

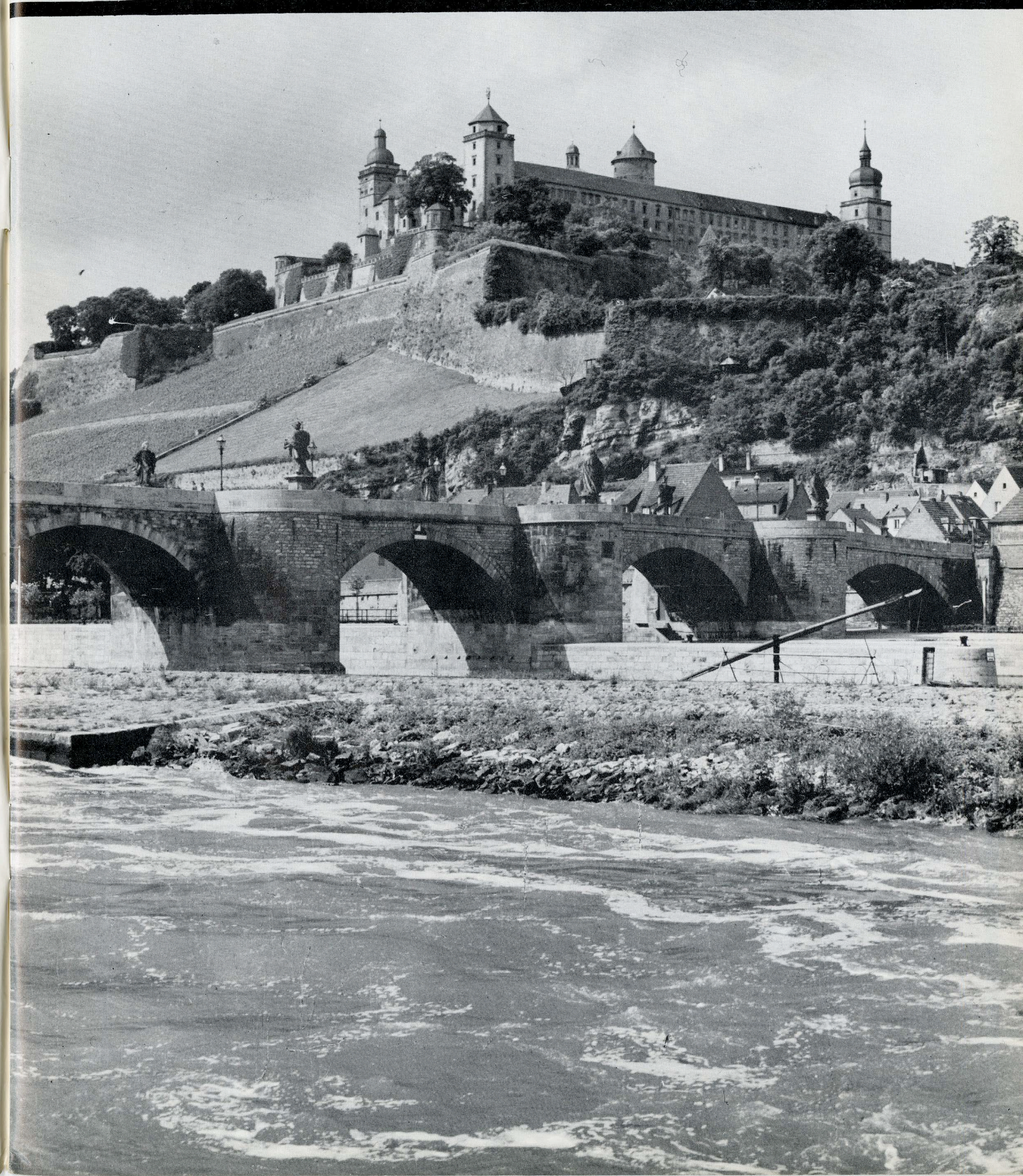
# BRIDGE of ETA KAPPA NU

Second-Class Postage  
Paid at Lafayette, Indiana  
and at Additional Offices

Mr. Donald Christiansen  
IEEE Spectrum-345 E. 47th St.  
New York, N. Y.  
Kappa 5  
10017  
79



*The Bridge of Eta Kappa Nu*







## Surely, that can't be the whole answer? Something's missing!

When you calculate the important personal investment you've made in your education, is this all the answer you want? You're you. And there's more to life than just "a job"—or should be.

What could you expect if you joined us? A quality of life that means the difference between "a job" and a way of living.

We design and manufacture complete electronic systems of various kinds for business, industry and government. It is our practice to hire very able people and then put them to work doing what they most like to do.

Because we are a large company, we offer a total career growth-potential that is as big as we are. And because we work in relatively small product-oriented divisions, your abilities and contributions are highly visible from the time you join us, with prompt recognition of superior performance.

Whether you work for us in California, New York, Ohio, South Carolina, Florida, Kansas or Delaware, you'll find yourself look-

ing forward to coming to work in the morning. And your technology won't become obsolescent in 5 or 10 years, because, to remain a leader, we must continue to work on the leading edge of the current state of the art.

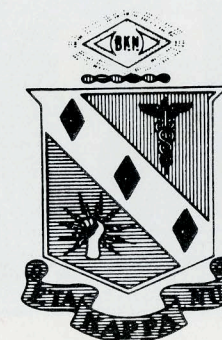
Professional involvement . . . continuing development as an engineer . . . an environment of individual responsibility that encourages new ideas and rewards initiative. These are good dividends on the personal investment you've already made on your education!

If you're not realizing them now, write:

Mr. Vernon L. Mirre, Dept. BR-11-76  
Corporate Executive &  
Professional Recruitment  
NCR Corporation  
Dayton, Ohio 45479

An Equal Opportunity Employer

**NCR**



Editor and Business Manager  
Paul K. Hudson

#### Contributing Editors

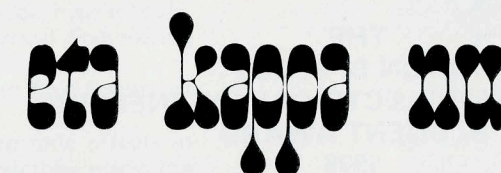
Larry Dwon  
Carl Koerner  
Marcia Peterman  
Miggs Pomeroy  
Jack Pullen  
Leon Zelby

#### Photography Editor

Howard Sheppard

#### OUR COVER

It is Springtime—time for romantic thoughts. Our cover shows the Marienberg fortress at Wuerzburg on The Romantic Road—see page 25.



Electrical Engineering Honor Society  
Spring, 1977, Vol. 73, No. 3

Alton B. Zerby Student Award .....	4
Electrifying the Family Car .....	7
Los Angeles Award Dinner .....	12
Gamma Theta Activities .....	14
Social Conscience .....	19
Zeta Kappa Activities .....	21
The Romantic Road .....	22
Chapter News .....	25
Merry Moments .....	27

The BRIDGE is published by the Eta Kappa Nu Association, an electrical engineering honor society. Eta Kappa Nu was founded at the University of Illinois, Urbana, October 28, 1904, that those in the profession of electrical engineering, who, by their attainments in college or in practice, have manifested a deep interest and marked ability in their chosen life work, may be brought into closer union so as to foster a spirit of liberal culture in the engineering colleges and to mark in an outstanding manner those who, as students in electrical engineering, have conferred honor on their Alma Maters by distinguished scholarship activities, leadership and exemplary character and to help these students progress by association with alumni who have attained prominence.

The BRIDGE is published four times annually—November, February, May, August—and is published by Eta Kappa Nu, Haywood Publishing Company, 5th & Ferry Sts., Lafayette, Indiana. Second Class postage paid at Champaign, Illinois and additional mailing office. Copyright, 1977, Eta Kappa Nu Association. Subscription price: three years, \$7.50; Life Subscription, \$30.

Address editorial and subscription correspondence and changes of address to: BRIDGE of Eta Kappa Nu, P.O. Box 2203, Station A, Champaign, Illinois 61802.

**Member Association of College Honor Societies**

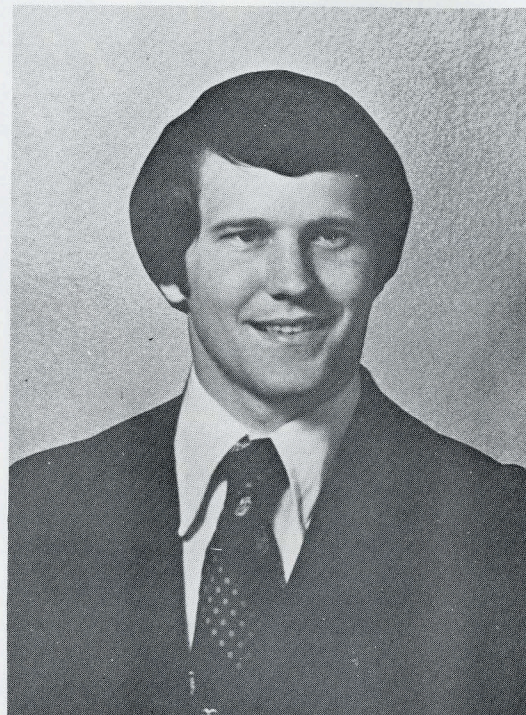


# Alton B. Zerby Student Award

**ALLEN DeVANEY ELSTER**

**WINNER**

**THE  
ALTON B. ZERBY  
OUTSTANDING ELECTRICAL ENGINEERING  
STUDENT AWARD  
1976**



Mr. **ALLEN DeVANEY ELSTER**, first in his class was nominated by Epsilon Lambda Chapter at Vanderbilt University. Mr. Elster has been honored with membership in Eta Kappa Nu, Tau Beta Pi, Phi Eta Sigma. He has served as President of Tau Beta Pi, the student chapter of the IEEE and The Engineering Council.

He is the recipient of a Rhodes Scholarship being the first engineer so honored; other scholarships and awards consist of The Vanderbilt Engineering Honor Scholarship, The National Merit Scholarship Award, The Tau Beta Pi Award for Outstanding Sophomore Engineering Student.

Mr. Elster has served his classmates as an Honor Council Representative, an Engineering Representative to Undergrad Student Affairs Board Curriculum Committee and as a member of The Young Alumni Trustee Selections Committee.

He has spoken at the Engineering Centennial Symposium as the only student representative of the school addressing the topic, "The Future Imperative for Technology."

Among the several technical papers he has authored is "The Two Faces of Technology," in "Technology and America's future," Proceedings of Centennial Symposium on Technology and Public Policy, Vanderbilt University Press, 1976.

In addition to his technical achievements he has found time to actively participate in varsity track and intermural basketball. He also is a Boy Scout Merit Badge Counselor.

For relaxation he enjoys playing the piano and acting in the theater.

**HONORED AT THE  
AWARDS DINNER  
IN LOS ANGELES  
JULY 16, 1976**

# HONORABLE MENTIONS

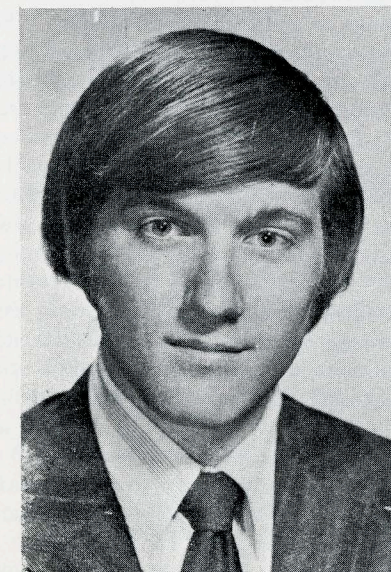
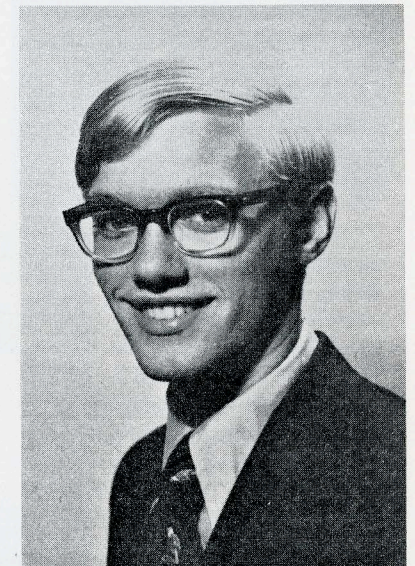
Mr. **ARTHUR EDWIN UBER III**, first in his class was nominated by Sigma Chapter at Carnegie-Mellon University. Mr. Uber has been honored with membership in Eta Kappa Nu, Tau Beta Pi and is a member of the IEEE. He has served as Vice President of Eta Kappa Nu and has received The Outstanding Senior Award from the IEEE.

He has served his community and classmates by many worthwhile projects, such as talks by Eta Kappa Nu students at local high schools, and listing of projects and research work in the Electrical Engineering Department to benefit his fellow students.

Mr. Uber also is an Assistant Scoutmaster in the Boy Scouts of America.

He has worked on a research project on "Electrostatic effects in Fabric Filtration of Dust." One of his photo-micrographs made the cover of The Air Pollution Control Association Journal.

For relaxation, Mr. Uber enjoys gardening, backpacking, golfing and repairing things.



Mr. **NEAL M. STOUGHTON**, first in his class was nominated by Upsilon Chapter at University of Southern California. Mr. Stoughton has been honored with membership in Eta Kappa Nu, Phi Kappa Phi, Tau Beta Pi and is a member of the IEEE and served as President of Eta Kappa Nu and of the IEEE.

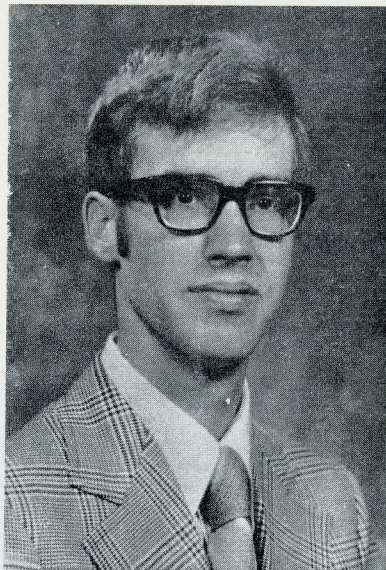
As President of Eta Kappa Nu he organized a special 50th Anniversary Banquet honoring Upsilon Chapter where members and guests heard a charter member speak as well as other past and present members. He also arranged special tours of industrial operations so members can find out more about the operations in industry while students.

As Chairman of the IEEE he organized field trips to facilities of interest at ITT, Los Angeles International Airport, Northrop, etc.

For relaxation he enjoys bicycle racing, bicycle touring and is an award winning concert pianist.

► Next Page





Mr. **BRUCE CONRAD WALKER**, first in his class was nominated by Omega Chapter at Oklahoma State University. Mr. Walker has been honored with membership in Eta Kappa Nu, Tau Beta Pi, Phi Kappa Phi and is a member of the IEEE and has served as President of Eta Kappa Nu, Treasurer of the IEEE and President of The Amateur Radio Club.

As President of Eta Kappa Nu he has been instrumental in continuing and improving the effectiveness of The Peer Advertisement Program. This is a program in which Eta Kappa Nu members set aside one week per semester for advising young students on the selection of electrical engineering courses for their junior and senior years.

As a Ham Radio Operator he has served his community in various ways by working closely with both the Stillwater and Muskogee Civil Defense during tornado watches.

For relaxation he enjoys amateur radio, tennis, hunting, camping and coin collecting.

## JURY OF AWARD 1976

### CHALMERS M. BUTLER

National President of Eta Kappa Nu  
Chairman of Electrical Engineering Department-University of Mississippi  
Associate Editor of the "IEEE Transactions on Antennas and Propagation"  
Vice President of the Southeastern Section of the American Society for Engineering Education

### JOSEPH K. DILLARD

President of IEEE  
Manager of Advanced Systems Technology-Westinghouse  
Fellow of IEEE  
Member of the National Academy of Engineering

### ERIC T. B. GROSS

Chairman Electric Power Engineering Curriculum-Rensselaer Polytechnic Institute  
Past National President of Eta Kappa Nu  
Eminent Member of Eta Kappa Nu  
Fellow IEEE

### EDWARD C. JORDAN

Head of Department of Electrical Engineering-University of Illinois  
Eminent Member of Eta Kappa Nu  
Fellow of IEEE  
Member of the National Academy of Engineering

### THOMAS H. LEE

Manager-Strategic Planning Operation-General Electric Company  
Fellow of IEEE  
Member of National Academy of Engineering  
President of The IEEE Power Engineering Society

### GORDON E. MOORE

President-Intel Corporation  
Fellow of IEEE  
Member of the National Academy of Engineering  
Co-founder of Fairchild Semiconductor Corporation

# Electrifying the Family Car

The electric car has been a long time arriving, and it isn't quite here yet.

IN THE FIRST GOLDEN ERA of the electric car — maybe the best and worst year was 1908 — a frustrating fork in the road following a decade of progress.

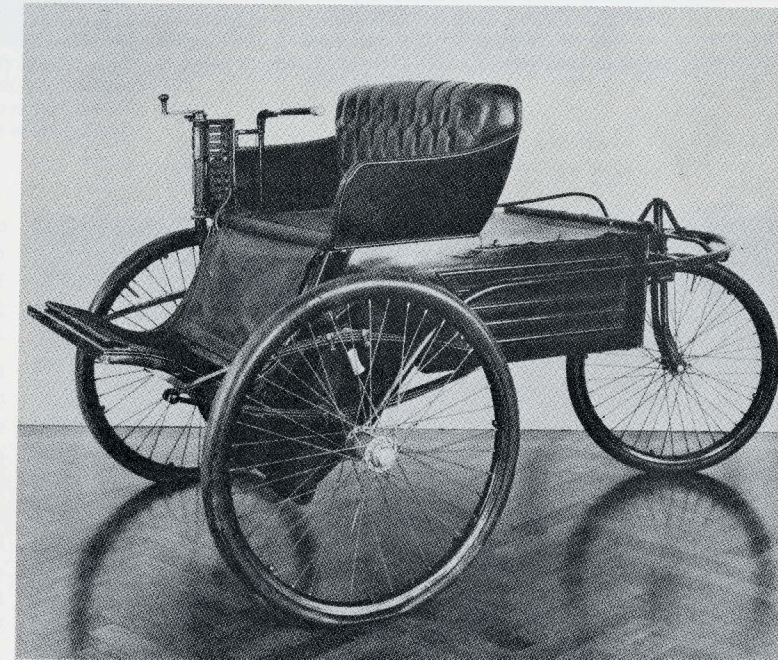
Long after the idea of self-propelled vehicles was widely accepted, inventors were still arguing as to what their motive force should be. There were vehicles perking along on illuminating gas, cars burning powdered coal, elegant runabouts puffing steam, and those controversial horseless carriages advancing on smoky, oily gasoline explosions.

And there were the electrics. Quiet. Clean. Simple. Dependable.

At Cranston, Rhode Island, in 1898, electrics hit speeds of 26.8 miles per hour to win races against gasoline-powered Duryeas. An electric pioneered the enclosed cab. In 1901, the first car depicted on an American postage stamp was a reliable Baker electric taxi. In 1904, one-third of the cars in New York, Chicago, and Boston were electrics. Oldsmobile, Montgomery Ward, and the Studebaker brothers joined scores of manufacturers producing thousands of electrics for motorists who preferred smooth, low-maintenance, individual transportation that required no cranking to start.

Said Thomas A. Edison to Walter Baker: "If you continue to produce your present quality of electric car, and I my present battery, the gas buggy won't stand a chance."

Still, cars of other means of power



The first battery-powered electric automobile was built under the direction of Thomas A. Edison about 1889. Called the Edison Electric Runabout, it had a five-horsepower motor powered by a storage battery using nickel plates and alkaline electrolyte.

also prospered. Their advantages of peppy performance and long range appealed to drivers eager to accelerate into history's greatest revolution in personal mobility. By 1905, of the 212 entries in the New York Automobile Show, 31 were electric, four were steamers, and 177 were internal combustion. In sensational stunts, races, and endurance runs the gasoline cars proved their worth — most ambitiously in the 10,000 mile, Peking-to-Paris saga of the summer of 1907.

Such competitive hijinks particularly rankled Oliver P. Fritchle of Denver, Colorado. Fritchle happened to manufacture electric cars. He catered to high society with sure-start coaches which did not offend ladies with unpleasant sputterings. Among Fritchle's patrons was the Unsinkable Molly Brown, whose chauffeur nightly re-

turned her car to the factory for a 12-hour recharge.

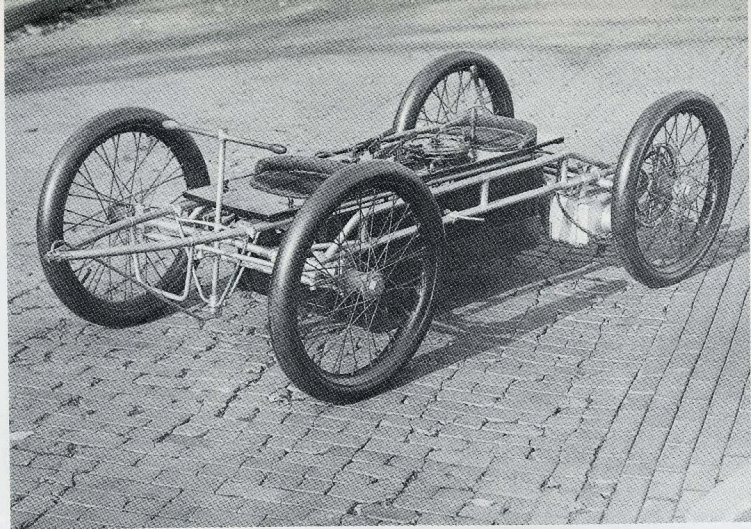
Stung by slurs upon the touring range and backroad muscle of electrics, Fritchle set out in late autumn of 1908 from Lincoln, Nebraska, toward New York City. He chose the boggy season on purpose, to put his car to the greatest test. Fritchle slogged through mud, rain, snow, sleet, and endless detours. He spent whole days sleuthing out recharging facilities, and often he obtained proper voltage by rigging a rainbarrel as a rheostat.

Fritchle met covered wagons winding West. At Avoca, Nebraska, farmers fearing an explosion refused him a

tow by mule. Sometimes at the top speed of 30 mph, other times creeping blindly through fog, Fritchle pressed across the nation. His lead-acid batteries kept the car going 100 miles (he said) between charges. An ingenious electric brake revived the batteries in downhill runs.

Fritchle experienced but two failures: a flat tire in Chicago, and burned brakes in the Alleghenies. (He relined the brakes with camel's hair.) Twice he was arrested for being unlicensed. Despite delays and primitive roads he covered his 2,140 miles in five weeks. The *New York Times* headlined the Fritchle expedition as "probably the longest journey ever undertaken in an electric vehicle." Fritchle triumphantly paraded the cities of the East, convinced he had established the electric as the car of the future.





The Riker Electric Torpedo Racer won speed trials over 140 competitors in 1901 with a speed of 57.1 miles per hour, establishing a world record for electric vehicles.



Exxon researchers at Florham Park, N.J., test electric motors and control systems on a drivable chassis in an effort to develop more efficient power trains.



This 1912 Baker Victoria Phaeton was purchased during the administration of President Taft, and was available for use by Mrs. Warren Harding, Mrs. Woodrow Wilson and Mrs. Calvin Coolidge.



Under development by Exxon Research is a battery using a zinc film on plastic plates and a bromine electrolyte, with the energy density potential of twice that of conventional lead-acid batteries.

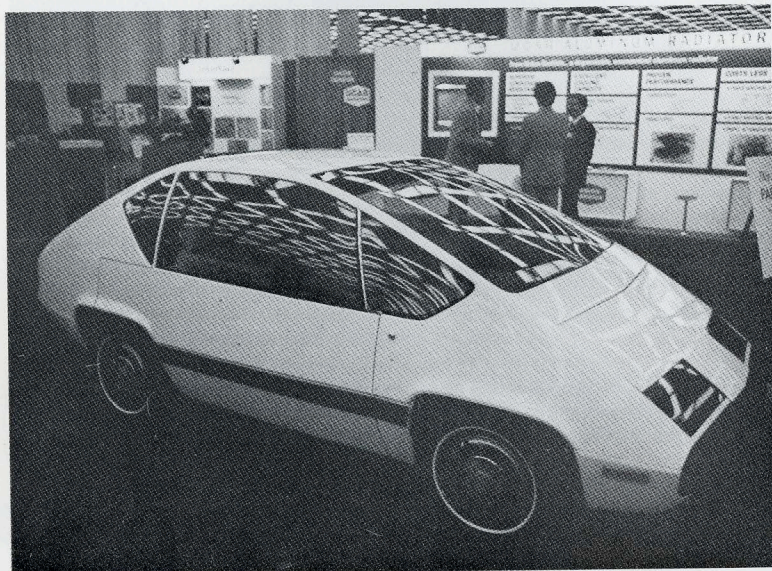
But other developments of 1908 overshadowed Fritchle's feat. General Motors was organized and began merging several leading makers of gasoline cars. And Henry Ford began production of the first of millions of Model T's.

Less than 10 years later, Fritchle was out of business, doomed by the gasoline engine self-starter. By the 1930's, only one manufacturer, Detroit Electric, was still making electric cars, and only on special order. In America, at least, demand for and use of electric passenger cars on streets and highways all but vanished.

"Things do not change," once wrote Thoreau. "We do."

We have evolved into a nation deeply concerned about air quality, environmental values, resource conservation, and energy costs. Imaginative minds grapple with alternatives for moving things and people. One phenomenon: rekindled interest in that turn-of-the-century marvel, the electric car.

It never went away, really. Electric propulsion had survived in traditional and novel mass transit systems both here and abroad. Other countries clung to electrics as delivery vans. In America, scarcely a month could pass without articles in *Popular Mechanics*,



The Copper Electric Town Car, offered by Copper Development Assoc., Inc., has a top speed of 40 mph, and will travel 120 miles before its 18 six-volt lead-acid batteries require recharging.

*Science Digest*, or Sunday supplements about some company or individual testing concepts and models of electric cars. General Motors experimented extensively in the late 1960's with a converted Corvair. Clean Air Car Races by college engineering whizzes included imaginative electrics.

From coast to coast, gifted shade-tree mechanics tinkered with electric propulsion. John Hoke, of Washington, D.C., concocted a tiny electric that made 20 miles between charges. Warren Harhay, electronics instructor at Parma, Ohio, led his high school class in fashioning an electric car that reached speeds up to 55 mph powered by a battery pack weighing 900 pounds. Leo Schatzel, an electronics technician

of Fontana, California, rigged his 1960 NSU Prinz for commuting 22 miles to work.

Always good for a smile was Richard Mills of Everett, Washington, when seen taking his electric Dauphine for a walk. He spent one-and-a-half years and \$600 in the conversion. Frequently the Dauphine balks on the long hill home, and Mills jogs along beside the car with a hand through the window on the steering wheel.

In the autumn of 1966, an electric car covered some of the tracks of the Fritchle. A

converted five-passenger Renault dubbed the Mars II was driven westward from Detroit by engineers of Arizona Public Service Company. At the Indianapolis Speedway the car clocked a top speed of 68 mph. Cruising at 44-55 mph between 36 recharging stops, the Mars II covered 2,226 miles at a consumption of 1,074 kilowatt-hours and an energy cost of \$27.17, or 1.2 cents a mile, a bit less than gasoline costs today for a stock Renault.

Yet electric car buffs were quick to recognize some persistent drawbacks: pokey performance, high initial cost, protracted recharging, low payload, limited range, sluggishness in cold weather, and the ever-present penalty of the weight of multiple sets of con-

ventional lead-acid batteries.

Thus, economic and engineering realities relegated widespread use of electric vehicles in the U.S. to specific industrial types, such as fork-lift trucks. In leisure-time applications, notably America's 200, golf carts, electric propulsion gained acceptance.

By now, the vision of golf carts delivering relief pitchers from the bullpen to the mound is ingrained in baseball lore. But how many fans would want to drive a larger, more powerful golf-cart-version commuter is conjectural. In a recent survey made for the Electric Vehicle Council, Americans were asked to imagine a little electric that would be suitable for town trips, would have a top speed of 40 mph, and would go about 150 miles between charges.

The survey reported that 55 million Americans might be interested in owning such a vehicle if it costs less than \$2,000. Greatest interest was discerned among young people, and big city residents. That this curiosity has not excited a buying binge may be explained in part by the mid-1975 introduction of a standard sedan converted to electric drive that will go 120 miles at freeway speeds for \$1.20 in electricity. All to the good. But the sticker



Made in Great Britain, the Lucas Electric Van was designed for use as a taxi cab. It is powered by 2,000 pounds of lead-acid batteries.

price is a discouraging \$18,000.

Which may be the top of the line. At present, no less than 30 companies boast of short-range, low-speed electric cars either in prototype or production stages. The price of the wedge-shaped, 63-inch-wheelbase Sebring Citicar in 1975 was below \$3,000. The *Electric Vehicle News*, quarterly voice of the Electric Vehicle Council (EVC), reports and advertises increasing numbers, varieties, and uses of electrics.

One on-road car weighs just 980 pounds, looks like a tiny Jeep, gets up to 60 miles per charge, and costs \$1,986. Another car, whose 80-inch wheelbase is still shorter than a Honda Civic, totes 1,200 pounds of batteries to be replaced every two years for \$600.

Another model is available as half-a-car (the going half), and is priced at \$1,700 for the do-it-yourself market.

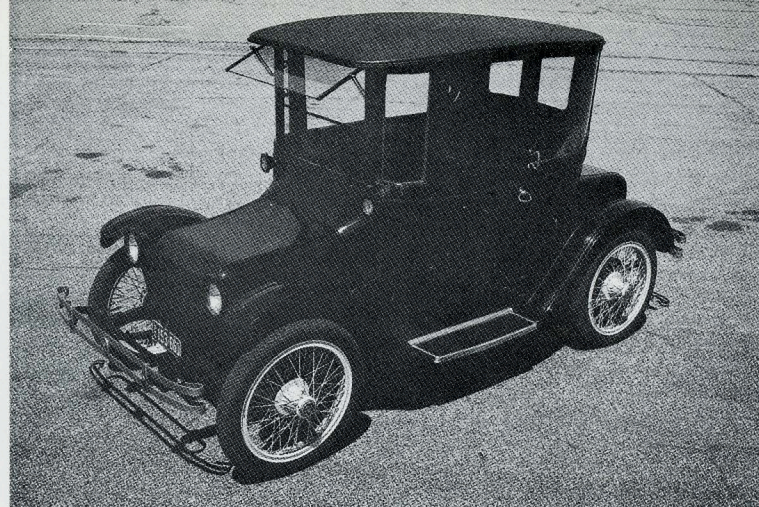
In an EVC-sponsored program, some 57 co-operating utilities are field-testing electric vans. Such uses have been publicized in recent years during international symposia administered by the EVC. Scientific and industrial papers tell about the Midi-Bus shuttling electrically between Birmingham and Manchester, England. Research continues in France, Germany, Holland, Italy, Mexico, and

Brazil. Japan, whose urban air pollution likely is the world's worst, encourages electric vehicle development as a national policy.

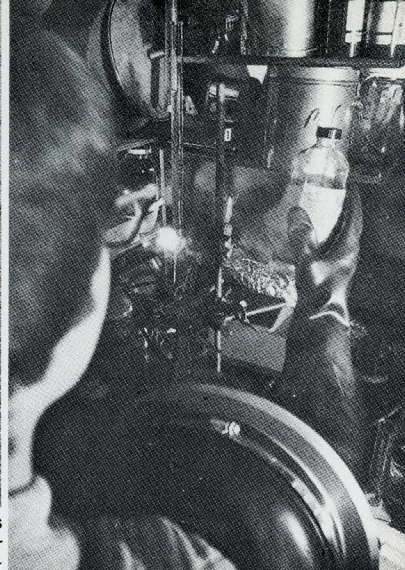
Closer to home, practical demonstrations of specialized, on-road electrics have included federally financed bus service in Lansing, Michigan, and Yosemite National Park. Elsewhere, two large-scale deployments may be showing the promise of electric cars, where they precisely fit a need.

At Cupertino, California, testing of 30 electric delivery vans by the U.S. Postal Service has led to the purchase of 350 more. Says Donn P. Crane, fleet management director, "So far, performance on routes averaging 11.5 miles has been satisfactory." Crane estimates

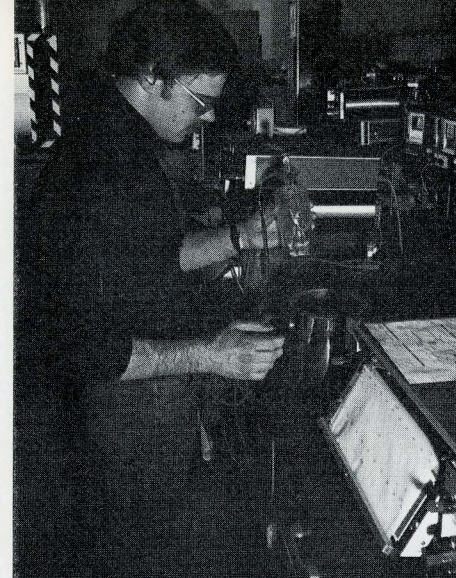




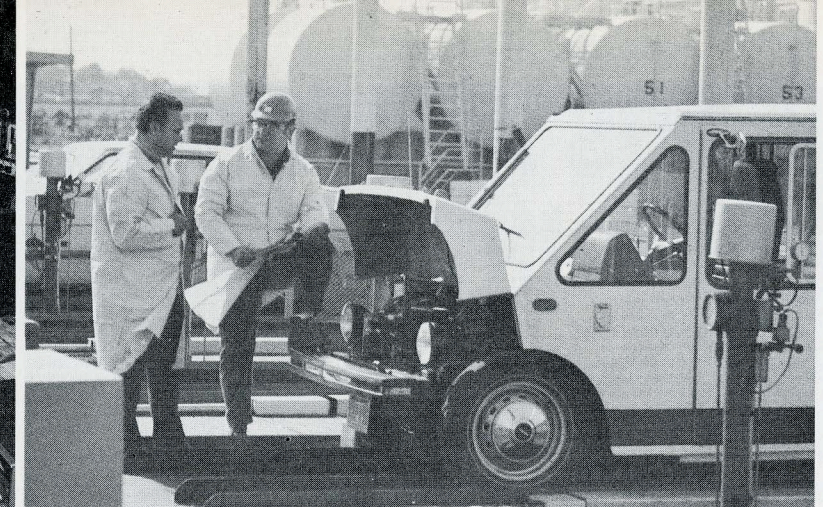
The Detroit Electric Coupe was produced from 1907 to 1942. This 1922 model had a single electric motor with shaft drive to the rear wheels, and could reach a top speed of 24 miles per hour. It cost \$4,000. The cars are from the collection of the Henry Ford Museum in Dearborn, Michigan.



Working in a "dry box" free of oxygen and moisture, an Exxon researcher assembles a lithium battery for testing.



Although the lithium battery must be sealed in glass to exclude air and moisture, it offers an energy density potential many times that of conventional batteries.



One of Exxon's two electric vans gets a going-over at the Linden, N.J., research center where tests are being conducted to determine performance under varying conditions. It is powered by 14 six-volt lead-acid batteries.

that there are some 30,000 postal routes that fall within the parameters of speed, distance, and grade now available in present electric capability.

Another tailor-made utilization of electric cars is at Sea Pines Plantation, a totally designed community with four golf courses on the southern tip of Hilton Head Island, South Carolina. A vehicle called the Islander, capable of carrying four adults and 500 pounds of luggage at 30 mph for 50 miles is rented to transient residents and tourists. Recharging is accomplished through a multitude of recharging stations. The Carolina experiment is judged a success, in part because of ideal use, terrain, and climate.

In such well-targeted applications, as in the days of the horseless carriages, the vaunted advantages of the electrics are displayed. The noise is of rolling tires, humming motor, and whooshing wind. Pollutants are nil, except at the power generating station, where (as a rule) they may be more easily controlled. No radiator, complex engine, ignition system, transmission, exhaust, and muffler require maintenance and replacement. At a standstill, no energy is used in idling. Unlike the gasoline engine which dissipates much of its energy as heat, the electric motor squanders little. Gone is the need for antifreeze, oil changes, tune-ups, warmups, and steam cleanings. The compact electric motor component might go 400,000 miles without a major overhaul.

Be that as it may, both champion and skeptic agree on one prediction: No universal American turn-on to elec-

tric cars is likely until an electric storage battery much better than lead-acid is perfected. It was lead-acid that powered the Baker and Fritchle into the museums, and it is lead-acid, albeit improved, that chemically stores the energy upon which most of this day's electrics rely. Unfortunately, lead batteries are so heavy that stuffing enough of them inside a car to run it decrease the vehicle's ability to move.

Scientists in battery research refer to a technical term, "energy density," for the amount of energy that can be packed into a given weight of battery. One who seeks a better battery is Dr. Robert Hamlen, who works for Exxon Enterprises, Inc., an affiliate of Exxon Corporation. Says Dr. Hamlen:

"The best lead-acid battery commonly available has an energy density of about 15 watt-hours per pound in electric vehicle applications. That imposes on a reasonable electric car of this day a 30 to 40-mile range in typical urban use. For a 100-mile range we require a battery with 30-50 watt-hours per pound energy density. And if we aspire to approach the range of present-day cars per tank of gasoline, we'll need a battery of 100 watt-hours per pound energy density. Outside the laboratory, such batteries do not exist for practical use on a broad scale."

What are the prospects? Research divisions of automobile makers, battery manufacturers, and energy companies are committed to programs pregnant with promise.

A sodium-sulfur battery eventually could have 5 to 10 times the energy density of lead-acid. But the laboratory

version has to be kept at more than 500 degrees Fahrenheit to function; the battery's components at this temperature could react spontaneously with each other or with air should the case crack open in an accident.

A zinc-air battery gives a theoretical capacity nearly eight times that of lead-acid. In practice, the zinc-air system requires complex auxiliary machinery such as compressors, pumps, separators, reservoirs, and exhaust purifiers. Additionally, it cannot be easily recharged.

Lithium often is mentioned as a reactant in future batteries. In room-temperature systems, its values thus far are outweighed by its drawbacks, including long charging time and short cell life. High-temperature lithium systems have problems similar to those of sodium-sulfur batteries, as well.

Familiar to consumers is the nickel-cadmium battery as premium-priced power for radios and recorders and such. Although it is long-lived and effective, its energy density actually is in the range of lead-acid.

A silver-zinc cell was the heart of the moon buggy driven by American astronauts. The battery has an energy density of about 50 watt-hours per pound, at a handsome price. The silver-zinc batteries that gave GM's Electrovan a maximum 80-mile range cost \$15,000, and had to be replaced after 100 recharging cycles.

Thus, except in labs or in costly experiments, lead-acid remains electric propulsion's only challenge to gasoline today. In terms of energy density, it's no contest. A 20-gallon tank of gasoline

can provide 2.4 million British Thermal Units (BTU's). Lead-acid storage batteries, weighing the same as a tank of gasoline, can provide only about 7,700 BTU's. Although the electrical energy of the battery can be used more efficiently, gasoline's energy potential outclasses lead-acid batteries by 300 to 1. In total energy efficiency — a measure of the amount of energy it takes to move a car a mile — electricity leads gasoline. But not by much. Normal losses of energy during the generation, transmission, and battery-charging processes subtract heavily from the electric car's energy efficiency rating.

The challenge occupies much of the time of Dr. Hamlen, whose group collaborates with other scientists at the Linden, N.J., laboratories of Exxon Research & Engineering Company. His belief in the worth of his work is based on some long-range assumptions about energy supplies. In the long term as the world's petroleum reserves are depleted, Dr. Hamlen presumes that a greater share of energy supply will be derived from nuclear sources. In addition, since there is incentive to operate nuclear plants at or near maximum output, the need will grow for systems to store energy produced when demand falls off, such as late at night. This should mean lower cost electricity for



The Elcar 200, made by Elcar Corp. in Elkhart, Indiana, features a light-weight fiber glass body and a price under \$3,000. Its 8 lead-acid batteries give it a 35-mile range with a top speed of 35 mph.

electric vehicles recharged during these off-peak hours.

Dr. Hamlen states that Exxon Enterprises is probably at least five years away from development of a "second generation" battery with 30 to 50 watt-hours per pound energy density.

Meanwhile, others in Exxon Enterprises are seeking improvements in other components of electric propulsion: motors, drive trains, chassis, body, and accessories. Ron Ricci, who leads this activity, notes an automotive trend toward energy conservation as seen in streamlining, smaller cars, and return to manual transmissions.

"Our goals in electric propulsion will have to be toward even higher efficiency and reduction in weight of components," says Ricci. "There's not much room for increasing the 93 percent maximum efficiency of the elec-

tric motor, but maybe we can make it lighter; maybe we can approach maximum efficiency over more of the vehicle's operating range."

Ricci forecasts no dramatic switch to electric and utility vans over the next several years. Hopes are falsely raised that electric cars can today effect instantaneous cures of economic and environmental problems.

"The statistic that sticks in my mind," says Ricci, "is that Detroit requires six years to pro-

duce a new conventional car, from drawing board to showroom. To call for mass production immediately of electrics is to ask Detroit to create a safe car using an unconventional body, a highly unconventional propulsion system, and a battery not yet invented.

That said, the pragmatic scientists who are devoted to the furtherance of electric propulsion are spiritual kinsmen of those trailblazers of the turn of the century.

Oliver P. Fritchle was right about there being a future for the electric car.

It's just taking longer than he thought.

DON DEDERA

#### ABOUT THE AUTHOR

Don Dederia is a free-lance writer living in Del Mar, California.

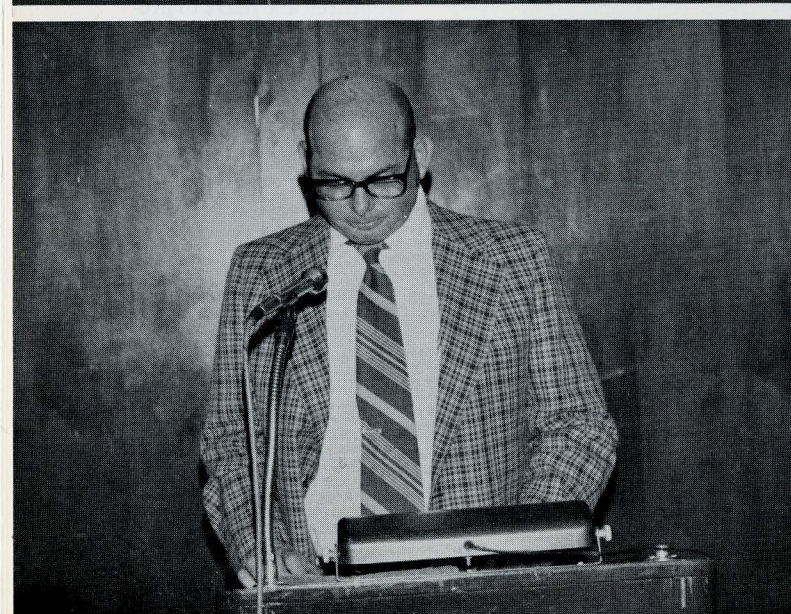


# LOS ANGELES AWARD DINNER PHOTOS

by Colleen Hamilton

The Annual Award Dinner held by the Los Angeles Alumni Chapter in honor of the Alton B. Zerby Outstanding Student Award winners was held at the Disneyland Hotel, Anaheim, California, on July 16th. One hundred members and guests had a most wonderful time. Shown below, at left are

Lawrence Hamilton, Chairman of the Award Program and Norman S. Nise, Program Coordinator. Below at right are Vice President Marcus Dodson and Norman Nise holding plaque with names of past award winners, and President Earl Eyman presenting certificate to this year's winner Allen D. Elster.



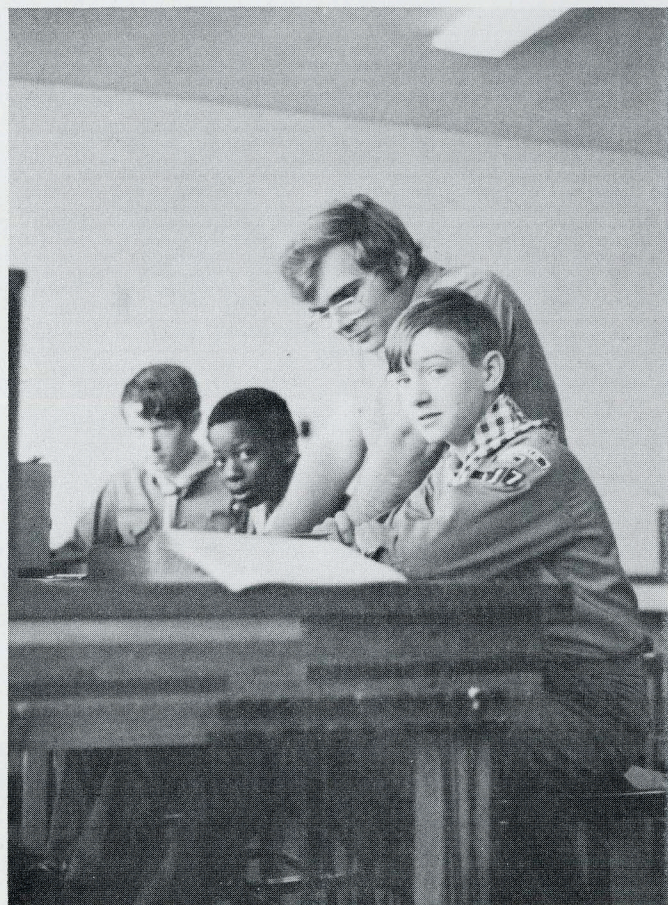


# Activities of Gamma Theta ...

## University of Missouri-Rolla

**Authors: Tom Pond, Dennis Leit-  
terman, & Ross Livengood.  
Photographer: Pham Q. Chot**

The Gamma Theta Chapter of Eta Kappa Nu was involved in many worthwhile projects during the 1975-76 school year. The projects were of a varied nature. Six of the projects were oriented toward assisting the community surrounding the University of Missouri-Rolla. The balance of the projects was in assisting the Electrical Engineering Department of UMR.



**Dennis Appel instructing boy scouts in the Electronics Merit Badge requirements.**

Our major project for the fall semester was upgrading the electrical wiring of the Rolla Youth Center. The Rolla Youth Center is a recreational facility for the youth of Rolla, Missouri. The building which houses this facility is old and some of the wiring had deteriorated to an unsafe condition. Ross Livengood, a Gamma Theta Chapter member, did a preliminary evaluation of the wiring of the building and made his recommendations to the local chapter at a regular meeting. His findings and recommendations were coordinated with the local building in-

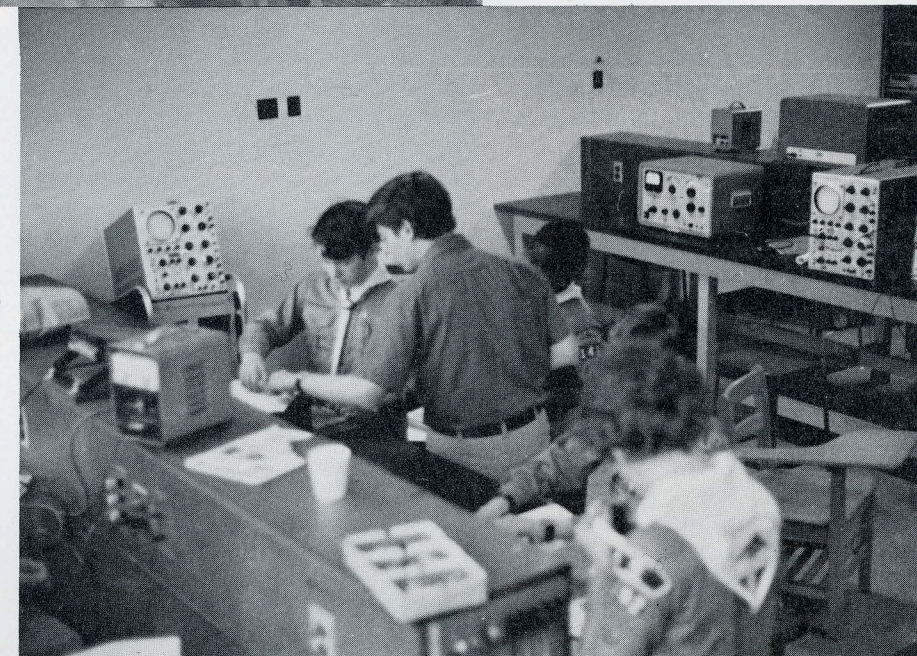
spector, plans were drawn up by Dennis Leittermann (Gamma Theta's fall 1975 President), and a date was set for volunteers from the chapter to make the necessary corrections. Funding for the project was provided through the administration of the Rolla Youth Center. November 14, 1975 was the date set to do the project. Work done on this project included replacing cover plates on switches and outlets, splitting an existing 240 volt circuit into two 120 volt circuits and placing one circuit in the storage room and the other circuit in the game room, replacing bad circuit breakers in the breaker box, replacing circuit breakers with circuit breakers of the proper size for the existing wiring, replacing bad duplex receptacles in various rooms, and installing a floodlight on the northeast corner of the building. This project involved two students for four days and ten students for one day.

It was learned through the local VISTA worker for Phelps County that two homes, which were in need of extensive repair, had to have the wiring brought up to standards before HUD would finance the other repairs. Gamma Theta Chapter decided that it would be a worthwhile project to assist these two people in bringing the wiring up to code. Five members of our local chapter of HKN conducted an electrical survey of each house and determined what had to be done to bring them up to code. The new electrical system was designed by Dennis Leittermann and Ross Livengood, two local members, and a materials list was prepared. The plans were presented to the local fire chief for approval. After approval of the plans, the materials were pur-



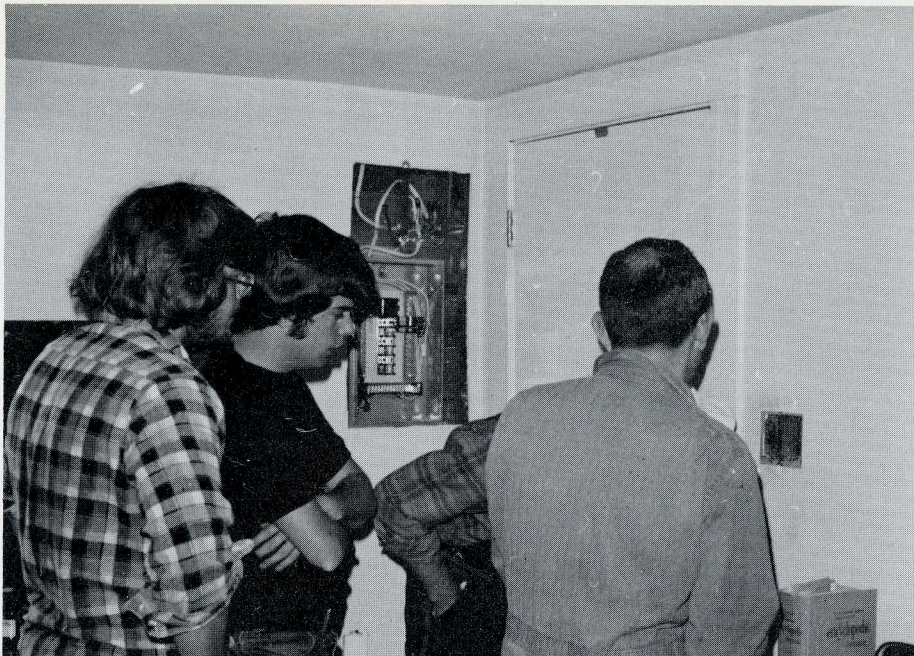
**Spring 1976 Smoker**

**Jim Detry instructing boy scouts in the Electronics Merit Badge requirements.**



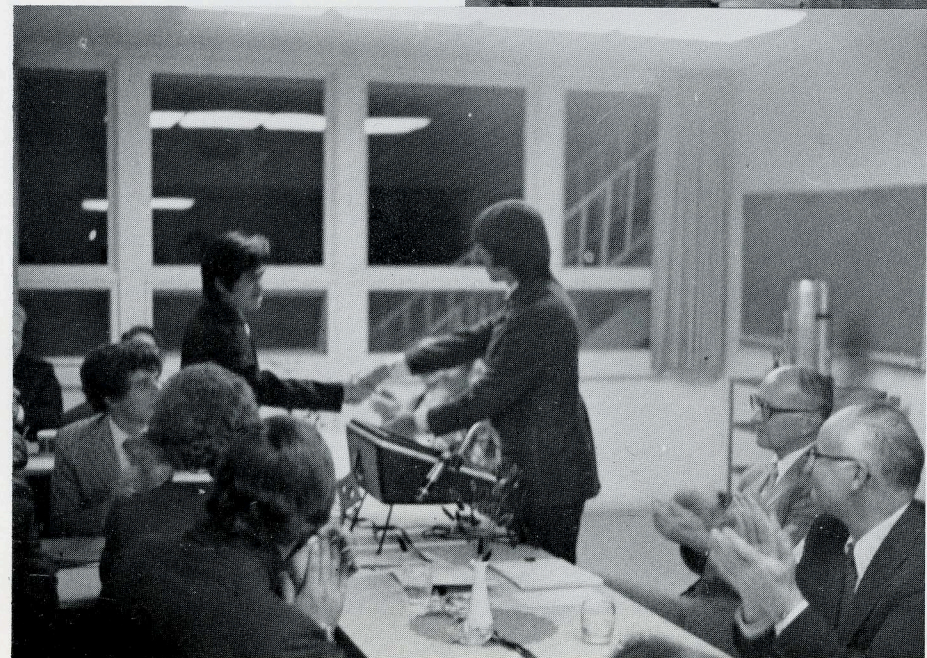
**The HKN members who brought the electrical wiring in Mrs. C. L. Pellikaan's home up to code. Row 1: (l to r) Mike Patterson, Mark Mills, Mark Owens, Dennis Leittermann; Row 2: Phil Beck, Pete Kinman, Mark Call, Gene Kulengowski, Mark Westerdale; Row 3: Phil Bogler, Mike Dixon, Steve Kuehn, Dave Brandon, Brad Dixon, Mark Beckner.**





Installation of new wall switch in Mr. Szatuna's home. (l to r) Dave Poe, Rick Minne', Dennis Appel, Dr. David Cunningham.

Installation of new circuit breaker panel in Mrs. C. L. Pellikaan's home. (l to r) Mike Patterson, Dennis Leitnerman, Gene Kulengowski, Phil Bogler, and Ross Livengood.



Presentation of HKN Gamma-Theta Chapter Scholarship to Pham Q. Chot by Chapter President Paul Abney at Spring 1976 Initiation Banquet.

chased. On March 6, 1976, twenty-four HKN members assembled along with our faculty advisor, Dr. David Cunningham, to perform the project. Fifteen students under the leadership of Dennis Leitnerman and David Brandon went to the first house, owned by Mrs. Pellikaan. Dennis Appel and Dr. Cunningham took the other students to the second house owned by Mr. Szatuna. The work done on Mrs. Pellikaan's house was quite involved due to the construction of the house. The work done on this house included installing eleven new receptacles, installing wall switches and all new lights in the house, installing a new breaker box, removing all old wiring and completely rewiring the house, and installing a new service entrance. At Mr. Szatuna's house, the work required the installation of three new circuits, ten new receptacles, a back porch light, junction boxes in the attic, a 240 volt circuit to provide service to an air conditioning unit, and a new breaker panel and service entrance. The jobs were inspected by the local fire chief and service was returned to the houses the next day.

Over a dozen boy scouts in troops from Kansas City, Springfield, and Rolla participated in the instruction and testing for the Electricity Merit Badge and the Electronics Merit Badge. The scouts were taught principles in each of these areas. They received hands-on experience in constructing their projects and were tested per the official B. S. A. requirements. After the completion of the morning and afternoon sessions, they were given a tour of the EE Building. Many expressed a desire to become electrical engineers.

Eta Kappa Nu in conjunction with the local student branch of the IEEE offered a \$25.00 award for the best exhibit dealing with electrical engineering at the District Science and Engineering Fair held on the UMR Campus. This was done in order to motivate high school students to begin thinking more about electrical engineering as a career and also to reward those who show interest and promise in the field. The judging repre-

sentative for Eta Kappa Nu was Tom Pond. The award was given for a project dealing with solar energy used to light a house using a phosphorescent material.

A trip to the local high school to have an informal discussion with high school students about life in a college situation and about engineering was suggested by Tom Pond last year. This would be of some benefit in giving high school students some insight in making plans for the future. The session was coordinated with the high school counselor at the Rolla High School. On March 11, 1976, Dennis Leitnerman and James Pruitt presided over a question and answer session with ten students and two counselors at Rolla High School. Items that were discussed were EE curriculum, other engineering disciplines, material covered in freshman and sophomore courses, the job market in engineering as well as starting salaries compared to other fields, the work an engineer does, what subjects high school students who are interested in engineering should have, and the enrollment procedure for getting into college. The two high school counselors were interested in repeating this program in succeeding years only to have more disciplines represented at these meetings. The students were extremely interested in the material presented at the meeting and the entire time period allowed by the high school was used.

One of Gamma Theta's minor projects each semester is the donation of candy to the Boys Town at St. James, MO. During pledge week, each new pledge is to supply a goodie box as part of his initiation. When these boxes are picked up on the last night of pledge week, the contents of these boxes are donated to this worthy organization.

Several study aids to EE students were instituted this year by our chapter. One of these study aids was the compilation and dispersal of old EE tests in various required EE courses at UMR. A small charge was placed on the service to offset the cost of duplication, supplies, etc., but was operated non-profit. Another study

aid suggestion was the initiation of an EE hotline. This involved having various volunteer students' and professors' telephone numbers printed on a register along with the subjects in which they are well versed. Then, when a student was having difficulty on some point after school hours (6:00 to 10:00 p.m.), he called the proper person on the register and obtained help.

Another project initiated this year was the placing of a weekly EE problem on the bulletin board for students who like to test their wits on various tricky EE problems. The solution to the problem was placed beside it the following week, and a new problem was posted.

A contest was held to obtain a design for an electrical engineering T-shirt. The design by Mike Dixon was chosen and redrawn by Jim Detry. The design gained widespread acceptance. An order was placed with a local shop for thirty shirts. Upon arrival, Mike and Jim were each awarded a free T-shirt and the remainder were sold out shortly thereafter. A copy of the design is included with this article. A table was set up to receive additional orders, and sixty more were sold. Due to the high demand, orders will be taken next semester, also.

An "Area of Interest" survey was taken of the Gamma Theta Chapter members. The "Area of Interest" is the area(s) of electrical engineering in which the student is most interested; such as, power, digital, control, circuits, communications, fields & waves, or physical electronics. This data along with the student's name, telephone number, local address, and degree/year were compiled on two typewritten sheets and distributed to key faculty members for use when contacted by companies desiring to interview students. A release form petition was signed by the students allowing this information to be disclosed.

The Common Knowledge Forum was a result of a suggestion by Charles Nchako when he was an HKN pledge. It consists of a presentation on and a discussion of a



familiar item which actually has much engineering built into it but not discussed in detail in EE courses. One such forum was held this past spring. Professor Jack Morris spoke on automotive electrical systems. He displayed generators, alternators, starters, and other various automobile electric components; and, discussed and answered questions on each. The forum was open to all students and attendance was good. Common Knowledge Forums on television sets and radios are planned for future semesters.

Each semester, HKN Laboratory Insurance is sold by the Gamma Theta Chapter. Policies are sold for \$1.50 which provide the student coverage up to \$150.00 in

equipment damage in any of the undergraduate electrical engineering laboratory courses. If any profits are made, they are accumulated until sufficient capital exists to make a scholarship presentation.

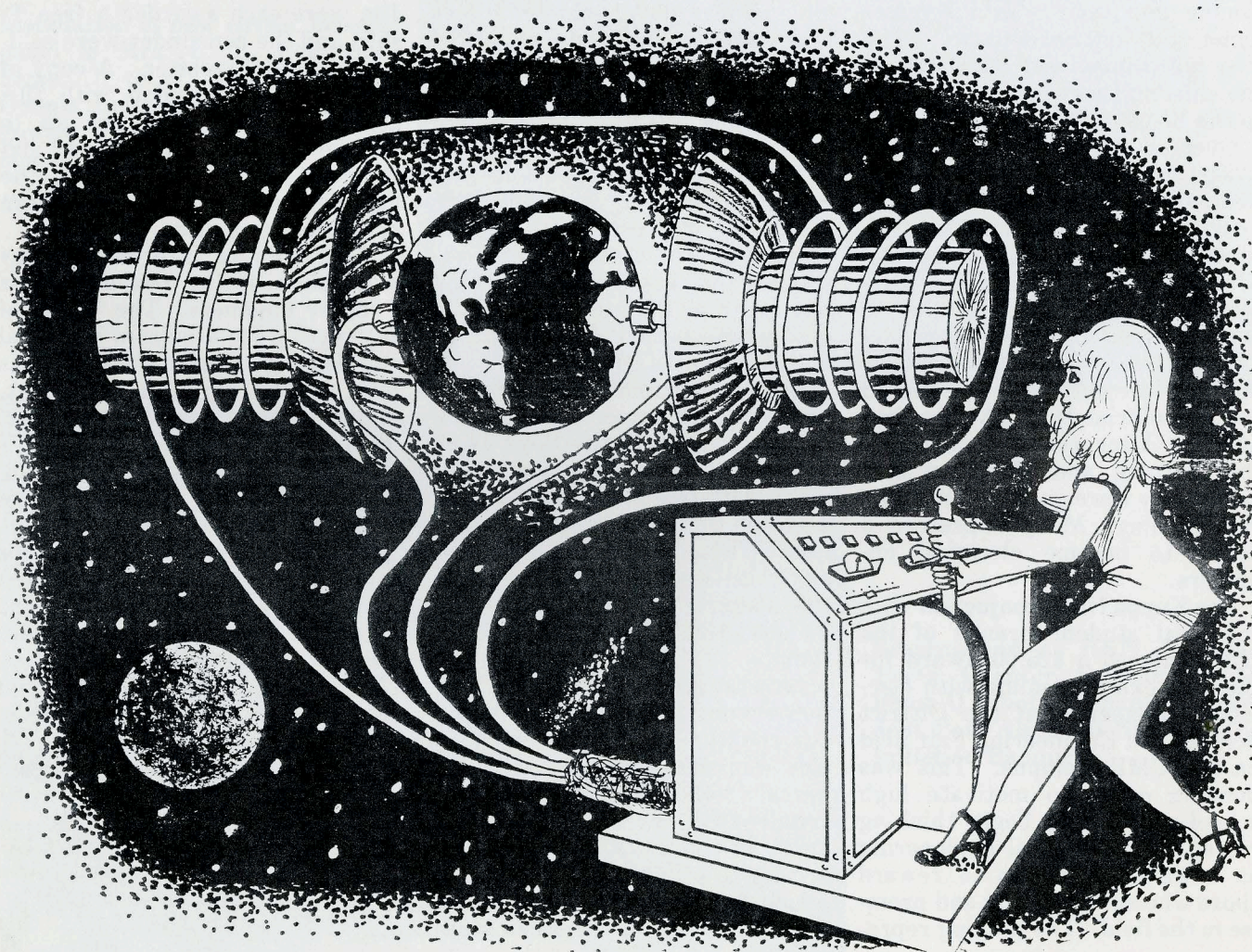
The Eta Kappa Nu Association Gamma Theta Chapter Scholarships were awarded to Paul A. Abney at the Fall 1975 Initiation Banquet and to Pham Q. Chot at the Spring 1976 Initiation Banquet. Each award was for \$270.00. That was the amount of incidental fees charged at UMR. The selection was made by a committee composed of Electrical Engineering Faculty on the basis of need and scholarship.

It was a good year in terms of student participation and the quality of the projects completed and planned.

## NOTE

*Gamma-Theta Chapter (University of Missouri-Rolla) will be celebrating its 25th Anniversary on March 25 & 26, 1977. This is going to be a huge celebration with several social events, two luncheons, one dinner, a discussion of programs, and a presentation by equipment manufacturers of the latest electronic equipment available. Industrial representatives and a Past National HKN President are also planning to participate. Nearby HKN Chapters will receive invitations soon. The two representatives from each chapter invited will have all travel, lodging, and meals paid for by the National Organization! Plan to attend.*

## Gamma Theta's T-Shirt Design



# SOCIAL CONSCIENCE AND FREE ENTERPRISE

Clarence Zener  
Carnegie Mellon University

Students learn from professors, not only in formal courses but also during their informal contacts. The following presents a point of view that the author would like universities to instill in their students from such contacts.

Mr. Papandreou gave a talk in Pittsburgh several years ago which made a deep impression upon me. Mr. Papandreou was the prime minister in Greece before the Colonel takeover. The American Embassy saved him from execution by the Colonels after the takeover. The gist of his talk was that we kid ourselves if we think we perform our civic duty merely by appearing at the voting booth once every four years, that we are in danger of losing those things in our society we treasure most unless we are continually vigilant, and work for what we value through the various organizations to which we belong.

A well known economist at the University of Chicago preaches a quite different philosophy. He teaches that society operates most efficiently if every man, if every business, acts solely to maximize his or its profits, provided such actions stay within the law. The Chicago economist expresses the commonly accepted philosophy of the free enterprise system.

We need both the social conscience of Papandreou and the free enterprise of Friedman. A totalitarian society has no place for either social conscience or free enterprise. A citizen of such a society is

merely expected to obey. A socialistic society has plenty of room for social conscience, but provides little incentive for the release of the tremendous creative capacity of men. Such a society may be pleasant, but it would certainly be dull. A society based on free enterprise would need no social conscience if the laws of the land were perfect, and if the administration of these laws were carried out by perfect men. It is unrealistic to assume perfection in laws and men. We need free enterprise to both invent and drive the various mechanisms in a modern society. We need social conscience to lubricate these mechanisms, and thereby avoid unanticipated breakdowns.

It would ill become a professor to discuss social conscience of industry without first discussing social conscience of universities.

In our present society, universities have a unique opportunity to play a truly decisive role. In no other institution does one have the opportunity to ferret out the real problems which this country will face in the coming years, and to figure out options for solving these problems. The government is so preoccupied in seeing that no calamity occurs during its 4-year term of office that it certainly cannot be relied upon for penetrating thought. The business community's primary responsibility is to operate efficiently, and hence profitably.

During his apprenticeship in a

university, a faculty member must participate in the well publicized **publish or perish** syndrome. Once he has attained his professorship, and tenure, he is free to ask: What are the really important problems that society faces, and how can these problems be attacked?

Having acquired my professorship, and tenure, some thirty years ago, I have had time to ask: What are the really important problems that society faces to which I, a scientist and engineer, can contribute?

That problem which each of us would list as the most important will of course depend upon our particular background. Number 1 on my list is a cheap, inexhaustible, and non-polluting source of energy. In working upon this problem, I have run into an unexpected impediment, an impediment which I am sure all of you will run across in working upon your number 1 problems. I had thought that solving the technical aspect of my problem was all that was needed. There was a time when decisions requiring technical knowledge were left to the experts. The people of this country have learned, however, not to trust the experts, neither the experts in Government, in industry nor in universities. As an example, in my field of energy, several western states will this year vote on referendums which could effectively place a morator-



ium on the further building of nuclear power plants. Because of this distrust of the energy experts, exacerbated by the lack of candor of the former AEC, the people may make thier decisions on an emotional, rather than on a rational, basis. I have concluded that professional people can be effective in solving social problems only if we first regain the credibility we once had. This we can do only by being completely candid with the public.

A young man starting his career in industry faces much the same problems as in a university. He starts in a highly competitive system where he must prove his merit before advancement. Advancement for him usually means acceptance into management. The higher he advances in management, the greater is his exposure to problems in which there may exist conflicts between his social conscience and the welfare of his corporation as seen by his boss. I emphasize that the conflict is with the welfare of the corporation as seen by his boss. His boss is apt to be in middle management, certainly not in top management. The system of promotions in corporations is such that this boss is himself judged by the annual profits made by his section of the corporation. In the absence of strong corporate policy forbidding action doing violence to certain social values, the boss must insist on those actions which maximize immediate profit.

The type of anti-social action to which I am especially allergic is public deception in order to gain a temporary advantage. I believe an example of such deception is now shaping up in the energy area.

In the past, a striking correlation has existed between the gross national product and the consumption of energy. Leaders in the energy business are now publicly saying that, because of this close correlation between GNP and energy consumption, we must continue to provide for an energy growth consistent with the desired growth in the GNP. Now, every industrialist knows that a trade-off exists between the use of energy and the use of other commodities. A quadrupling in the cost of a unit of energy must result in a more effi-

cient use of energy. The sharp rise in cost of energy which we have experienced, and will continue to experience in the years ahead, will cause a wide departure from the past correlation between GNP and energy use. As both government and the energy business emphasize the need for a massive building program for nuclear power plants, while at the same time de-emphasizing their skyrocketing cost, statements coming from the power industry will only deepen people's distrust.

I now return to our bright engineer who is rising in management, and first encounters a conflict between his social conscience and the welfare of his corporation as seen by his boss. Heretofore his loyalty has been exclusively to his company. Over the intervening years he has acquired a family, and is more and more concerned with the kind of world his children and their children will live in.

To oppose his boss, he must risk losing his job. A loss of job means giving up a vested interest in pension, which is not, as in universities, transferable. Still worse, he has conformed to the typical American style of living up to his income, or even beyond. He has no savings. He is chained to his job. He conforms.

What can we as faculty do to help our students escape from this trap? What we can do is to instill in our students the desire to build up savings for fiscal independence, as opposed to the satisfaction of material consumption. We can instill in him the pride of being able to say "Go to hell" to his boss, and seek his fortune elsewhere. In short, we can create in him the desire to be a free man, rather than a slave surrounded by luxury.

**NOTE** — When sending an address change to Headquarters, please be sure to send the old address and old Zip Code as well as the new address and new Zip Code.

## DIRECTORY

### Executive Council

Earl D. Eyman, President, Electrical Engineering Department, University of Iowa, Iowa City, Iowa.

Marcus D. Dodson, Vice-President, 9302 Grindlay St., Cypress, California.

Paul K. Hudson, Executive Secretary, Department of Electrical Engineering, University of Illinois, Urbana, Illinois 61801.

### Directors

Quayne Golden Gennaro, 2D Bartle Ct., Highland Park, New Jersey 08904.

Albert Hauser, Electrical Utilities Industry, LaSalle, Illinois.

W.V.T. Rusch, Electrical Engineering Department, University of Southern California, Los Angeles, Calif.

William J. Johnson, Philadelphia Electric Company, Philadelphia, Pa.

Alan R. Stoudinger, Electrical Engineering Department, Tri-State University, Angola, Indiana.

### Committees

CONSTITUTION AND STATUTES—Warren T. Jessup.

MOVIE—J. E. Farley.

OUTSTANDING YOUNG ELECTRICAL ENGINEER AWARD—Harlan J. Perlis.

OUTSTANDING STUDENT AWARD—Lawrence Hamilton.

OUTSTANDING PROFESSOR AWARD—

OUTSTANDING CHAPTER AWARD—Alan Lefkow.

PUBLICITY—Berthold Sheffield.

VISITATION—Larry Dwon.

# Zeta Kappa ... Tennessee State University

by Ngabuen Nshom

On April 16th the Electrical Engineering Department of Tennessee State University successfully initiated six qualified candidates into the Eta Kappa Nu Honor Society of Electrical Engineers. The induction ceremony which was the fourth held in the history of the institution, was unique in that, for the first time the President of the University, Dr. Frederick Humphries our honorable guest speaker was inducted into Zeta Chapter at Tennessee State University.

Dr. Frederick Humphries' induction into the Eta Kappa Nu

Honor Society of Electrical Engineers was not a spur of the moment idea. It was done in full and strong recognition of his outstanding contributions to the continuous development and improvement of the School of Engineering at Tennessee State University. He had also taken special interest in the Department of Electrical Engineering. The Vice President Dr. Bernard G. Crowell and the Dean of the School of Engineering, Dr. Edward I. Isibor were inducted for the same reason, namely for their contribution to the develop-

ment of the Electrical Engineering Department at Tennessee State University. The student inductees who qualified by virtue of their academic performance and met the standards of the society were: Anthony Gibbs, Prince Gates, Ngabuen Nshom and Sheila Rogers.

Presiding over the initiation was Karl W. Wyatt the outgoing President of the Chapter. We are looking forward to initiating more qualified student members next year.

**From Left to Right: Dr. Frederick Humphries, President of Tennessee State University; Mr. Karl Wyatt, President of Zeta Kappa Chapter; Dr. Bernard Crowell, Vice President for Academic Affairs; Prof. Malkani, Chairman of Electrical Engineering Department and Faculty Advisor; Mr. Ngabuen Nshom, Zeta Kappa secretary; Dr. Edward Isibor, Dean of Engineering and Technology; and Mr. Raymond Lynn, Treasurer.**

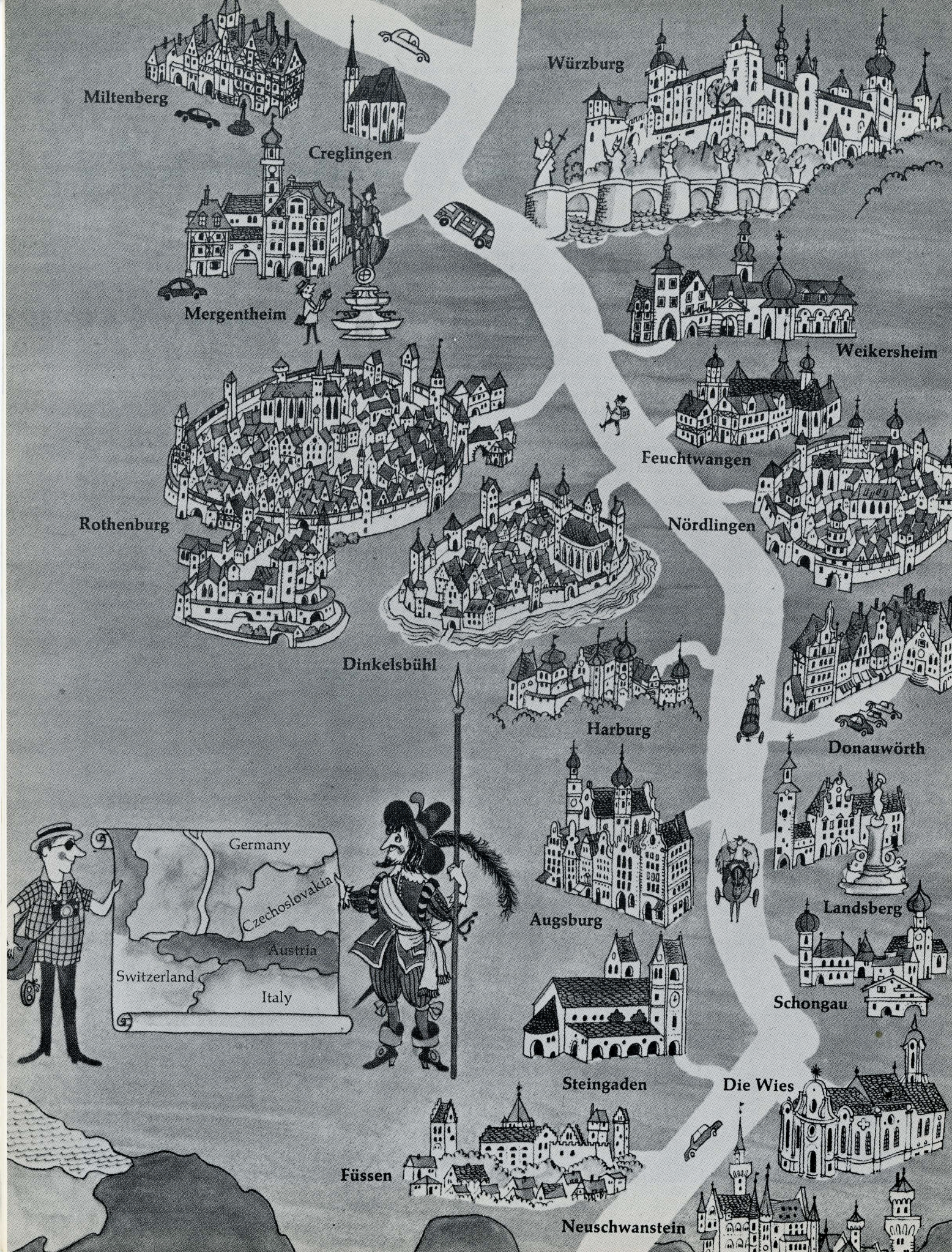




# Historic Pathways Of The World

## Part Five

### The Romantic Road



In southern Germany there is a road that covers about two hundred miles and two thousand years, and the perfect way to journey along it would be by horse and carriage, with Chaucer as your companion. Each evening, after supper in one of the village inns, the great storyteller would entertain you and your fellow travelers with history, legends and lore of the highway.

Chaucer would seldom feel out of his time or place along the road, but for you it means getting into a machine set for a Middle Ages pilgrimage, with flashbacks to Roman times and previews of Renaissance and newer-fangled things to come. The route you follow is a chain of cities that have for centuries been accustomed to travelers: the most persistent visitors before you were medieval merchants who traded salt and textiles for wine and grain, and so prospered on the road that it came to be known as Rich Street.

Today, rich in history and heritage, the route, shown at the left, has again been aptly named: the Romantic Road. It begins in the north at Würzburg, early an influential center of art, architecture and learning—for it grew as a bishop's seat and university town. Marienburg, the bishop's fortress, still lords it over the neighborhood from its height above the Main River, and from here you can see the strip of park that replaces the old walls (a common practice in German cities) and the hillside vineyards that produce the delicious Franconian wines you drink

at meals. The river below looks like a street, with its boat and barge traffic jams, and along the bank the line of houses resembles a box of watercolors—yellow, rust, pink and gray squares—waiting to be transferred to canvas. Near the center of town is the prize of all Würzburg's architectural treasures, the bishop's baroque Residence, a junior Versailles whose rooms of frescoes, carved stucco, sculptures and chandeliers are as princely as a Mozart quartet. The sounds of Mozart, in fact, do fill its candlelit Imperial Hall during summer concert evenings.

After a sidetrip to Miltenberg to see the gabled, timbered houses where Shakespeare would have felt more at home than Chaucer, you enter Mergentheim, whose personality is split between medieval and modern ways. German Crusaders used to own the town, and their castle, hospital, chapels and churches still stand as reminders of their thirteenth century socialism. Beyond these lies a posh health resort, a place that induces Instant Inertia with its sparkling mudpack rooms, heated pools, concert hall, pampered parks, and drinking pavilions where the curing flow photoelectrically the moment you put your cup under the spigot.

You return to the Middle Ages and the Renaissance at Weikersheim Castle, ancestral home of the Hohenlohe family, origin of many German royal houses, including ancestors of Queen Victoria and relatives of Prince Philip. Original mirrors, paintings, tapes-

tries, wallpaper, china, chairs and desks—mostly two and three hundred years old—are still in their places in the sumptuous rooms. One baroque bed is surrounded by so many elaborately carved cherubs you need a ladder to get up and over the décor; this gave rise, the story goes, to the expression "climb into bed." Grandest of all the rooms is the gigantic Knight's Hall, with its dozens of ceiling paintings of gory hunting scenes and its walls covered with game trophies, family portraits and carvings. When you look at the marks on the wood floor and the worn stone entrance stairway, you know for certain that counts galloped their horses into this banquet hall for post-hunt orgies.

A short detour takes you to the country chapel, Herrgottskirche, near Creglingen, to admire the other-worldly altar of Tilman Riemenschneider, master sculptor and carver of the early fifteen hundreds. If the wimpled faces of nuns, who are often here gazing at the altar, look familiar, remember the illustrations of medieval manuscripts.

The road continues along the lovely Tauber River, a rolling parkland of fields and neat forest plots. Instead of separate farmhouses, you pass clusters of houses huddled around a church, often onion domed, set right in the middle of the fertile land. From these little enclaves, women in bright skirts, men in blue overalls and children with stocking caps go out daily to work the fields. In spring, white



anemones and yellow *schlüssel-blumen* crowd the riverbank, but in any season this valley road is a fitting prelude to the most famous walled city in Germany, Rothenburg.

Perched proudly on its hill, with the Tauber for its private moat, Rothenburg looks like a medieval postcard. The city's history is about as old as its hill: settled by Celts in pre-Christian times, by Franks in the ninth century, it grew by the thirteenth century into a powerful, autonomous city-state within the Holy Roman Empire. Perhaps because of a long habit of independence, it has been particularly stubborn in cherishing its architectural legacy: externally, Rothenburg is an authentic medieval town with Renaissance adornments here and there, surrounded by towers, bastions and gates; within the walls, the facades of new buildings must match the old ones, while their interiors adopt modern Bavarian comforts. Along the cobbled lanes, you see at every turn a composition for an artist—a fountain or statue or timbered house or clock tower; a monastery; nunnery or granary—all a picture history to twentieth century eyes.

The road meanders through little villages where you glimpse crooked, slender lanes with houses that lean toward each other as in a Van Gogh painting. If you are lucky, you will see a chimney sweep, in black suit and top hat, soot-smudged from one job, bicycling to another. In Feuchtwangen, stop at the Romanesque cloisters; here, legend says, Charlemagne in 768 founded a monastery to celebrate the source of the Tauber.

Two walled fairy-tale towns enclose you next. Dinkelsbühl and Nördlingen are smaller, less self-conscious editions of Rothenburg, set in lush meadows instead of on hilltops. With their ramparts, moats and timbered houses where burghers and craftsmen lived, they are genuine stage sets for any story that begins, "Once upon a time . . ." You can walk around each town in about an hour. Stop for lunch at Dinkelsbühl's exquisite Deutsches Haus, built in 1440, and for tea or dinner at Nördlingen's

Hotel Sonne, resting place for emperors and kings, princes and poets since 1477.

The road goes *under* the citadel Harburg, more than a thousand years old, and now a stronghold only of books, statues, carvings and Gobelin tapestries. In Donauwörth, after a visit to the street of patrician houses built for medieval merchants, you cross a gentle blue stream, the Danube, before arriving at Augsburg, headquarters of the rich and powerful bankers, shippers and merchant princes of the Middle Ages.

Founded in 15 B.C., Augsburg was named for the Roman Emperor Augustus. Because of its position at the junction of two rivers and the intersection of the north-south and east-west trade routes, it was an early meeting place of emperors and congresses and became the largest of all the imperial city-states on Rich Street. It attracted people like Mozart's ancestors—

builders, sculptors, musicians and architects—who expressed their talents in the city's houses, churches, towers and fountains. As you walk down Maximilianstrasse, the main street, you feel the wealth of centuries in the handsome homes, some platian in size.

After Augsburg, the highway follows the Via Claudia, ancient Roman route from Germany south, through Landesberg, with its ornate Rathaus, and to Schongau, where for the first time you can see mountains in the distance—the Tyrolean Alps. Stop off at two churches, the Romanesque Steingaden and Die Wies, a lavish rococo paradise on earth, before you enter Füssen, a mountain town with high peaks and pine forests as backdrops. The Romantic Road finishes here with a flair: nearby rises King Ludwig's famous pseudomedieval Neuschwanstein Castle—like a royal exclamation mark.

My arm started to hurt and I asked the doctor to examine it. He looked at my arm and brought out a medical book and studied it for fifteen minutes. He said to me, "Have you ever had that pain before?" I said "Yes." He said, "Well, you got it again."

\* \* \* \*

Adolescence is a period of rapid changes. Between the ages of twelve and seventeen, for example, a child may see his parents age twenty years.

\* \* \* \*

Husband: "Where is yesterday's newspaper?"

Wife: "I wrapped the garbage in it."

Husband: "Oh, I wanted to see it."

Wife: "There wasn't much to see . . . just some orange peels and coffee grounds."

\* \* \* \*

Boy: "Dad, I just got a part in the school play. I play the part of a man that's been married for twenty-five years."

Father: "That's a good start, son. Just keep right at it and one of these days you'll get a speaking part!"

## CHAPTER NEWS

**ALPHA CHAPTER, University of Illinois** — The semester of the fall of 1976 has been an eventful and enjoyable one for the University of Illinois Alpha Chapter. Our officers this semester were Eric Nagel, President; Ray Kunita, Vice President; Steve Wetter, Treasurer; Eric Knight, Recording Secretary; Judi Lifton, Corresponding Secretary; and Harry Borovik, Engineering Council Representative. The Professional Engineering Refresher Course (PERC) was offered again by the chapter. This program is a six lecture course for preparing seniors for the Engineer in Training Exam. The enrollment was good and the program was very successful. On October 12, the chapter sponsored a plant trip to Motorola, Incorporated, Communications Division in Schaumburg, Illinois. Sixteen students and Professor William Albright attended the trip. The people at Motorola were very nice hosts and we all learned a great deal. The last major event of the semester was the initiation of 64 new members. Following was a banquet at the Redwood Inn at Rantoul at which Professor Paul Hudson, national executive secretary of Eta Kappa Nu, gave a delightful speech entitled "A visit to my world, by one who's never been there." We were proud to have many distinguished guests at the banquet from the administrations of the Electrical Engineering Department and the College of Engineering. Finally, new officers were elected at our closing meeting. They are Judi Lifton, President; Steve Vaughn, Vice President; Mike Coffman, Treasurer; Eric Knight, Recording Secretary; Mike Nowak, Corresponding Secretary; and Dan Asta, Engineering Council Representative.

by Judi Lifton

**XI CHAPTER, Auburn University** — The Xi chapter would like to recognize its first female president since its formation in 1920. She is Cindy Hess who is attending Auburn University with the aid of the Owens-Corning scholarship. Cindy hails from Huntsville, Alabama where she went to school at S. R. Butler.

When Cindy first came to Auburn, she was a work-study student for 5



In an effort to touch all bases in the realm of public service, ALPHA CHAPTER hangs a sprig of Mistletoe in the hallway of the electrical engineering building at X-Mas time.

quarters, played in women's intramural baseball, and as a pre-engineer she was in the top 5% of her freshman class which enabled her to be eligible for initiation into Pi Gamma Tau, and in addition, Cindy joined Alpha Lambda Delta that same year. Since then, Cindy has continued to be active, joining Eta Kappa Nu (Spring '76) and Tau Beta Pi (Fall '76).

Shortly after being initiated into HKN, Cindy was elected as the Xi chapter president in the Spring quarter elections. After the election, Cindy immediately began planning for the summer quarter, and as the quarter began to evolve, the Xi chapter was found to be one of the busiest engineering honoraries on campus. Projects accomplished during the summer included the construction of a student mailbox and the writing of a computer program which updates the names to be placed on the mailbox, a test-file for electrical engineering students providing representative material for study, a "Clean the Bridge party" for the replica of the Bridge located on the lawn in

front of Ramsey Hall, and helping with the Red Cross Blood drive held in the Haley Center student lounge.

Richard Griffin, an HKN member, was chosen as the summer quarter Outstanding Engineering graduate by the Engineering council and has begun working with TVA since graduating.

Returning from the summer-fall quarter break, the Xi chapter became active once again. A series of seminars on the use of the HP-2000 Basic computer were planned. The seminars were taught over a 3 week period by several HKN members and consisted of instruction on basic, intermediate, and advanced programming.

Next the Xi chapter became involved in the Fall quarter initiation. The pre-initiation meeting, "The Smoker", was held on November 2. For the prospective new members, Dr. Lowry gave a slide presentation on Eta Kappa Nu and the Auburn electrical engineering department. The formal initiation was



held the following week in the Textile engineering auditorium and 28 new members joined the Xi chapter ranks.

In the area of community service, HKN donated \$50 to buy a Thanksgiving grocery basket for a needy family. Also, several HKN members volunteered to help the Red Cross with the Swine Flu vaccination program held on November 22-24 in the Auburn coliseum.

The fall quarter Outstanding Engineering graduate nominee for HKN is Don Allen. Don is a member of the USAF and will be attending the Air Force Officer Training school after graduation.

At the last quarterly meeting, Dr. James L. Lowry was presented an Outstanding Service Award as the Xi chapter advisor for the years 1957-59 and 1965-76. Participating in the presentation were his wife and family, associate professors, and HKN members. Dr. Lowry will finish 1976 as the Xi chapter advisor, and succeeding him will be Dr. Charles A. Gross.

by Don Allen

**BETA PSI CHAPTER, University of Nebraska** — The Beta Psi Chapter recently concluded an eventful semester with many activities and projects successfully completed.

The beginning of the semester presented us with the task of selecting a new advisor due to the departure of Dr. Gibson. Our labors were rewarded when Dr. Soukup accepted the position. Dr. Soukup, new at the University of Nebraska, assumed a very active interest in our organization.

In past semesters we have sold op-amps and transistors for some labs allowing students to purchase resistors and capacitors from a local firm. It was brought to our attention many of these components in the package deal were not needed. After advising the firm, we are now selling smaller lab kits. This is much cheaper for the student and also allows us another source of income.

The Professor Evaluation Program used in the past was changed. Evaluations are done in the final week of classes enabling us to get a more complete evaluation of all professors.

Our tutoring program was successful as always. At the start of next semester the location will be moved to Nebraska Hall. This will be more convenient for all involved.

by Ronald F. Taylor

**EPSILON ZETA, University of Lowell** — The Epsilon Zeta Chapter now represents the University of Lowell which was formed by a recent merger between our past tie (Lowell Technological Institute) and Lowell State College. The twenty-two current members

and twenty-seven pledges are participating in a wide range of projects designed to benefit both our own department and the school as a whole.

Our job file program, in which prospective employers across the country are notified concerning eligible graduates, is in its second year. To date, ten individuals have successfully obtained jobs through this facility.

A library of electrical engineering periodicals is being established. It currently contains several thousand issues dating as far back as 1900.

Work is also in process to establish a chapter of the interdepartmental honor society Phi Kappa Phi.

Tutoring by pledges is made available to undergraduate students having difficulty with their engineering studies.

In the recreational area, several outings are planned and a banquet will be held following the induction on December 6.

by Stephen Glinski

**ZETA ETA, Tennessee State** — The Eta Kappa Nu Honor Society at Tennessee State University has just gone through another full year of activities. The activities were designed to meet some objectives that we had in mind.

Some of the activities that we carried out were calculated to enable us to increase our chapter enrollment number. In order to publicize the existence of our honor society in the School of Engineering we had to carry out an activity that will enable us to meet a good number of students. Lastly we had in mind a way of creating an incentive or a motivation in students striving to become members of the honor society.

The first activity that we launched was at the beginning in which we had all seniors in the Electrical Engineering Department that are members of Eta Kappa Nu Honor Society, give advice to freshmen students and particularly freshmen in Electrical Engineering on how to develop good study habits and also what courses to take as they progress so that they can have a better feeling and understanding for engineering as they progress. This activity was in no way limited to Freshmen students. Sophomores and Juniors were more than welcome to benefit from this advice.

This activity in itself goes to fulfill our first objective, namely increasing the number of qualified students in our chapter. We believe that if the students started well, there is high chance that we might have many carry on through their junior as far as good academic record is concerned.

The second main activity that we carried was most successful and fascinating. We arranged several seminars

and tutorial sessions that were held at the Engineering Tutorial Centre. In each of these seminars or tutorial sessions, we had five or six professors from the Math, Physics and Engineering Department give a talk on their field of specialty. During the tutorial sessions problems were being solved for the benefit of the students that were lagging behind. We succeeded in drawing student and faculty audiences and we never failed to seize this opportunity to publicize the Eta Kappa Nu Honor Society its objectives. A total of three seminars and four tutorial sessions were given. This helped us achieve our second and third objective.

Then last but not the least came our annual initiation ceremony in which, we had four student members and three professional members inducted. This went to crown the year.

A glance at the list of activities will reveal that our activities for the past year were limited to people who have something to do with the physical sciences. Charity begins at home! For next year we are looking forward to having a broader spectrum of activities which will include people from all walks of life.

by Ngabuen J. Nshom

**GAMMA XI CHAPTER, University of Maryland** — Gamma Xi Chapter at the University of Maryland, College Park, is in a period of rapid changes. All but four of our members graduated this December, leaving only the 17 electees and a skeleton crew of officers to organize for spring. The initiation ritual was rewritten by the officers to make it 'nonsexist', in fairness to our female initiates and members. Members served as guides for visitors during the Engineering Open House in October. Our display case, built last summer, received improvements in the form of fluorescent lights and electrical outlets for equipment on display. Dr. Urs Hochuli displayed some gas laser tubes used in research here.

Also, one of the members interfaced his TV-typewriter to an INTEL 8008 microcomputer so that passersby can push a button on the display case and view a message on a CRT monitor screen. Messages relate to the current experiment on display, or may give news of upcoming events—a real attention-getter!

Lastly, some phone calls to local lumber suppliers and two hours at UMD's Industrial Education Shop allowed Gamma Xi chapter to reduce our costs threefold for the mahogany plaques used for pledge projects. Other chapters might look into this way of reducing running expenses.

by John Ciccarelli

# MERRY MOMENTS WITH MARCIA

Hospital costs are so high these days, it's impossible for anybody to be ill at ease.

\* \* \* \*

There's one good thing about kleptomania — if you've got it, you can always take something for it.

\* \* \* \*

I don't mind if the kids have pets. It's vice versa that bothers me.

\* \* \* \*

Words must be weighed not counted.

\* \* \* \*

There is no right way to do the wrong thing.

\* \* \* \*

In failing to prepare — you are preparing to fail.

\* \* \* \*

Age is a matter of mind — if you don't mind — it doesn't matter.

\* \* \* \*

Your smile is your personal piece of sunshine.



"Young man, there were two cookies in the pantry this morning. May I ask how it happens that there is only one now?"

"Must have been so dark I didn't see the other one."

\* \* \* \*

A young man came home from the office and found his bride sobbing convulsively. "I feel terrible," she told him. "I was pressing your suit and I burned a big hole right in the seat of your trousers." "Forget it," consoled her husband. "Remember that I've got an extra pair of pants for that suit."

"Yes, and it's lucky you have," said the little woman, drying her eyes. "I used them to patch the hole."

\* \* \* \*

"Did you hear about the cross-eyed discus thrower?"

"No, did he set lots of records?"

"No, but he sure kept the crowd alert!"

\* \* \* \*

Customer: "Waitress, why is my doughnut all smashed?"

Waitress: "You said you wanted a cup of coffee and a doughnut and step on it."

\* \* \* \*

Wife: "Honey, I can't get the car started. I think it's flooded."

Husband: "Where is it?"

Wife: "In the swimming pool."

Husband: "It's flooded."

\* \* \* \*

Bill: "I'd move heaven and earth to break my 110 score."

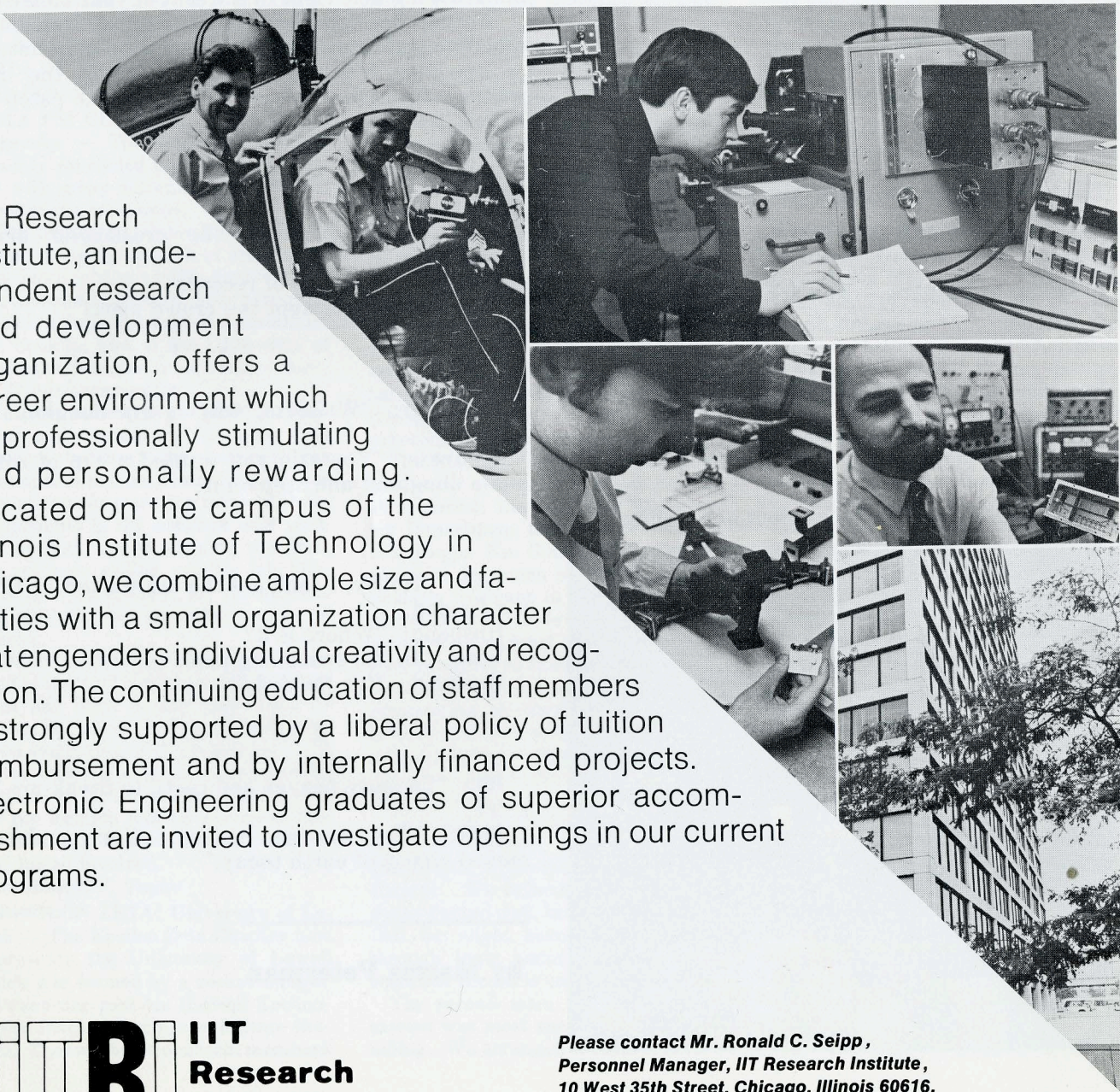
Phil: "Try moving heaven. You've already moved plenty of earth today."

by Marcia Peterman



## **Careers in Electronics Research at IITRI**

# From discovery to application



IIT Research Institute, an independent research and development organization, offers a career environment which is professionally stimulating and personally rewarding. Located on the campus of the Illinois Institute of Technology in Chicago, we combine ample size and facilities with a small organization character that engenders individual creativity and recognition. The continuing education of staff members is strongly supported by a liberal policy of tuition reimbursement and by internally financed projects. Electronic Engineering graduates of superior accomplishment are invited to investigate openings in our current programs.



**Please contact Mr. Ronald C. Seipp,  
Personnel Manager, IIT Research Institute,  
10 West 35th Street, Chicago, Illinois 60616.**

An Equal Opportunity Employer, M/F