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

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Merry Moments


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Paul K. Hudson

Contributing Editors
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Carl Kiker
Marcia Peterman
Miggs Pomeroy
Jack Pullen
Leon Zerby

Photography Editor
Howard Sheppard

OUR COVER

It is Springtime—time for romantic thoughts. Our cover shows the Marienberg fortress at Wurzburg on The Romantic Road—see page 28.
Alton B. Zerby Student Award

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.”


In addition to his technical achievements he has found time to actively participate in varsity track and intramural 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

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.
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 1906—frenzied excitement filled 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 gas explosion.

And there were the electrics. Quiet, Clean, Simple, Dependable. At Cranston, Rhode Island, in 1888, electrics hit speeds of 30.8 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 Steudebaker 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 also prospered. Their advantages of poppy 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 9,000-mile, Peking-to-Paris saga of the summer of 1907.

Such competitive hijinks particularly ranked 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 startings. Among Fritchle's patrons was the Unstoppable Molly Brown, whose chauffeur nightly re-tuned 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 1906 from Lincoln, Nebraska, toward New York City. He chose the bogg season on purpose, to put his car to the greatest test. Fritchle slugged 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 rain barrel 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 Alleghanies. (He relined the brakes with named'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.
But other developments of 1968 overshadowed Fritchie's feat. General Motors was organized and began merging several leading makes of gasoline cars. And Henry Ford began production of the first of millions of Model T's.

Less than 10 years later, Fritchie 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 a 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, environment 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 here and abroad. Other countries cling to electricas as delivery vans. In America, scarcely a month could pass without articles in Popular Mechanics, 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 whizkra included imaginative electrics.

From coast to coast, gifted shake-tree mechanics tinkered with electric propulsion. John Heke, of Washington, D.C., concocted a tiny electric that made 20 miles between charges. Warren Harrhay, 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 1969 NSU Prinze for commuting 22 miles to work. Always good for a smile was Richard Mills of Everett, Washington, who, when seeing 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 jobs 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 Fritchie. 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 44-45 mph between 36 charging stops, the Mars II covered 3,226 miles at a consumption of 1,071 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: policy performance, high initial cost, no recharged low power, limited range, sluggishness in cold weather, and the ever-present penalty of the weight of multiple sets of conventional lead-acid batteries.

This 1912 Baker Victoria Phaeton was purchased during World War I by President T. 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.

The Cooper Electric Town Car, offered by Cooper Development Asso., has a top speed of 40 mph and will travel 120 miles before it is ready to recharge lead acid batteries require recharging before it is ready to recharge lead acid batteries.

The Cooper Electric Town Car, offered by Cooper Development Asso., has a top speed of 40 mph and will travel 120 miles before it is ready to recharge lead acid batteries require recharging before it is ready to recharge lead acid batteries.

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

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 cooperating 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 Mid-Bus shutting 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 federated 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 390 more. Says Donn P. Crane, fleet management director, "So far, performance on routes averaging 11.5 miles has been satisfactory." Crane estimates...
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 homeless 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 radiators, 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 electric cars is likely until an electric storage battery much better than lead-acid is perfected. It was lead-acid that powered the Baker and Fitchette 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 decreases 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 is about equal to a 12-volt battery that 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, pressure 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. He says that much 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 seed will grow for systems to store energy produced when demand falls off, such as late at night. This should lower cost electricity for 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 electric 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 cars 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 produce a new model, whereas an electric car, from drawing board to showroom, can be mass-produced in months."

The Elcar 200, made by Elcar Corp. in Elkhart, Indiana, features a lightweight fiberglass body and a price under $3,000. Its 8 lead-acid batteries give it a 25-mile range with a top speed of 20 mph.
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 Fyman 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: Phan Q. Chot

The Gamma Theta Chapter of Eta Kappa Nu was involved in many worthwhile projects during the 1975-76 school year. The pro-
jects were of a varied nature. Six of the projects were oriented to-
ward assisting the community sur-
rounding the University of Mis-
souri-Rolla. The balance of the pro-
jects was in assisting the Electrical Engineering Department of UMR.

Our major project for the fall semester was upgrading the elec-
trical wiring of the Rolla Youth Center. The Rolla Youth Center is a recrea-
tional facility for the youth of Rolla, Missouri. The building which houses this facility is old and some of the wiring had deterior-
ated to an unsafe condition. Ross Livengood, a Gamma Theta Chap-
ter member, did a preliminary evaluation of the wiring of the building and made his recom-
mandations to the local chapter at a regular meeting. His findings and recommendations were coor-
dinated with the local building in-
spec tor, plans were drawn up by Dennis Leit terman (Gamma The-
ta’s fall 1975 President), and a date was set for volunteers from the chapter to make the necessary cor-
rections. Funding for the project was provided through the admini-
stration 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 cir-
cuit breakers in the breaker box, replacing circuit breakers with cir-
cuit breakers of the proper size for the existing wiring, replacing bad dup lex 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 fin-
ance 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 mem-
bers 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 Leit ter-
man and Ross Livengood, two local members, and a materials list was prepared. The plans were pre-
mitted to the local fire chief for approval. After approval of the plans, the materials were pur-

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

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

Spring 1976 Smoker

The HKN members who brought the electrical wiring in Mrs. C. J. Pelikan's home up to code. Row 1: (1 to r) Mike Patterson, Mark Mills, Mark Owens, Dennis Leit-
terman; Row 2: Phil Beck, Pete Kinman, Mark Call, Gene Kuleni-
gowski, Mark Westerdale; Row 3: Phil Bogler, Mike Dixon, Steve Kehr, Dave Brandon, Brad Dixon, Mark Beckner.
Installation of new wall switch in Mr. Satunna'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 Leiterman, 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 Lederman 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. Satunna. The work done on Mrs. Pellikaan's house was quite involved due to the construction of this 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. Satunna'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. This award was given 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 representative for Eta Kappa Nu was Tom Pond. The award was given for a project dealing with the use of 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 college 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 Leiterman and James Pratt 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 were 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 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 these 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 without charge. 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" 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 Nehako when he was an HKN pledge. It consists of a presentation on and a discussion of a...
familiar item which actually has much engineering behind it, but not discussed in detail in EE courses. One such forum was held this past October by Professor Jack Morris 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 profit is 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. Abaci at the Fall 1977 Initiation Banquet and to Pham Q. Chot at the Spring 1976 Initiation Banquet. Each award was for $150.00. 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 all have travel, lodging, and meals paid for by the National Organization. Plan to attend.

### 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 social conscience society has plenty of room for participation 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 they be attacked and solved?

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-poisoning 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-

Gamma Theta's T-Shirt Design
Zeta Kappa...
Tennessee State University

by Nguuenh Nshom

Executive Council
Earl D. Byman, President, Electrical Engineering Department, University of Iowa, Iowa City, Iowa.

Marcus D. Dodson, Vice-President, 1932 Grindlay St., Cypress, California.

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

Directors
Quayne Golden Gennaro, 29 Bartie Ct., Highland Park, New Jersey 08804.
Albert Hausser, Electrical Utilities Industry, LaSalle, Ill.

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


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

Committees

MOVIE – J. E. Farley.

OUTSTANDING YOUNG ELECTRICAL ENGINEER AWARD – Harlan J. Parli.

OUTSTANDING STUDENT AWARD – Lawrence Hamilton.

OUTSTANDING PROFESSOR AWARD – Outstanding Chapter Award – Alan Letfow.

PUBLICITY – Berthold Sheffield.

VISITATION – Larry Dvon.

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 development 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, Nguuenh 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. Nguuenh Nshom, Zeta Kappa Secretary; Dr. Edward Isibor, Dean of Engineering and Technology; and Mr. Raymond Lynn, Treasurer.
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 hillsides 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 Residenz, a junior Versailles whose rooms of frescoes, carved stucco, sculptures and chandeliers are as princely as an opera quartet. The sounds of Mozart, in fact, do fill its candlelit Imperial Hall during summer concerts.

After a sidetrip to Miltenberg to see the gabled, timbered houses where Shakespeare would have felt more at home than Chaucer, you enter Mergenthalen, 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 post 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, tapestries, wallpaper, china, chairs and desks—most 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 decor; 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 gay 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 Crelingen, to admire the other-worldly altar of Tillman Riemenschneider, master sculptor and carver of the early fifteen hundreds. If the wrinkled 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 schlüsselblumen crown 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 a bout as old as its hill: settled by Celts over 5000 years ago, the Danube, before and after 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—fountain or statue or timbered house or clock tower; a monastery, nunnery or granary—all a picture story 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 striped apron, soot-smudged from one job, bicycling to another. In Feuchtwangen, stop at the Thurn and Taxis cloister; 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 set in 19th Century Germany—"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, built only for books, statues, carvings and Gobelin tapestries. In Durnau, birth, after a visit to the streets of patrician houses built for medieval merchants, you cross a gentle blue stream, the nanne, and 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 cities on rich street. It attracted people like Mozart's ancestors—builders, sculptors, musicians and architects who discovered their talents in the city's houses, churches, towers and fountains. As you wander the Maximilianstrasse, the main street, you feel the wealth of centuries in the handsome homes, some in partial use.

After Augsburg, the highway follows the Via Claudia, ancient Roman route from Germany south to landesburg, with its orate Rathaus, and to Schongau, where for 30 years you can see mountains in the distance—the Tyrolean Alps. Stop off at two churches, the Romanschulgaden and Die Wies, a lavish rococo paradise on earth, before you enter Flüssen, 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 pseudo-nemral Schwanstein 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... it's just some oranges and coffee grounds."

Boy: "Dad, I just got a part in the school play."

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

XI CHAPTER, Auburn University — The Xi chapter would like to recognize its first female president since its formation in 1979. Cindy Eisele, who is attending Auburn University with the Johnson-Owens Scholarship, is the first female president. Cindy hails from Huntsville, Alabama where she went to school at St. Rita's.

When Cindy first came to Auburn, she was a work-study student for 3 quarters, played in women's intramural basketball, and as a pre-engineer she was in the top 5% of her 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).

Following her activities at Auburn, Cindy was selected as the Xi chapter president in the Spring quarter elections. After the election, Cindy immediately began planning for the summer quarter. At the chapter 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 of "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 Student Center student lounge.

Richard Griffin, an HKN member, was chosen as the summer quarter Outstanding Engineering graduate by the Engineering council and has been 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-institution meeting, "The Smokeout," was held on November 2. The prospective new members, Dr. Lowry gave a slide presentation on Eta Kappa Nu and the Auburn electrical engineering department. The formal initiation was
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 discuss throwing ball?"

"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

by Stephen Gisaka

ETA 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 numbers, as well as 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 for the students to strive to become members of the honor society. This was the first activity that we launched and 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 us the freshmen, students and particularly freshmen in Electrical Engineering on how to develop good study habits and also Joker 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. 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 they 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 students' attention to the necessity of study and we never failed to seize this opportunity to publicize the Eta Kappa Nu Honor Society's 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 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 began at home! For next year we are looking forward to having a broader spectrum of activities which will reflect more of all walks of life.

by Nipshon J. Nkom

GAMMA XI CHAPTER, University of Maryland—Gamma Xi Chapter at the University of Maryland, College Park, is in a period of rapid expansion. All but four of our members graduated this December, leaving only the 17th sylphon 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. Ura Hochuli displayed some gas laser tubes used in research here. Also, one of the members interfaced his TV typewriter to an INTEL 8085 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 UM's Industrial Education Shop allowed Gamma Xi chapter to reduce our costs three-fold for the mahogany plaques used for pledge projects. Other chapters might look into this way of reducing running expenses.

by John Incorreci

The Beta PSI chapter is proud to announce that Betty Joe Willis, a sophomore from North Carolina, has been named the Beta Psi chapter member of the month for March. Betty Joe is a member of the National Honor Society and is active in many campus organizations. She is a natural leader and has been a valuable asset to the Beta Psi chapter. Congratulations to Betty Joe on her achievements!
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