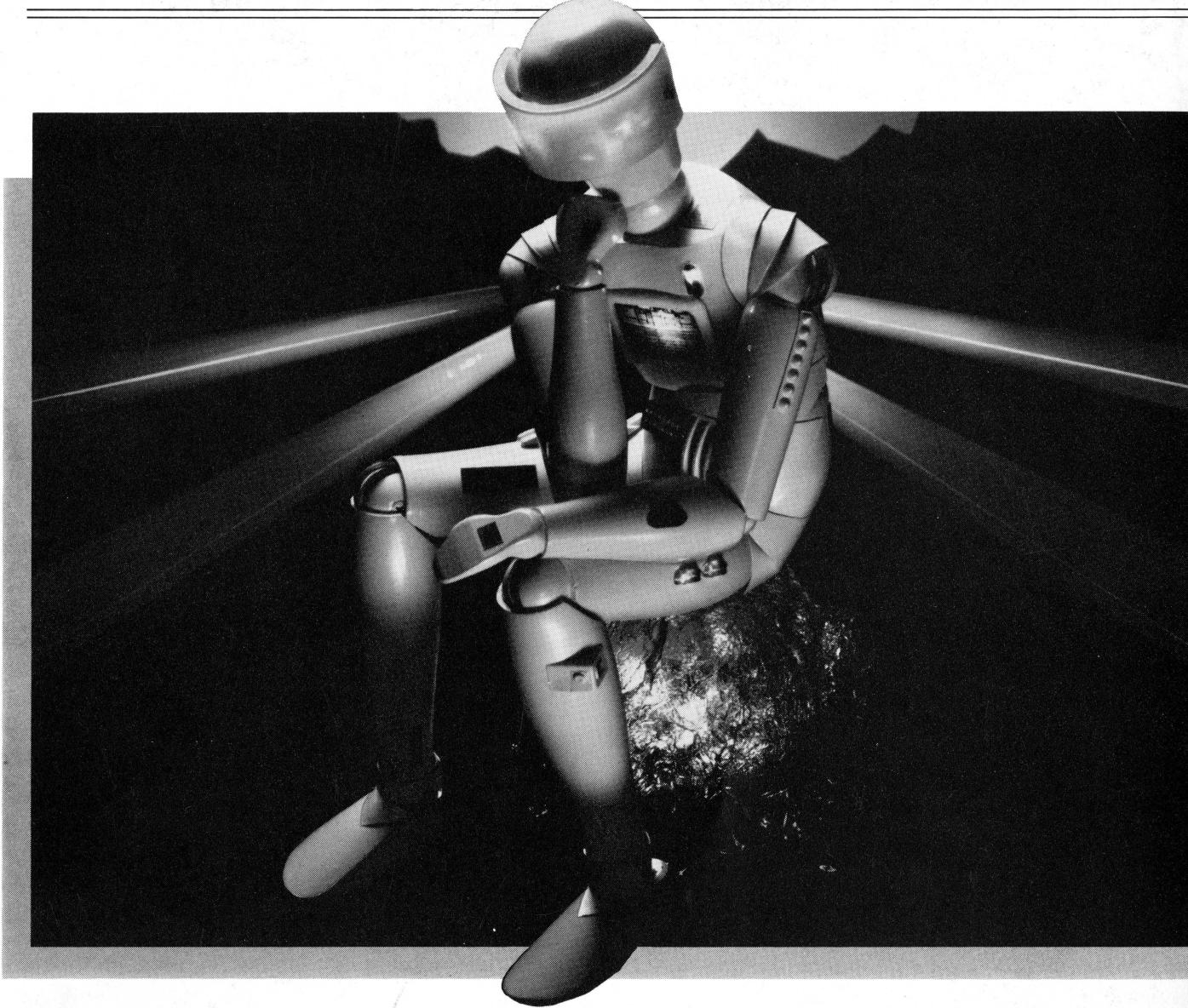
To learn more about a state-of-the-art career at General Dynamics, see your Placement Office for a campus interview.

The state of the art in careers.

The state
of the art
in careers.

GENERAL DYNAMICS

An Equal Opportunity Employer/U.S. Citizenship Required



Create computers that capture the mysteries of common sense.

The brain does it naturally. It wonders. It thinks with spontaneity—advantages we haven't been able to give computers. We've made them "smart," able to make sophisticated calculations at very fast speeds. But we have yet to get them to act with insight, instinct, and intuition.

But what if we could devise ways to probe into the inner nature of human thought? So computers could follow the same rationale and reach the same conclusions a person would.

What if we could actually design computers to capture the mysteries of common sense?

At GE, we've already begun to implement advances in knowledge engineering. We are codifying the knowledge, intuition and experience of expert engineers and technicians into computer algorithms for diagnostic troubleshooting. At present, we are applying this breakthrough to diesel electric locomotive systems to reduce the number of engine teardowns for factory repair as well as adapting this technology to affect savings in other areas of manufacturing.

We are also looking at parallel processing, a method that divides problems into parts and attacks them simultaneously, rather than sequentially, the way

the human brain might.

While extending technology and application of computer systems is important, the real excitement and the challenge of knowledge engineering is its conception. At the heart of all expert systems are master engineers and technicians, preserving their knowledge and experience, questioning their logic and dissecting their dreams. As one young employee said, "At GE, we're not just shaping machines and technology. We're shaping opportunity."

Thinking about the possibilities is the first step to making things happen. And it all starts with an eagerness to dream, a willingness to dare and the determination to make visions, reality.

An equal opportunity employer



***If you can dream it,
you can do it.***