

# HEADQUARTERS GRAND ARMY OF THE REPUBLIC MAY 5, 1868

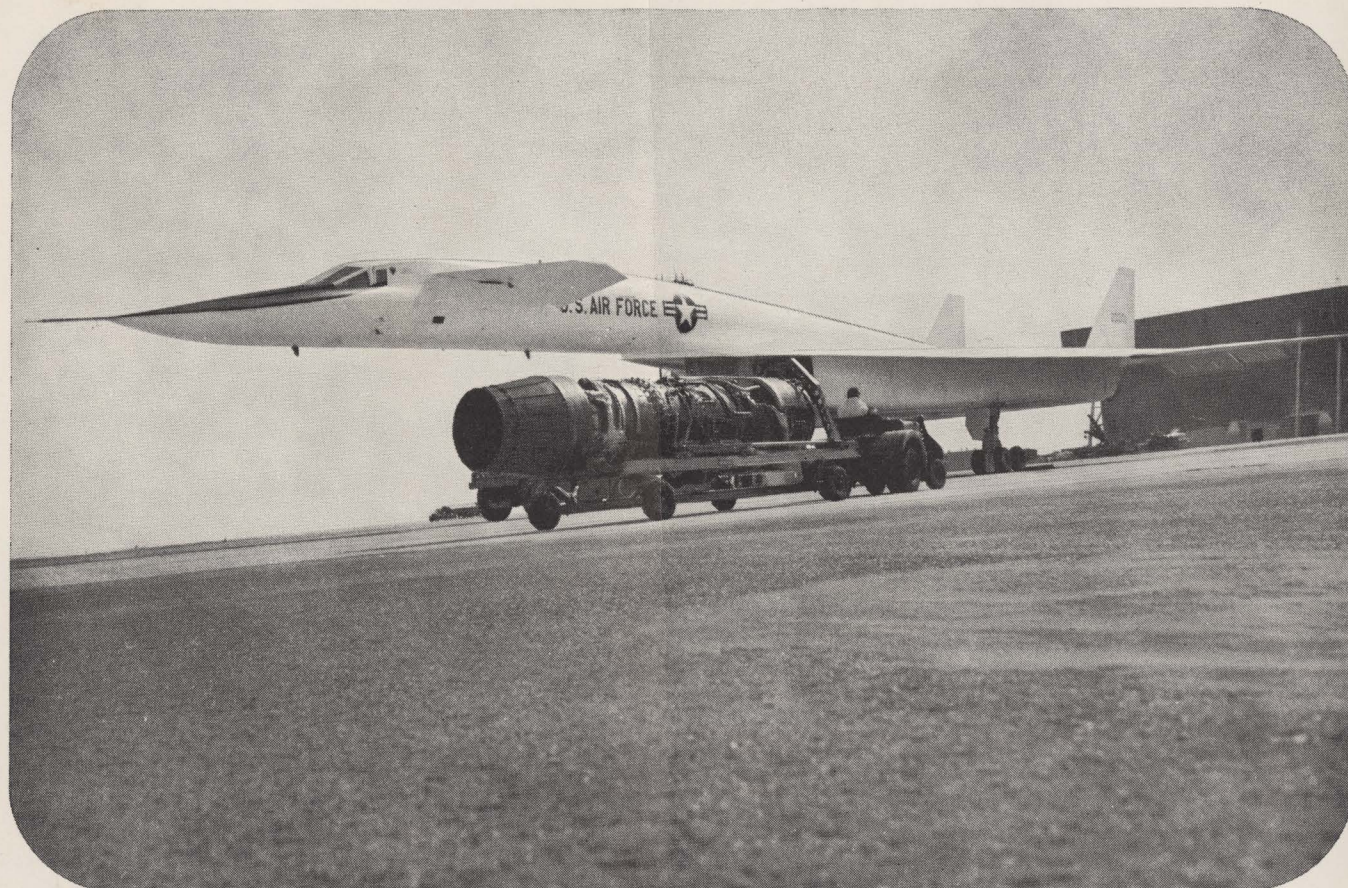
## General Order #11

1. The 30th day of May, 1868, is designated for the purpose of strewing with flowers or otherwise decorating the graves of comrades who died in defense of their country during the late rebellion, and whose bodies now lie in almost every city, village, and hamlet churchyard in the land. In this observance no form or ceremony is prescribed, but posts and comrades will in their own way arrange such fitting services and testimonials of respect as circumstances permit.
2. We are organized, comrades, as our regulations tell us, for the purpose, among other things, "- - of preserving and strengthening those kind and fraternal feelings which have bound together the soldiers, sailors, and marines who united to suppress the late rebellion." What can aid more to assure this result than by cherishing tenderly the memory of our heroic dead. We should guard their graves with sacred vigilance. All that the consecrated wealth and taste of the nation can add to their adornment and security is but a fitting tribute to the memory of her slain defenders. Let pleasant paths invite the coming and going of reverent visitors and fond mourners. Let no avarice or neglect, no ravages of time, testify to the present or to the coming generations that we have forgotten, as a people, the cost of a free and undivided republic.
3. If other eyes grow dull and other hands slack, and other hearts cold in the solemn trust, ours shall keep it well as long as the light and warmth of life remain in us.
4. Let us, then, at the time appointed, gather around their sacred remains and garland the passionless mounds above them with the choicest flowers of spring-time. Let us in this solemn presence renew our pledges to aid and assist those dependents whom they have left among us as sacred charges upon the nation's gratitude.

N. P. Chipman  
Adjutant General

John A. Logan  
Commander-in-Chief

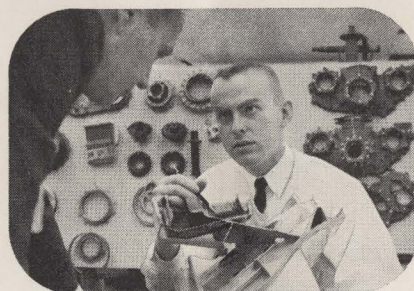




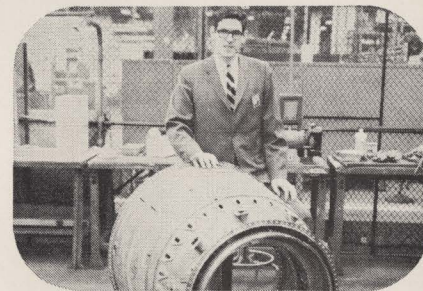
SIX G-E J93 ENGINES push USAF XB-70 to MACH 3.



**JACK WADDEY**, Auburn U., 1965, translates customer requirements into aircraft electrical systems on a Technical Marketing Program assignment at Specialty Control Dept.



**PAUL HENRY** is assigned to design and analysis of compressor components for G.E.'s Large Jet Engine Dept. He holds a BSME from the University of Cincinnati, 1964.



**ANDY O'KEEFE**, Villanova U., BSEE, 1965, Manufacturing Training Program, works on fabrications for large jet engines at LJED, Evendale, Ohio.

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in jet power since the beginning of propellerless flight has made us one of the world's leading suppliers of these prime movers. This is typical of the fast-paced technical challenge you'll find in any of G.E.'s 120 decentralized product operations. To define your career interest at General Electric, talk with your placement officer, or write us now. Section 699-16, Schenectady, N.Y. 12305. An Equal Opportunity Employer.

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**GENERAL  ELECTRIC**

# Bridge



of ETA KAPPA NU

Electrical Engineering Honor Society

**MAY, 1966, Vol. 62, No. 3**

Editor and Business Manager  
Paul K. Hudson

## OUR COVER

If other eyes grow dull and other hands slack, and other hearts cold in the solemn trust.

The haunting lines of General Logan's famous **Order Number Eleven** establishing Memorial Day are superimposed upon the image of Abraham Lincoln, buffeted by the weather in death as in life, gazing wistfully from the tomb at Springfield. For an unusual effect view the cover from a distance of six to ten feet. Photo of Lincoln by David Attie of **VENTURE**, Copyright 1965 by Cowles Magazines and Broadcasting, Inc.

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# Real and Imaginary

What Happened to the . . .

## "MARY CELESTE"?

A ghost ship floundering aimlessly in the mid-Atlantic. A sword lying under the captain's berth. The ship's log open in the mate's cabin. The compass and running rigging destroyed. The cargo of 1,700 barrels of alcohol—all except eight leaking barrels—still intact. More than three feet of water in the hold.

The ship's small boat gone. And all eight crew members and two passengers—one the captain's two-year-old daughter—missing.

This was the baffling discovery made some 400 miles off the Azores by the British vessel "Dei Gratia" on December 4, 1872.

(Continued on page 10)



**THE "MARY CELESTE" IS SPOTTED** drifting aimlessly. Though its crew is missing, everything on board appears ship-shape. What happened? The mystery, dating from 1872, remains unsolved. Sleuths at the Atlantic Companies, in whose famed marine library this oil painting depicting the scene hangs, are keeping the case open.

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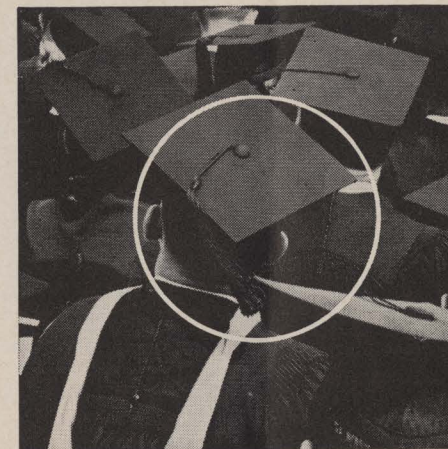
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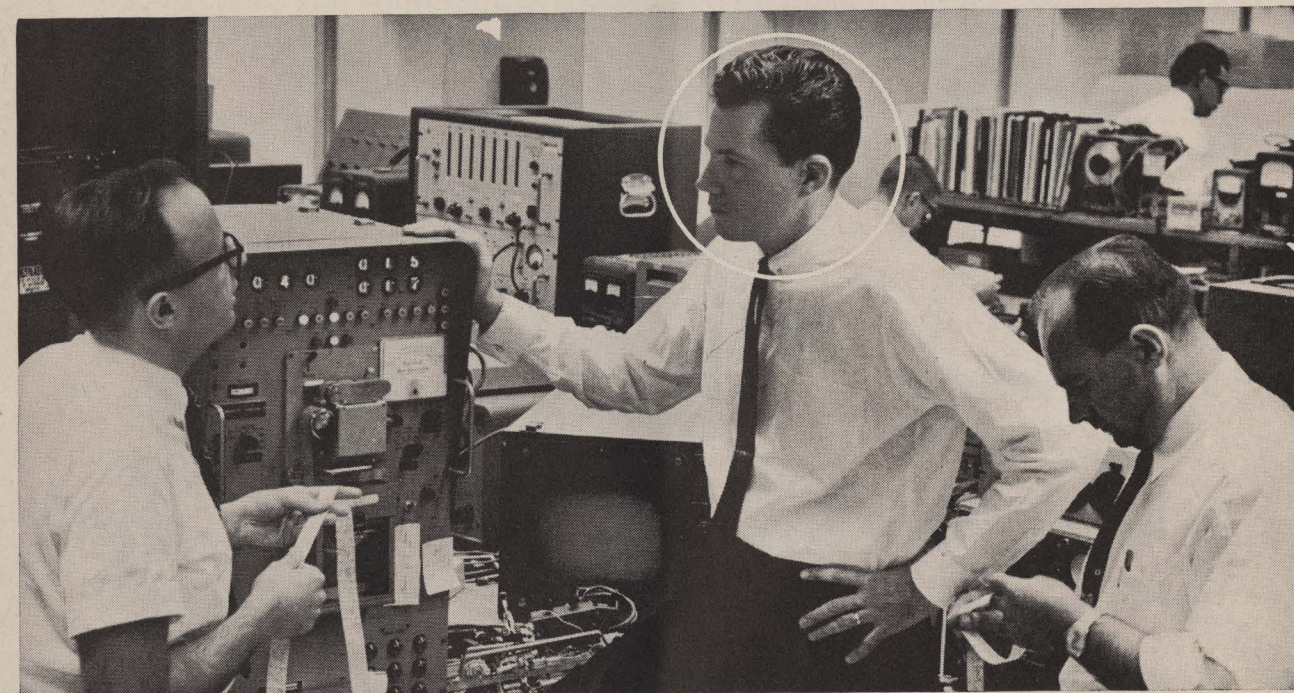
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## John Lauritzen wanted further knowledge



## He's finding it at Western Electric

When the University of Nevada awarded John Lauritzen his B.S.E.E. in 1961, it was only the first big step in the learning program he envisions for himself. This led him to Western Electric. For WE agrees that ever-increasing knowledge is essential to the development of its engineers—and is helping John in furthering his education.

John attended one of Western Electric's three Graduate Engineering Training Centers and graduated with honors. Now, through the Company-paid Tuition Refund Plan, John is working toward his Master's in Industrial Management at Brooklyn Polytechnic Institute. He is currently a planning engineer developing test equip-

ment for the Bell System's revolutionary electronic telephone switching system.

If you set high standards for yourself, educationally and professionally, let's talk. Western Electric's vast communications job as manufacturing unit of the Bell System provides many opportunities for fast-moving careers for electrical, mechanical and industrial engineers, as well as for physical science, liberal arts and business majors. Get your copy of the Western Electric Career Opportunities booklet from your Placement Officer. And be sure to arrange for an interview when the Bell System recruiting team visits your campus.



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☐ Engineering Research Center, Princeton, N. J. ☐ Teletype Corp., Skokie, Ill., Little Rock, Ark. ☐ General Headquarters, New York City



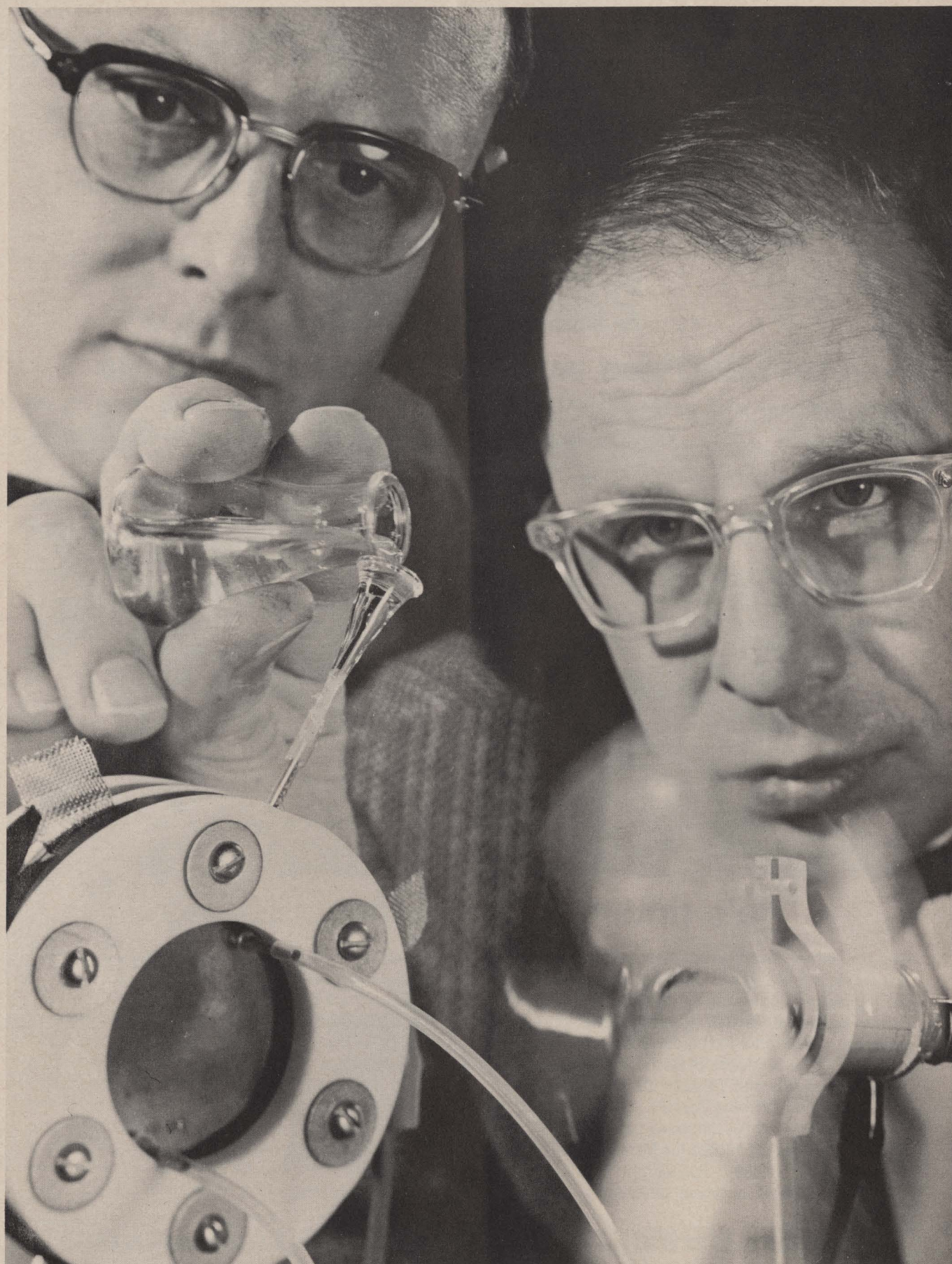


Photo at left: **DIESEL OIL** is combined with air in a new General Electric fuel cell, generating electricity directly to power the motor at right. Pouring the fuel (commercial 18-cent-a-gallon diesel oil, simply purified) is Dr. Thomas Grubb, pioneer with Dr. Leonard Niedrach (left) in the development of the first fuel cell to operate successfully with a broad range of inexpensive hydrocarbon fuels at moderate temperatures. The new cell has been operated with a variety of other common liquid fuels as well as such gaseous hydrocarbon fuels as propane and natural gas.

# FUEL CELLS TODAY

Technical Staff — G.E. Research Lab.

Schenectady, New York

Fuel cells are not new. The principle was first defined by Sir William Grove in 1839, but only during the past decade has the fuel cell reached the stage of practical application.

Its unique advantages—extraordinary efficiency, silent operation, and avoidance of noxious exhaust—suggest many potential uses.

General Electric fuel cell batteries provided the electric power needed aboard the Gemini two-man spacecraft. While the special requirements of space flight make that field the first user of fuel cells, many uses on land and at sea are foreseen for this important addition to the available sources of electric power.

Delivering electric power as long as fuel is supplied, with high efficiency and without moving parts, the fuel cell is very attractive for a wide range of uses. Since the cost of fuel cell power is now well above that of power

from existing utility lines, its major usefulness is in isolated areas, on vehicles and as sources of emergency power. Remote applications include not only locations around the globe where utility power is not available, but also the environments of space and the sea. In land, space, and sea vehicles, fuel cells can supply traction or propulsion as well as auxiliary power. For communication and other vitally needed equipment, they can furnish electric power over long periods in case of power failures or disasters.

## How Fuel Cells Generate Electric Power

A fuel cell is an electrochemical device that can continuously change the chemical energy of a conventional fuel and oxidant to electrical energy by a process involving an essentially invariant electrode-electrolyte system. In simple terms: It produces electric power directly from a continuous chemical reaction.

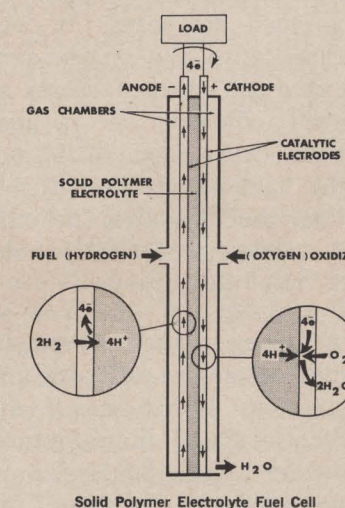
By contrast, a conventional battery does not convert energy but stores it. It is limited by the extent of its primary charge or by the need for periodic recharging. The fuel cell operates as long as fuel and oxidant are supplied.

The hydrogen-oxygen fuel cell reverses the well-known process of electrolysis. Instead of break-

ing water down into its components by passing an electric current through it, water is formed in a controlled reaction that liberates energy in the form of electricity.

In a typical fuel cell, shown here with an acidic electrolyte, hydrogen reacts at the anode to give up an electron ( $e^-$ ) to the load while simultaneously releasing hydrogen ions ( $H^+$ ) in the solution. At the cathode, these hydrogen ions combine with oxygen and the electrons from the load circuit to produce water.

Material and electrical charge balance are maintained by migration of both electrons and ions. Interrupting the electron flow in the external circuit or the ion flow in the internal circuit inter-



Solid Polymer Electrolyte Fuel Cell

(Continued on next page)



rupts the power—and interrupting the external electrical circuit essentially stops the use of fuel.

Hydrogen/oxygen fuel cell systems are today a practical reality. At General Electric, they are produced in quantity, in a quality-controlled manufacturing process. Other fuels than hydrogen—such as propane or octane, as well as methyl alcohol and ammonia—may be used directly in certain fuel cell systems.

Thus, any fuel cell consists of a number of elements, separately or in combination: Positive and negative electrodes; an electrolyte that serves as a medium for ion transport; the fuel and the oxidant. It is also common to use a catalyst to promote reaction at the electrodes.

#### Fuel Cell Characteristics

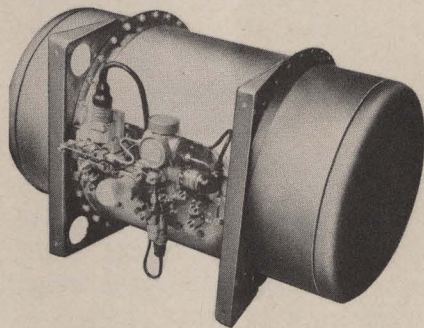
Although there are various approaches to the design and construction of fuel cells, all the major concepts have some points in common.

- (1) Fuel cells are highly efficient. They convert between 50 and 70% of the energy of the reaction to electric power.
- (2) This efficiency increases as the load decreases. It contrasts with the engine-generator set which operates at lower efficiency as it goes from rated load to idling. The fuel cell is "self-throttling" and consumes fuel only as needed—practically none at "idle" operation.
- (3) In theory, a fuel cell can be built in almost any size and capacity. For practical applications and manufacture, however, individual cells are packaged in "modules" or "batteries" and put on the

line in either series or parallel.

- (4) Fuel cells basically have no moving parts and therefore need little maintenance. The amount of auxiliary pumps, fans, plumbing and controls varies with fuel cell types. General Electric's solid polymer electrolyte fuel cell batteries require a minimum of such equipment.
- (5) The noxious or toxic exhaust products associated with a combustion reaction—smoke, corrosive substances, and noise—are avoided. In fact, the by-product of the hydrogen/oxygen fuel cell is drinkable water. An efficiently operated direct hydrocarbon fuel cell produces water and carbon dioxide.

Intensive fuel cell research has been carried on for many years. The major effort, ranging from basic research to repetitive production, has been focused on what are considered to be the most promising fuel cell technologies. For this reason, fuel cells should, at this time, be regarded as an evolving group of products at various stages of development.



Gemini fuel cell battery

#### Solid Polymer Electrolyte Fuel Cell

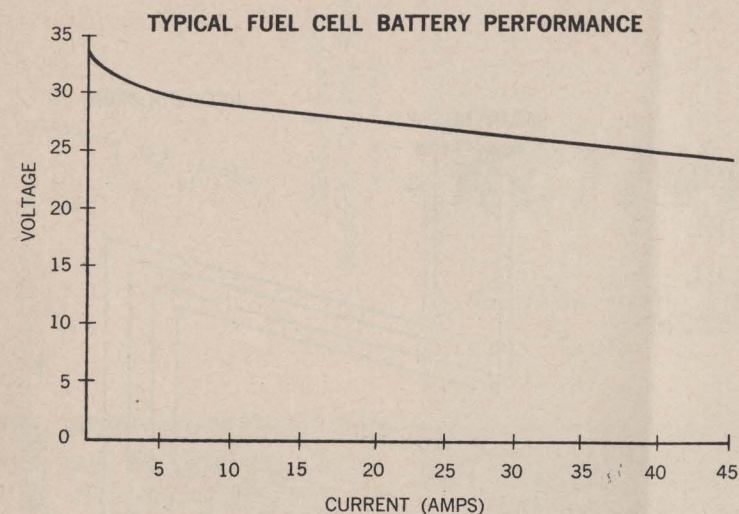
This fuel cell technology is characterized by use of a thin, tough sheet of polymer plastic—an ion-exchange membrane—as the electrolyte. By bonding a simple catalytic electrode structure to each side of this sheet, we are able to construct a fuel cell of unique simplicity and light weight. Because the membrane rejects water above a fixed amount, this by-product of operation can be easily removed by condensing the vapor on cool wicks which carry it off by capillary action.

Individual cells can produce up to 1 volt and are normally operated from 0.8 to 0.9 volts depending on the current density desired. At present, cells for spacecraft measure about 7 x 8 inches and deliver 35 watts/ft<sup>2</sup> with peak power capability up to 75 watts/ft<sup>2</sup>. Much higher power densities have been achieved with other fuel cells. For tests connected with potential marine uses, scaled-up cells of 200 in<sup>2</sup> area delivered 120 watts/ft<sup>2</sup>.

The diagram illustrates the varying relationship between voltage and power density of present G-E production fuel cells.

For practical use, individual fuel cells are stacked into series-connected modules. For example, the modules for Gemini spacecraft contain 32 fuel cells.

One, two or three such modules are then combined in a cylindrical container, where they can be electrically connected in series or parallel. Hydrogen is supplied by manifold to individual cells. Oxygen reaches the opposite side of all cells from the atmosphere in the container whose non-working open space is filled with plastic foam, as one of a series of safety



measures. Both hydrogen and oxygen are at low pressure (approximately 21-22 psia), with the oxygen pressure slightly higher than that of hydrogen. Each module can be separately controlled.

#### 1 KW Fuel Cell Battery

Contains 3 modules of 32 fuel cells, pressure regulators and sensors, product water separator

Fuel: Hydrogen, Approx. 0.1 lbs/kwhr

Oxidant: Oxygen, approx. 0.8 lbs/kwhr

Output: 1 kw peak

By-product: Water, approx. 1 pint/kwhr

Weight: 70 lbs. approx.

Size: 12.5" dia., 25" long

Cooling need: Liquid Coolant. Temperature at inlet: 40-100 degrees, 75 degrees avg. Higher temperatures tolerated for brief periods.

Efficiency: 50%-60%.

#### Operating Life

The practical life of a fuel cell battery is considered to end at the point where voltage or cur-

rent drop below the specified minimum. As this time span is affected by such factors as the actual load cycle, storage, coolant temperature and flow, it cannot readily be stated in general terms, but examples of test-proven life are given below.

General Electric has accumulated more than half a million cell test hours on complete fuel cell batteries and systems. Fuel cell batteries have run through ground test missions, up to 46 days, equalling five trips to the moon and back. Modules have exceeded 2,000 hrs. (86 days) of continuous operation on a number of occasions and one passed six months of constant output. In tests to marine performance specifications, individual cells have exceeded 4,000 hours of operation. G.E. fuel cell modules and batteries have successfully withstood rugged tests of resistance to acceleration, shock and vibration while delivering power.

New electrolyte materials used in typical operating configurations have already demonstrated the capability to extend operating life far beyond the above limits.

#### The Fuel Cell Power System

In simple terms, the compo-

nents of a typical fuel cell power system are:

- (1) The reactant supply system
- (2) The fuel cell battery
- (3) Water and heat removal
- (4) Electrical control.

#### 1. Reactant Supply

If the reactants are hydrogen and oxygen, they may be drawn from pressurized containers or from special cryogenic reactant supply systems. Cryogenic (super-cold) storage has the advantage of keeping tank space to a minimum. However, it requires special auxiliary equipment and is time-limited unless power is used to maintain cryogenic temperatures.

Air-breathing fuel cells avoid the necessity of an oxygen supply. At low power levels, natural convection provides sufficient air. At higher levels, a simple blower is needed. Powered by the fuel cell itself, it circulates air among the individual cells.

Hydrogen can be produced in a chemical generator that is connected to the fuel cell. The raw material may be an active metal (activated by adding water), ammonia, or hydrocarbon fuels such as gasoline or kerosene. The latter can be reformed to hydrogen and carbon dioxide in a chemical reaction which employs the fuel cell's own product water.

#### 2. Water Removal

In the design and application of fuel cell batteries, means must be provided to remove the water and heat that are their normal by-products. In hydrogen-oxygen fuel cells, General Electric uses wicks to transport the product water from individual cells to a common collection point within the battery structure. The water

(Continued on next page)



is removed from the oxygen atmosphere of the cell by a separator that operates without any moving parts. It can then be collected for such uses as drinking or cooling. In air-breathing fuel cells, product water is carried off by a stream of air, to be either vented or collected for other use.

### 3. Heat Removal

While fuel cells convert 50-70 per cent of the reaction energy to electric power, the remainder is largely rejected as heat. This must be carried off so that temperature is maintained. Fuel cells can be cooled by circulating a liquid coolant among the cells and then through a radiator. They may also be cooled by air (the same air that supplies oxygen to them) or by direct contact of the cells with a radiator structure. General Electric's present solid electrolyte fuel cells for space applications are designed for circulation of a liquid coolant ranging between approximately 75 degrees F. and 120 degrees F. Fuel cells now in development will tolerate higher temperatures.

### 4. Electrical Control

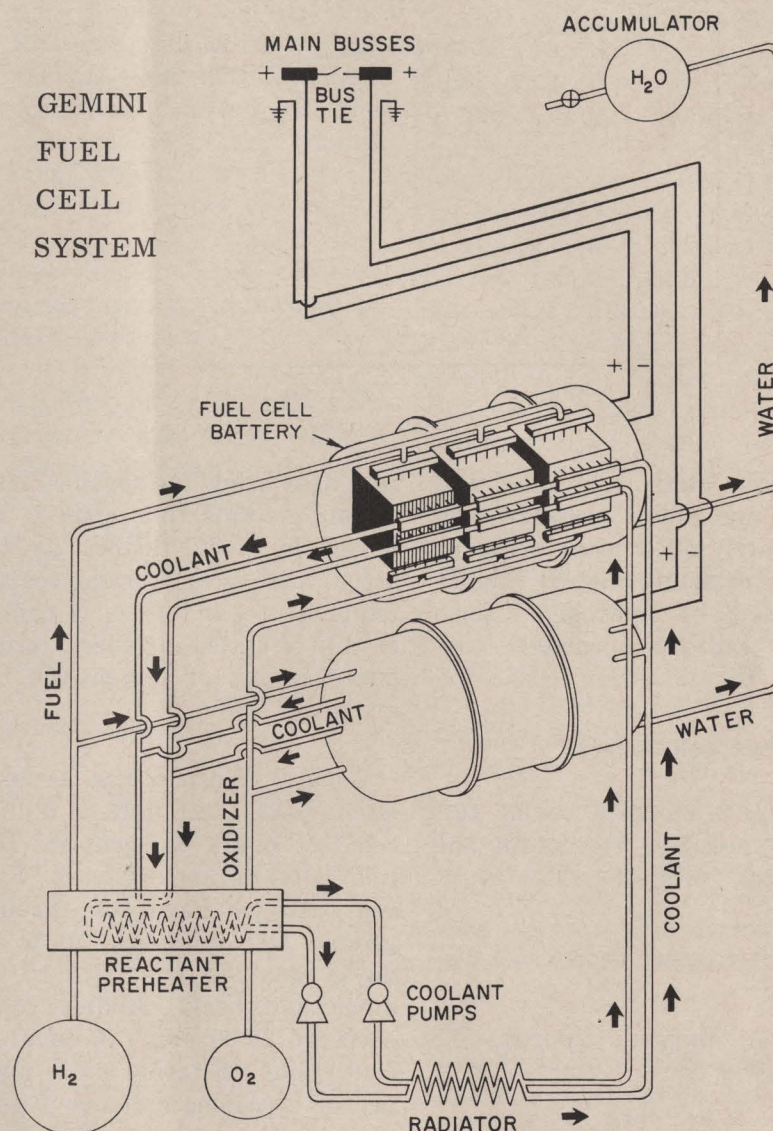
For many applications, fuel cell batteries will provide current and voltage within acceptable limits, based only on the series or parallel connections of the individual cells. (Due to its inherent large capacity [farads] the output impedance of a fuel cell is very low.) Closer voltage limits can be achieved by designing the battery for lower current at any given voltage, with a penalty in size and weight by a saving in fuel consumption. For very tight voltage limits, it may be necessary to design for the optimum combination of fuel cell battery, fuel supply and voltage regulator. To cope with these problems, series-parallel switching of batteries

and conversion-regulation circuitry have been developed. Voltage and current delivered by the battery can now be closely regulated and stepped up or down with effective DC-DC converter-regulators developed by General Electric. Practical fuel cell power supplies are expected to offer a choice of DC voltage, as well as alternating current.

Studies have shown that pulsating loads can be applied to the fuel cell without incurring large losses due to RMS heating effects.

### WHAT PEOPLE ARE SAYING:

Allie Sherman, coach of the New York Giants, in the locker room after a practice session: "Now listen fellas, I know you have been reading in the papers about how I have been trying to trade Del Shofner for Paul Horning. Well I want you to know there is no truth in it. I wouldn't even trade Shofner for Horning and all his girl friends." Several players in unison: "Now wait a minute coach, let's take a vote, let's take a vote."



## RHO CHAPTER WINS 1965

# NATIONAL ACTIVITIES AWARD

Beta, Beta Epsilon, Gamma Theta, Beta Pi, Regional Winners

The judging has been completed and the winners chosen. For the 28th consecutive year the New York Alumni Chapter of HKN has paid recognition to the outstanding college chapters in the nation. The awards are presented for worthwhile activities and for the manner in which they are carried out as reported by the chapters. Four regional awards are made and the outstanding chapter among them is chosen for the national award. Should a region not produce a report worthy of merit in a particular year, then no regional award is given. The New York Alumni Chapter is delighted to report that each region had a winning report, in fact, the East Central region had two reports judged of equal excellence which resulted in a tie.

The winning reports are as follows:

Rho of the University of Colorado—Western Regional and National Award

Beta-Pi of the City College of New York—Eastern Regional

Gamma-Theta of Missouri at Rolla—West Central Regional

East Central Regional tie between:

Beta of Purdue and Beta-Epsilon of Michigan University



Dr. Donald Fink, General Manager of IEEE, was chairman of the Chapter Awards Committee for 1965.

As winners they join a distinguished group. The list of past winners can be found in the Winter 1964 issue of THE BRIDGE, the 1964 winners are reported in the Spring 1965 issue.

This year's Chapter Awards Committee was chaired by Dr. Donald G. Fink, General Manager and fellow of the IEEE, and eminent member of HKN. The Committee members were: William T. McMahon of the Bell Telephone Laboratories at Wippany, N.J., Bruce Renz and Alan Lefkow, both of American Electric Power Service Corporation. Working very hard with the Committee

was the past President and present Secretary to the New York Alumni Chapter of HKN, Dr. Frederick F. Russell of Newark College of Engineering. Also working with the Awards Committee at the final act of selecting the winners were the following officers of the New York Alumni Chapter:

Philip Carl, Jr., President, AEP, New York City

Irving Engelson, Bridge Correspondent, Trenton Junior College, Trenton, N.J.

Edgar W. Markard, RCA, New York City, and

Berthold Sheffield, Past President of the Advisory Council to the New York Alumni Chapter, RCA, N.Y.

Most chapters have followed the recommended outline for reports as it appears in the Spring 1965 issue of THE BRIDGE, however, it was felt that a number of chapters did not provide the committee with sufficiently detailed information. Since chapters are being judged on the basis of their reports it is most important to present reports in the recommended form. Chapters that do not have a copy of the Spring 1965 BRIDGE on file may obtain a copy of the proposed outline for reports by writing to:

(Continued on next page)



Professor Irving Engelson  
Department of Engineering  
Trenton Junior College  
Trenton, New Jersey 08608

To further facilitate the chapters with the reporting, the New York Alumni Chapter will most probably reproduce the winning report and make it available to College chapters.

While the number of winners is, of course, limited, the number of fine reports were many, and it was evident throughout that all college chapters engaged in various unselfish activities in the true HKN tradition.

The New York Alumni Chapter of HKN congratulates the winners and strongly urges the other chapters which submitted reports to see in what way future reports may be improved. Those chapters which have not submitted reports are encouraged to do so in the future. The award is worth striving for, it has a long and honorable history!

#### REAL & IMAGINARY (from page 2)

The derelict ship, yawing and under very short canvas, was the ill-fated brigantine "Mary Celeste." Over the past nine decades, hundreds of conjectures, rumors and theories have arisen concerning the fate of the Mary Celeste's crew. Yet to this date, the disappearance of the ten people remains one of history's classic mysteries.

The Mary Celeste left New York harbor on November 7, 1872, according to the famed "disaster books" of the Atlantic Mutual Insurance Company. The books also note that during the closing months of 1872, the Atlantic Ocean was unusually tempestuous. Very heavy seas and

winds of gale force buffeted ships unmercifully.

Captained by Benjamin S. Briggs, the Mary Celeste's destination was Genoa, Italy. Aboard were the Captain's wife, Sarah Elizabeth, and their infant daughter, Sophia Matilda.

For almost a month the 282-ton Mary Celeste was out of touch with civilization when it was sighted apparently in distress by the "Dei Gratia."

Viewing the derelict ship through his spyglass, Captain David Morehouse of the "Dei Gratia" saw only a deck deserted of life. The "Dei Gratia" pulled near the drifting "Mary Celeste" and Morehouse "spoke" to her. When he received no response, Morehouse ordered two of his crew to board the brigantine.

The boarding crew stepped into a bone-chilling mystery. Not a soul was aboard. The captain's chronometer, sextant, navigation book, ship's register and other papers were missing.

Three-and-a-half feet of water was in the hold. The forward house was full of water and tons of water were between decks. Two of the Mary Celeste's sails had been blown away with some of the running rigging.

But the men's clothing, boots and oil skins, even their pipes, had been left behind. All the captain's effects were on the ship. On the captain's bed, "there was the impression as of a child having lain there." A child's toys were also found in the cabin.

On the log slate still lying on the cabin table, the following entry dated Monday, November 25, 1872, had been written . . .

"at 5 o'clock made the island of S. (Saint) Mary's bearing ESE. At 8 Eastern point bore SSW 6 miles distant."

These were the farewell words of the Mary Celeste. From November 25 to December 4, she had been a derelict, plaything of sea and wind and a hazard to ships at sea.

Curiously enough, despite her severe buffeting, the little brigantine was quite seaworthy, "capable of sailing round the world." A six months' supply of food and potable water was aboard.

Eventually three Dei Gratia crewmen sailed the Mary Celeste to Gibraltar and Genoa.

Numerous theories have been advanced as to the fate of the ten people aboard the Mary Celeste, theories ranging from mutiny and murder to the sudden appearance of an island from the Atlantic depths which lured the crew to their death.

One theory proposed by the late Charles Edey Fay, a leading student of the sea tragedy, is that in traversing the raging Atlantic, the Mary Celeste kept her hatches closed. In passing from the frigid, blistery north to the balmy Azores, alcohol in the non-ventilated hold may have suddenly fumed upwards.

Confronted by imminent peril, fearing for the safety of his wife, child and crew, the Mary Celeste's captain may have ordered the ship's boat launched.

He further theorized that after leaving the ship a violent squall, so characteristic of the Azores, may have swamped the small life boat and swept all aboard into the sea.

(Continued on page 18)



#### A DAY AT DE LEON SPRING

Dear Friends:

I will now try to tell you of a day spent at lovely De Leon Spring in Florida a little over seventy-one years ago. The Spring is there now as it was centuries before the Spanish explorer who discovered it ever saw it. But such a day as we had there while I was Dean at Stetson University never can again be enjoyed. I was not too happy with the title I struggled under. I think some people in the north realized this for some of them sent me messages in silly verse addressed to "The Dean of De Land." But there came once in a while an incident which gave me real joy then. And I get joy in the memory of some incidents. Such a one was the picnic at De Leon Spring.

#### LETTERS from Ellery



At Mrs. McKinney's home where I lived were Mrs. McKinney, her elder sister from the Catskills and the three teen-age girls. Then there was the Emmie Belle and her mother from New York City. The plan developed little by little as we ate at table. I don't remember who first proposed it, but Mrs. McKinney said she would put up the lunch, and Emmie Belle's mother said she would pay for the conveyance and I was to engage the horses and big wagon and do the driving. The party was enlarged by inviting the mother and a Stetson student and the teacher of German to whom the student was engaged and possibly a few other girl friends of the McKinney daughters. This made a party of a dozen or fifteen persons.

It would take a large vehicle to carry that number but such a vehicle was available. The first time I saw it was when I came from the north and arrived in the middle of the night. This vehicle was used to meet that train instead of using the wood burn-

ing locomotive and two cars for the daytime trains. The first time I rode in it there were four horses to draw it and one of the horses was imperfectly trained and insisted on throwing itself flat on the ground. For our party I decided we could get on with two horses only. The distance was a dozen or so miles, but we did not need to hurry the horses. The wagon had very high wheels and many crosswise seats high above the ground.

The way was mile after mile through the great long-leaf pine forest. The trees were mostly about the size of flour barrels at the base and they grew straight without branches about 75 feet and above that height was the wonderfully beautiful green mass of needles of length of two or more feet. These trees gave a most delicious fragrance and the breezes produced sweet sounds as they set the needles in motion.

As to the road, there was none in the ordinary sense. One drove

(Continued on next page)





a winding way through the forest around the individual trees. It was just as nature left the forest except that men had gone out with horse-drawn rakes gathering the fallen needles and dumping them onto the path where the wagon was to go. To my mind there never was a more delightful road to ride over than that needle highway. One went along without the slightest sound of horses' feet or wagon wheel rattle. The nearest thing to it was to be in a boat floating along in perfect quietness.

At the Spring a problem at once arose. The girls wanted to go into the crystal-clear water. The older ladies knew it was improper for them to go in with the two men present. I don't know whether they had brought bathing suits. At that time I had never seen a girl in such suit. It's not proper to have men there. So I and Mr. Baldwin said we would go by ourselves a mile or so down the stream from the Spring and have our swim there. We of course had no bathing suits. We found a boat and departed.

The stream from the Spring to the St. Johns river is some four or five miles long. It broadened out to a width of a mile or so, winding through the quiet tropical region. At length we were at a safe distance from the ladies and we began to take off our clothes. I did the rowing. Just as my companion was about to go overboard I felt a bump on the bottom of the boat and saw a large creature speeding away raising a big wave from its motion and leaving the water behind it black and muddy. Had it not gone so fast we should have thought it was an Alligator. But no 'Gaitor could go at that speed. I suppose it must have been a very large fish. But whatever it

was we began to have doubts about the joy of a swim there. Then too, the muddy water was not appealing. We didn't go in.

After a suitable time had elapsed we returned to the Spring. We saw the younger girls fully dressed looking into the Spring and the older ladies making ready the lunch. The Spring was a perfect place for a swim. It was circular in shape and a few hundred feet in diameter. One could see the bottom even in the great depth as clearly as through air. The sand on the bottom was in motion from the upward motion of the water coming no one knew from where. Nearby was a part of the mill the Spanish men once built to get power to run a sugar mill.

As I walked from our boat to where the McKinney girls were I saw a pretty frog sitting on the top of a lily pad. I pointed out the frog to the girls and one of them said "What a beauty."

I said, "Would you like to have it to hold?"

The answer was "Oh yes, I want it."

So I got down to the edge of the water, leaned over toward the little frog and made a sudden dash with my right hand. The water splashed and I felt the live creature struggling in my closed hand.

Walking up to the one who said she wanted it, I told her, "Hold out your hand if you want it." I put it in her hand and she looked and shouted, "Oh you have given me a fish." And sure enough, it was a pretty fish two or three inches long.

I, too, was surprised but I at once remarked, "Wouldn't you

rather have a fish than a frog?"

So there was running and shouting, "Mr. Paine has caught a fish in his hands."

They all began to ask, "How could you catch a fish in your hand?"

I didn't try to explain but said, "Didn't you ever read that Thoreau in Concord was believed to be able to take fishes from the brook in his hand? If he could do that in Concord, why shouldn't I be able to do it in Florida?"

I don't remember just what happened then to the fish, but I suspect it was returned to the Spring. Lunch was ready and the action quickly turned to it. But I did by myself give quite a lot of thought to my trying to catch a frog and instead found I had a fish.

That picnic was a year before Emmie Belle asked my advice about her love affair. I do remember that her mother told me that day that we ought to go there again. But we never did. Now there are no more great pine trees in that region. Gone are the smells and the music from the long needles of those trees. No more may one ride on the noiseless easy road of a bed of pine needles. One sees no more great wagons drawn by the horses. But the water still comes up out of the earth and flows out into the St. Johns river as it did centuries before De Leon thought as he discovered it that he had found "The Fountain of Everlasting Youth."

Love to all from

**ELLERY B. PAINE**  
EMINENT MEMBER HKN

**COMING SOON . . . . .**

## **THE GREAT SAHARA MOUSEHUNT**

by

**Catherine Collins and Miggs Pomeroy**

### **A \$4.75 Book Bonus**

By special arrangement with the authors and publishers the BRIDGE will publish serially, starting in the next issue, this hilarious, true, high-adventure book exclusively for BRIDGE readers. On 13th March, 1961, a party of 14 people in six cars started out from the North African coastal city of Benghazi for a wild dash across the Sahara to the Tibesti mountains—just for fun, adventure, and mice. They found them all, and more. Included in the party were Randolph and Winston Churchill, the son and grandson of the British Prime Minister.

Why not cross the Sahara looking for mice? This is the uninhibited record of a hilariously compatible group of people who did—swapping desert lore, fact and fiction, pushing each other out of sand swamps and over crested dunes, swatting flies, fleas and sometimes each other, swimming in icy desert lagoons and eating epicurean meals well homogenized with sand—from Benghazi in Libya to one of the most inaccessible mountain ranges in the world, the Tibesti, which they had the strength of mind, along with weak ankles and other excuses, not to climb.

Why not indeed! All that is needed, according to the authors,

is a judicious selection of gear, potables and traveling companions, a map or so (much debated for accuracy), and you're off. Add, for seasoning, a pocketful of introductions to desert sheiks and Foreign Legion types. *The Great Sahara Mousehunt* is the tale of such a trip taken by fourteen otherwise sane Angles and Americans. There were seven civilians, an officer of the Royal Scots, and six British soldiers ecstatic at escaping from "hup one two." The soldiers were in it for the desert experience, which they got with a few non-military curlicues. The civilians, with one exception, seem to have been there because of the holes in their heads.

Miggs and Catherine, who signed the Kaimakaan's guest book as "cook and kitchen maid," also kept the record. Miggs' husband, Liv Pomeroy, U.S. Information Officer in Benghazi, was reluctant leader of the expedition, announcing before take-off that he did not like leading and that he expected everybody to do his own. This attitude upset the military element who think a reliable focus for gripes is necessary to a happy atmosphere. Catherine's husband, Alan Collins, a New York literary agent, sparked the expedition and got a mouse named after him for his pains.

(Continued on page 16)

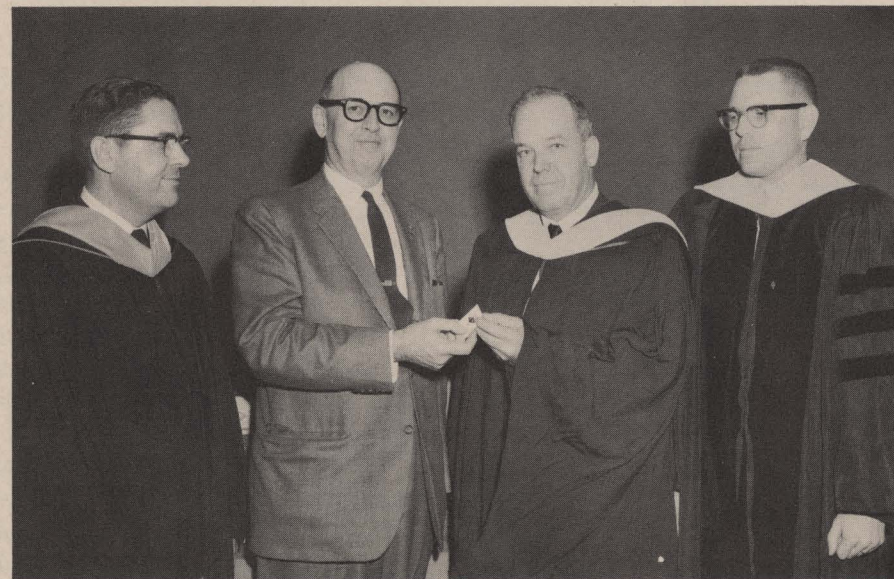


**CATHERINE COLLINS and MIGGS POMEROY**



# DONALD G. FINK-

Eminent Membership, Eta Kappa Nu's highest award, was conferred upon Dr. Donald G. Fink, General Manager of IEEE, at a special joint award program in connection with the NEREM meeting in Boston, Mass., on November 4th. The Induction Ceremony was conducted by Howard H. Sheppard, National President, John A. Tucker, Past National Director, and Bruce D. Wedlock, Past President of the Boston Alumni Chapter. Included among those present was the National Board of Directors of IEEE. The Certificate of Membership was presented to Dr. Fink at the Award Luncheon following the induction, by Melvin H. Weiner, President of the Boston Alumni Chapter.



DR. FINK IS PRESENTED the Emblem of Eta Kappa Nu by the Induction Team. L to R: John A. Tucker, Past National Director; Dr. Fink; Howard H. Sheppard, National President; and Bruce D. Wedlock, Past President of the Boston Alumni Chapter.

Eminent membership is offered to individuals who, by their technical attainments and contributions to society, have shown themselves to be outstanding leaders in the field of electrical engineering and benefactors of their fellow men.

Dr. Fink was graduated in 1933 from the Massachusetts Institute of Technology with the degree of Bachelor of Science in Electrical Communications. In 1942, he was granted the degree of Master of Science in Electrical Engineering by Columbia University. Following his graduation, Dr. Fink was a research assistant on the staff of the Departments of Geology and Electrical Engineering at M.I.T. In

1934 he joined the staff of the journal *Electronics* and served as its Editor-in-Chief from 1946 to 1952.

Obtaining a leave of absence from his editorial duties in 1941, Dr. Fink became a member of the staff of the Radiation Laboratory at M.I.T.; in 1943 he headed the Loran Division. He then transferred to the Office of the Secretary of War as an expert consultant on radio, navigation, and radar. During his war service, Dr. Fink traveled over 80,000 miles from Cairo, Egypt, to Darwin, Australia, siting Loran Stations and arranging for use of the Loran System by the Allied Forces. In 1946, he participated in the atom bomb tests at Bikini, as a civilian consultant in the staff of Admiral Blandy.

In 1948, Dr. Fink was chairman of the IRE Television System Committee, and in 1950, he was a member of the Senate Advisory Committee on Color Television (The Condon Committee). He was Vice Chairman of the National Television System Committee, 1951 to 1952.

In 1952, Dr. Fink joined the research staff of the Philco Corporation. In 1956 and 1957 he was Editor of the *Proceedings of the IRE* and in 1958 he served as President of the Institute of Radio Engineers, traveling 65,000 miles in that year attending IRE conferences throughout Eu-

# EMINENT MEMBER

rope and North America. In March 1961, he was appointed Vice President, Research, of Philco Corporation and later was appointed Director of the Philco Scientific Laboratory.

Since 1957, Dr. Fink has been an active member and consultant of the Army Scientific Advisory Panel, which advises the Secretary of the Army "in the field of Science and matters related thereto." He is Chairman of its Tactical Communications Subpanel, and is Chairman-Elect of the Electronics Advisory Group of the U.S. Army Electronics Command.

Dr. Fink is the author of numerous books, including *Engineering Electronics*, *Principles of Television Engineering*, *Television Standards & Practice*, *Micro-wave Radar*, *Radar Engineering*, *Television Engineering*, *Color Television Standards*, *Television Engineering Handbook*, *The Physics of Television*, and *Computers and the Human Mind*. He is Editor-in-Chief of *The Standard Handbook for Electrical Engineers*.

He is a Fellow of the IEEE and of the IEE (London), and a Fellow of the SMPTE: a member of Tau Beta Pi, Sigma Xi, and Eta Kappa Nu. In 1965 he was elected Eminent Member of Eta Kappa Nu. In 1951, he was awarded the IRE Radio Fall

(Continued on next page)



Dr. Fink is presented his EMINENT MEMBERSHIP certificate by Melvin H. Weiner, President of the Boston Alumni Chapter.



As National President Howard H. Sheppard smiles his approval, Dr. Fink pins the jeweled Eta Kappa Nu Sweetheart Pin on his lovely and talented wife Sally.



DONALD FINK (from page 15)

Meeting Plaque for "many contributions to the television industry." He holds the Medal of Freedom and the Presidential Certificate of Merit for his overseas wartime service. He holds two patents on stereophonic systems.

In January 1963, Dr. Fink became General Manager of the IEEE (The Institute of Electrical and Electronics Engineers, Incorporated), a professional society which combines the former American Institute of Electrical Engineering (AIEE) and the Institute of Radio Engineers, Inc. (IRE). As head of the Institute staff, Dr. Fink is responsible for serving a membership of 150,000 and for the publication of 35 technical journals dealing with electrical engineering and electronics.

GREAT SAHARA (from page 13)

It may be seen at the Smithsonian in Washington. Apply to Dr. Henry (Hank) Setzer, mammalogist, the exception without the hole in the head, a long-suffering expert among tyros. Finally, the Churchills. Randolph's famous father told him flatly that he was mad to go, and added wistfully that he'd rather like to come along himself. Equipped with hot water bottle, icebox and collapsible bar (rarely collapsed), Randolph, with his brilliant and outrageous wit, burst upon the party like a rocket before he remembered that he was needed at the Paris Peace Conference—lest it be too peaceful—and took himself off, leaving his son. Young Winston, on "reading leave" from Oxford, kept his boots in his father's abandoned icebox and his unread textbooks as ballast in the bottom of his car.

This is the final and definitive guide for anyone planning to cross the Sahara in search of mice, and we also unhesitatingly recommend it to those who don't want to do any such thing.

Catherine Collins is a writer who has progressed from literary contest entries at the age of ten, which were distinguished only by their spelling, to novels which she says were distinguished by their infrequency and the kindness, upon two occasions, of book club judges. Miggs Pomeroy makes her debut with this book and promises to outshine—well, not to get into a family squabble—promises to do very well by herself, though we think that she will never be able to misspell as well as her sister-in-law. Though she is a wife and sometimes lives in a house she does not like being called a "housewife." She is a first-rate beachcomber and currently combs those below the Horn of Africa in Mogadiscio.

### THE MINUET

Grandma told me all about it,  
Told me so I couldn't doubt it,  
How she danced, my grandma danced;  
long ago—  
How she held her pretty head,  
How her dainty skirt she spread,  
How she slowly leaned and rose—  
long ago.

Grandma's hair was bright and sunny,  
Dimpled cheeks, too, oh, how funny!  
Really quite a pretty girl—long ago.  
Bless her! why, she wears a cap,  
Grandma does, and takes a nap  
Every single day; and yet  
Grandma danced the minuet—long ago.

"Modern ways are quite alarming,"  
Grandma says, "but boys were  
charming"  
(Girls and boys she means, of course)  
"long ago."  
Brave but modest, grandly shy;  
She would like to have us try  
Just to feel like those who met  
In the graceful minuet—long ago.

by Mary Mapes Dodge

## BOSTON ALUMNI CHAPTER NOTES

by Bill Brown

The Boston Alumni Chapter opened its business year with an Executive Board meeting at MIT. The Board, made up of Mel Weiner, Hollis Baird, John Tucker, Bruce Wedlock, William Levison, Douglas Cluck and Bill Brown, planned the activities of the Chapter for the coming year.

The first general meeting will be held on October 8th at MIT. The business of the meeting will be election of officers for the year. A talk on Motor Vehicle Safety will also be given. The chapter's interest in automobile safety has gained it the support of Insurance Companies and safety-minded organizations not only in Boston, but throughout the nation.

The second general meeting will be held January 14, 1966, at MIT, when a talk by a member of the Federal Bureau of Investigation will be given.

The Chapter, in the past, has presented topics of interest for its professional membership and their guests. It will continue this program and encourages all readers of the BRIDGE to attend the meetings wherever possible.

### WHAT PEOPLE ARE SAYING:

One of the great problems of an Antarctic Station is finding snow to melt for drinking water. The wind and temperature are too severe to dig snow on the surface. Therefore it must be mined in tunnels in the same way coal is mined.

—Sir Bernard Fuchs

# THE WONDERFUL WORLD OF WINDOWS

By ROBERT C. DALEY

Pittsburgh Plate Glass Co.

It all started with a hole in the wall—but what progress the window has made! Now tons of all-climate insulating windows form the walls of gleaming skyscrapers, but ages ago they were nothing more than tiny slits—the smaller the better to keep arrows and savage beasts out of the cave.

Shedding a little light on the history of the window, the ancient Chinese used panes of rice paper; the Romans thin sheets of marble. Early English castles had them, set high in the thick walls, to defend against arrows, scaling ladders and battering rams. But windows didn't really see the light of day until men stopped holing up fearfully in fortresses and started living in wall towns.

By the end of the 3rd century, window glass was being mentioned by contemporary writers. Lactantius, in A.D. 290, writes

**THE FIRST MENTION** of stained glass windows is in the writings of 4th-century Latin and Greek authors. Above, upper left, is a fine 19th-century example of the art. Both the picturesque tower, upper right, and the oriel-window, bottom left, are part of a Victorian mansion in New York City. The highly ornamented beef-eye shaped dormer window, bottom right, graces the majestic Hotel des Invalides—thought by many to be the most impressive building in Paris.

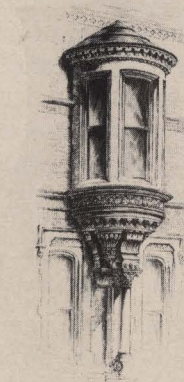
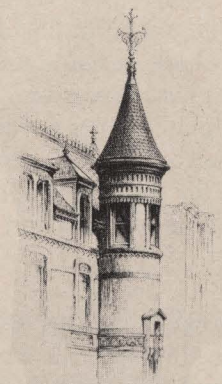
that our soul sees and distinguishes objects by the eyes of the body as through windows filled with glass. Saint Jerome, A.D. 331, speaks of sheets of glass produced by casting on a large flat stone—probably the earliest forerunner of modern plate glass manufacture.

The first crude plate glass windows must have been frustrating to mothers calling their children

in from the street—for the windows were set immovably in the walls and could not be opened. But if mama had no freedom of expression short of banging on the window, glaziers certainly did—they created highly decorative stained glass windows.

These glorious windows, built up of a multitude of small pieces of stained glass set in strips of

(Continued on next page)





lead, appeared in churches all over Europe during the 6th and 7th centuries. By the 12th century pictorial designs had been introduced—making the windows literally sermons in glass. At first the glass was dyed during melting by adding metallic oxides. Later, enamel was applied to the surface.

The principle of staining or tinting glass for windows is as important today as it ever was in the history of glassmaking—but for entirely different reasons. For as the scores of gleaming glass and steel skyscrapers rise all over the country, there is an ever-increasing need for a tinted all-climate insulating glass which cuts glare at the same time it provides adequate light transmission. Solarban Twindow, a new product by Pittsburgh Plate Glass, was developed to perform this job.

But even more important, Solarban—which is made up of two panes of glass separated by one-quarter inch of near vacuum—substantially reduces conducted heat loss or heat gain, measurably reducing heating and cooling costs.

Temperature control and glare resistance, however, are only part of the total picture of unique properties possessed by today's glass windows—which have added new dimension and utility to modern living for occupants of schools, hospitals, office buildings, homes, and vehicles.

Safety glass, for example, which originated way back in 1855 in England in the form of wired glass, has saved countless lives and prevented injuries to millions. Actually, the evolution

of safety glass alone involves three great ideas in windows. The first consists of embedding a wire mesh in the glass—providing excellent fire protection in buildings. Laminating a sheet of plastic between two sheets of glass is another common type of safety window. When the glass is struck a heavy blow, as in a car accident, splinters remain firmly adhered to the intermediate plastic layer. Bullet-resistant glass is a multi-layered form of this laminated glass.

A new tempering technique developed by Pittsburgh Plate Glass, known as the "gas hearth process," has made possible a third important type of safety glass, which answers the increased demand for larger expanses of glass in living areas. When the glass, called Herculite "K," does break, it crumbles into small round pieces without sharp edges.

One-way glass is still another great idea in windows that has found many important uses. This type of window is used with great success by teachers, psychologists, therapists, police investigators, and even by toy manufacturers testing their products.

Finally, a new float glass is helping to revolutionize the glass industry. While regular plate glass for windows would normally have to be ground and polished to make it smooth and clear, this unique type of glass is actually floated out of the ovens over a bath of molten tin, and emerges in a continuous ribbon of perfectly flat, exceptionally brilliant glass.

It may have all started with a hole in the wall, but the unique wonders of glass have made the saga of windows an important chapter in the story of mankind.

More than nine decades have gone by since the crew and passengers of the Mary Celeste vanished into eternity, but the tragedy still grips the imagination. Scarcely a month goes by without new "evidence" concerning the fate of the unfortunate crew

turning up at the offices of Atlantic Mutual. All data about the ship and its crew has been kept by the Atlantic Mutual, researched and often reviewed, yet to this day the mystery of the Mary Celeste remains as unfathomable as the sea which swallowed up its ten victims.

## FROM THE MAIL BAG

Dear Paul:

Did you ever raise potatoes above ground? I do. In Fall I plow the land and pile eight to ten inches of leaves on it, holding the leaves from blowing by sprinkling turkey manure (obtained from a local raiser) and compost. In May I find the leaves formed a mat. Then cover with about eight inches of old moldy hay. No more cultivating, pull a big weed once in a while. No potato bugs. In Fall I push the old hay aside and pick up my potatoes. Nice and clean ones.

A. B. ZERBY  
Dillsburg, Pa.

*Editor's Note: Mr. Alton B. Zerby, who was National Executive Secretary until his retirement in 1958, made "oceans" of friends through the years. In answer to numerous inquiries, we are pleased to report that Bro. Zerby and his lovely wife are healthy and quite active in many affairs, including Eta Kappa Nu. They recently drove to Nashville, Tennessee, in behalf of Eta Kappa Nu, to assist the students at Vanderbilt University in organizing a new chapter.*

# CHAPTER ACTIVITIES

**ALPHA, University of Illinois**—Alpha Chapter of Eta Kappa Nu voted on an approved construction of a three-foot bronze replica of the HKN key. The key is scheduled for completion in June and will be located in front of the Electrical Engineering Building.

Two completed chapters of the EE handbook were distributed among the members.

**BETA, Purdue University**—One of Beta Chapter's first activities of the fall semester was conducting tours of the Electrical Engineering Building and its labs for high school seniors as a part of the annual High School Day program.

A second and continuing project is a series of seminars for Electrical Engineering students. This series has featured several Purdue faculty as well as a guest speaker from the RCA Research Laboratory. Another continuing project is the composite picture of each graduating class from the E.E. school. Due to the large number of graduates in EE from Purdue each year, some of the composites for the years 1958 to date are not complete. Beta Chapter would like to make all the composites as complete as possible. Therefore, if any alumni of the chapter have not submitted their picture or know of a Purdue EE graduate who has not, we urge them to send a wallet size picture to Professor L. A. Krammer, c/o Purdue University, Electrical Engineering Department.

A third area of service projects was undertaken by the fall pledges of the chapter. These included a biannual cleaning of the Electronics Lab., rearranging the HKN-IEEE student workshop, preparing course summaries of undergraduate EE courses and constructing a set of lights for use in the HKN initiation ritual.

The fall pledge class of 32 undergraduate students was initiated on December 12, 1965, at The Trails. Dr. John C. Hancock, head of the Electrical Engineering Department and Dr. Violet B. Haas were initiated as professional members. Professor E. M. Sabbagh presented awards to Paul S. Heller, James D. Pardee and Steven B. Donacker for preparing the three best pledge essays. Beta Chapter's award to the outstanding freshman entering the EE school was presented by Dr. Hancock to Donald E. Kneble. Professor Paul K. Hudson was our guest speaker and also presented the Outstanding Electrical Engineering Student Award, Honorable Mention, to Richard L. Didday of Beta Chapter.

**EPSILON, The Pennsylvania State University**—Epsilon Chapter of Eta Kappa Nu inducted 28 new undergraduate members into the chapter on November 8, 1965.

A plaque acknowledging the chapter's Outstanding Electrical Engineering Student is being mounted in the entrance hall of the new Electrical Engineering building.

As in the past years, Epsilon Chapter is continuing its weekly tutoring sessions for freshman and sophomore engineering students. In addition, a reading room is kept open evenings during the week for study.

To raise money for the spring banquet the ITT publication "Reference Data for Radio Engineers" was sold to the public.

**THETA, University of Wisconsin**—Theta Chapter initiated 21 new members during the first semester, including last year's recipient of the HKN outstanding teacher award, Mr. Richard Marleau. Prospective members were introduced at an open meeting at the Wisconsin Student Union. A banquet followed the formal initiation. At that time Prof. Warren Young of the Mechanics Department spoke about engineering problems of India, of interest also because there are many Indian students in attendance on the Madison campus.

With the help of the University News Service, news of the initiation was sent to the initiates' hometown newspapers for publication, along with a short explanation of HKN.

The annual HKN award to the outstanding sophomore Electrical Engineering student was presented to Tom Peterson at a special Freshman Lectures program. At this meeting many extracurricular activities and the engineering honor societies are introduced to the freshman engineering students.

**MU, University of California**—Mu Chapter of Eta Kappa Nu began its active year on the Berkeley Campus of The University of California this fall. Juniors and seniors eligible for membership were invited to our traditional smoker. The smoker provides prospective members with an opportunity to become acquainted with HKN and the members of Mu Chapter. Interview and elections of the pledges followed the next week.

Each pledge was assigned two projects. The first was to construct a Wheatstone Bridge from plywood and

to obtain signatures of HKN members and faculty. The second project was an essay to be written on a non-technical subject related to engineering.

The initiation of twelve undergraduates, one graduate, and two professional members on December 10, 1965, was followed by a very enjoyable banquet. Faculty Advisor, Professor Charles F. Dalziel, presented awards for the best pledge projects.

A major highlight of this semester's activities was a very good tour of the Lawrence Radiation Laboratory in Berkeley. HKN members visited the semiconductor detector lab., vidicon scan system and the bevatron. HKN members participated in University Day this semester by demonstrating facets of electrical engineering to prospective Cal students.

The tours of the graduate research laboratories sponsored by Mu Chapter each semester as a service to the electrical engineering department were very successful. These tours were designed primarily to acquaint sophomore and junior engineering students with the facilities and types of research being conducted in our department. Among the labs. visited were quantum electronics, semiconductor electronics, bioelectronics, plasmas, digital computers, electron microscope and microwaves.

**LAMBDA, University of Pennsylvania**—Lambda Chapter has recently initiated an award for the "Outstanding Electrical Engineering Sophomore of the Year." The award was presented on November 12, 1965, to Mark Florenhoff '67, who, in the opinion of the brothers of the Chapter, by the end of his sophomore year had shown himself to be an exceptional scholar, a man of high ideals, and a conscientious and active citizen in the affairs of his school and community. This award will be presented to the outstanding sophomore each year by the Lambda Chapter.

As in past years, the Chapter has been active in its tutoring program, in which tutorial aid is offered free to all undergraduate students in electrical engineering. There has been an increasing number of requests for tutoring over the past few years, which shows the growing popularity of the program.

This fall the Chapter has accepted ten new members, who were initiated together with the new members of the Villanova University and Drexel Insti-

(Continued on next page)



tute of Technology chapters at a combination triple initiation and dinner-dance, which was held on November 19, 1965.

**XI, Auburn University**—The Xi Chapter at Auburn University invited 17 prospective candidates to its smoker, and the members, after an informal discussion with the candidates, voted the candidates to pledge status. The pledge week was ended with an informal initiation, during which the pledges underwent tests. Thirteen undergraduates and three graduate students were formally initiated on November 16, 1965.

During the quarter the Xi Chapter held its annual slide rule classes, where all students enrolled in the University were invited to attend. The members of the Chapter alternated in the lectures, and the results were gratifying to all concerned.

The annual Engineers Banquet was held on December 3, 1965, and the featured speaker was Mr. Kirk Newell, Sr., who discussed the Engineers life immediately after his graduation. At the banquet keys were given out to the new members of the chapter.

**RHO, University of Colorado**—This year promises to be an exciting one for Rho chapter, and for all of the engineering students here, due to the opening and dedication of our new Engineering Science Center, a huge complex which will house the entire College of Engineering, providing much needed space and other facilities. HKN members are already playing a large part in planning for this event, which will coincide with Engineer's Days early in May. Among other activities, our pledges will conduct guided tours of the center.

All of our past projects were continued this year, with increased success. Our slide rule classes, a series of weekly evening classes conducted at the beginning of the year for the benefit of incoming freshmen, were attended by more than 100 students. Collections from our EE lab insurance program were somewhat higher than last year. This program offers insurance against minor breakage to electrical engineering undergraduates, for a fee of 50c. This money is placed in a special fund, and is returned to the EE department at the end of the year in the form of a gift. An award will be presented as usual to an outstanding sophomore of our selection. Our 23-member fall pledge class undertook many interesting and valuable projects; each pledge is required to contribute 15 hours of his time to the department.

Three major new ideas are being followed up this year. A "job reference file" has been started, whereby each graduating senior is asked to fill out a report on whatever job he has taken, about six months after graduation. These reports will be made available to seniors who are interviewing for jobs.

A booklet is being compiled which will describe to high school students and incoming freshmen the opportunities and nature of work offered by the field of engineering. In connection with this we plan to advise high schools that the HKN film, "Engineering, a Career for the Future," is available.

**UPSILON, University of Southern California**—Upsilon Chapter of the University of Southern California has enjoyed an active fall semester.

The semester was inaugurated in good fashion with a dinner at the Pasadena home of Dr. Willard Rusch, faculty advisor, for all active members. Dr. and Mrs. Rusch proved to be very gracious hosts.

Another dinner was held at the Pasadena home of Dr. Alfred Ingersoll, Dean of the School of Engineering, for all professional and honor society officers. HKN was well represented at the informal event, which was held at Dean Ingersoll's poolside.

Upsilon Chapter participated in the High School Institute at USC. Members guided interested high school students on tours of the facilities of the School of Engineering.

Other events during the semester included attending Epsilon Theta's (California State College at Long Beach) formal initiation. Epsilon Theta was also represented at Upsilon's formal initiation. Upsilon and Epsilon Theta Chapters co-sponsored the nomination of Mr. William Bonser for Western Regional Director of HKN. Mr. Bonser should prove to be an extremely competent director if elected to the position.

A point of pride during the semester was the acquisition of a plaque of HKN for the engineering lounge. In the shape of the Key of HKN, the plaque was air-hosed in gold coloring in such a way as to give a three-dimensional effect. The Key was enclosed in glass and red velvet and was surrounded by a finished wood frame.

During the Christmas break a revision of the addendums to the initiation ritual was made. The revision covers procedures followed in the introduction of professional and graduate candidates and the ending of the initiation ceremony. If desired, copies of the revisions may be obtained from Upsilon Chapter.

**BETA ZETA, New York University**—The Beta Zeta Chapter of New York University, Bronx, N.Y., has had a very full fall semester. We had the pleasure of initiating many worthy new members representing undergraduates, graduates, and faculty, at an affair which was a huge success. The Brothers of Beta Zeta have participated in two school projects. They manned exhibits and led tours on an Engineering Day cooperating with the Electrical Engineering Department at NYU in giving individual tours to prospective

freshmen as they come for their personal interviews.

**BETA LAMBDA, Virginia Polytechnic Institute**—Beta Lambda Chapter at Virginia Polytechnic Institute has undertaken several projects for this school year. Some of the completed programs include a trip sponsored by this chapter to Smith Mountain Dam, a remote controlled gravity dam which is situated about 50 miles south of Roanoke, Virginia. Both members of this chapter and the IEEE-IRE attended. With an equal amount of success, members undertook a "High School Visitation Program" designed to inform interested seniors about engineering curriculums in college. The faculty responded quite well in the annual basketball game with members.

Some of the long-range projects include an "Outstanding Sophomore Award" to be presented at the end of the year. Also, a bronze emblem of HKN will be placed on the archway of our new engineering building along side emblems of other honor societies on campus. A "Tech-Festival" exhibit is presently in the planning stage and will be held in conjunction with the IEEE-IRE.

**BETA OMICRON, Marquette University**—The Beta Omicron Chapter initiated 13 new members this fall, bringing the total active membership to 46. There are, in addition, 12 faculty members and 14 graduate members.

The most outstanding achievement was the extension of the student help sessions from two to three days per week and the introduction of special night sessions, aimed at those enrolled in the evening division. The help sessions are named by members of the Chapter, in conjunction with the other honorary societies, for the purpose of giving help to underclassmen in their technical courses. Response to the program has been very encouraging, both from the student body and from the faculty.

**BETA PI, The City College of New York**—It is intercession at The City College of N.Y. and the members of Beta Pi chapter have just completed an eventful term and are looking forward to the new semester. Last term we continued our free tutoring service in engineering courses, our slide rule instruction for sophomores, and our other usual activities. The highlight of the fall term was our dinner at the Shelburne Hotel where we inducted 15 new members. Among the initiates were four graduate students who were admitted under our new policy of considering for membership men in the graduate division who have distinguished themselves by serving on the faculty in addition to meeting the high standards of HKN. We also presented our award to the man we selected as the outstanding electrical engineering sophomore. The proudest moment of the dinner came when it was announced

that our chapter had been selected the outstanding chapter in the eastern region for the third consecutive semester. In the coming term we look forward to a further expansion in the number and quality of our speakers from industry and to a rematch in our student-faculty softball game, won handily last year by the profs.

**BETA PSI, University of Nebraska**—The following is a report of Beta Psi chapter's activities for the first semester 1966.

On November 19, 1965, twenty-two initiates and one outstanding graduate student were inducted into Eta Kappa Nu. The initiation banquet following the initiation ceremonies featured Dr. Clyde Hyde, National Vice President of Eta Kappa Nu. His topic for the evening was "Digital Analysis of Electrocardiograms." The Eta Kappa Nu Scholarship Award for the outstanding sophomore student was awarded to initiate George Novotny.

Activities this semester included a freshman-sophomore activities smoker co-sponsored by HKN and IEEE. Also a picture board to contain pictures of all faculty, graduate students, staff, and undergraduates was constructed in the main entrance to the Electrical Engineering building. Money-making projects included a magazine sales drive, and the purchase of an enterprise to construct Quick-Connector kits for use in the electronics laboratory.

Highlighting the semester were the nominations of Beta Psi Chapter Advisor, Professor Henry Ablin, as candidate to the West Central Region Board of Directors of HKN, and Brother L. T. James as Outstanding Electrical Engineering Student Candidate.

**GAMMA MU, Texas A & M University**—The Gamma Mu Chapter has participated in the orientation of freshman Electrical Engineering students. Several Thursday afternoon meetings have been held where the Freshmen are first given a general talk on the Department and its aims and then are taken on a guided tour of labs and classes in progress.

The Fall Smoker was held and the new initiates were elected by the 25-member chapter at a closed meeting. Nineteen new members were initiated at the banquet, held January 11, 1966.

The Faculty Advisor for the year 1965-66 is Dr. Herbert M. Barnard, Associate Professor of Electrical Engineering. Dr. Barnard received his B.S. at Texas A & M in 1955, his M.S. in 1959, and his Ph.D. at Illinois in 1962.

**GAMMA TAU, North Dakota State University**—The Gamma Tau chapter of Eta Kappa Nu held their formal initiation on the 16th of December, 1965. A total of eight juniors and four seniors

(Continued on next page)



JOHN W. WEIGT

CARLETON E. TUCKER

John W. Weigt, Cornell, Kappa '00, National President of Eta Kappa Nu, 1929, died suddenly at his home in Southold, New York, May 6, 1965.

John was a Builder in Eta Kappa Nu. He carried the responsibilities as Editor of THE BRIDGE from 1921 to 1928. He changed the paper size and format of THE BRIDGE and he started the soliciting of advertising to share the publication expense. With his contacts he endeared himself to many.

At annual conventions and at meetings John was the sparkplug of new ideas. These were happy occasions and John was always a good one at them, harmonious and humorous, but serious.

(Continued on next page)

Professor Emeritus Carleton E. Tucker of the Massachusetts Institute of Technology passed away on January 17, 1966, in Cambridge. As a student and teacher, he had been associated continuously with M.I.T. for 51 years.

Professor Tucker was an authority on the principles and practice of electrical machinery, and of telephone communications systems.

Born on November 13, 1896, he attended the Whitman public schools and then Harvard University and M.I.T., receiving the bachelor of science degree from each in 1918. In that same year, he joined the M.I.T. staff as an assistant in the Department of

(Continued on next page)



JOHN WEIGT (from page 21)

John was elected National President of Eta Kappa Nu for 1929. This was our 25th anniversary year. We travelled to the University of Illinois at Urbana, the birthplace of Eta Kappa Nu, in 1904, where John dedicated the Boulder marking the Founding. Twenty-five years later, in 1954, John was present when the Boulder was moved in a rededication service.

In those 25 years John saw the advent of the selection of the Outstanding Young Electrical Engineer of the Year, conceived and carried forward by Roger Wilkinson. And for years John was a loyal member of the Award Organization Committee. He never lost interest.

In the words of Ruskin—of the Builder—he says, “Therefore, as we Build, let us think that we Build Forever.” Johnny Weigt, as he gave freely of himself for Eta Kappa Nu, was Building Forever. We owe him much. He was Eta Kappa Nu.

By Everitt S. Lee

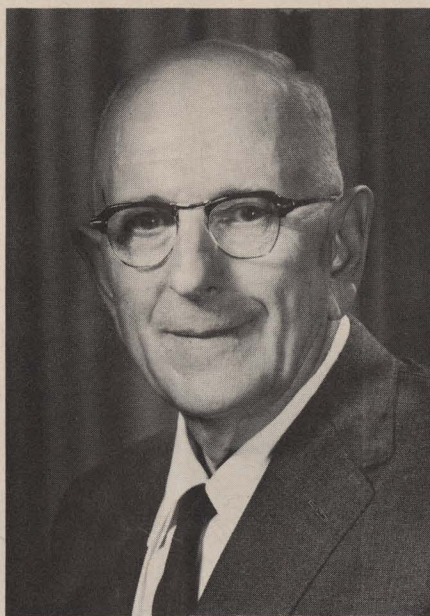
#### CHAPTER NEWS (from page 21)

were initiated at that time. The banquet was held at the Rex Cafe in Moorhead, Minnesota, and the guest speaker was Dr. C. H. Hyde, the National Vice President of Eta Kappa Nu.

As a pledge project, the new members were required to spend a couple of hours doing various jobs for the EEE department. As there is a new Engineering Complex on the campus there are many odd jobs to be completed. Many of these are being completed by all of the active members of the chapter.

This chapter is also planning on placing the symbol of Eta Kappa Nu, the Wheatstone Bridge, on the front of the new EEE building. Also in the spring the chapter will play an important part in the department's portion of Sharivar. Sharivar is the week in the spring when the school has an open house for anyone desiring to visit the campus.

**GAMMA OMEGA, Mississippi State University**—Our chapter had 22 initiates this past semester: nine seniors



CARLETON TUCKER (from page 21)

Electrical Engineering. He became Instructor in 1919, Assistant Professor in 1924, Associate Professor in 1930, and Professor in 1938.

Professor Tucker was a Fellow of the Institute of Electrical and Electronics Engineers, a member of the American Society for Engineering Education, and a member of Tau Beta Pi and Eta Kappa Nu. He was co-author with C. W. Ricker of Tulane University of the book “Electrical Engineering Laboratory Experiments.”

By Julius Stratton

and 13 juniors. The pledge project was the completion of a large Bridge which is now mounted in the corridor. On meeting days the Bridge is lighted to remind members of the meeting.

**DELTA ALPHA, Wayne State University**—Plans have been made to organize a bowling team that will eventually challenge the IEEE Student Branch and/or the engineering faculty. This activity will help to form a stronger bond of fellowship among the brothers as well as advertise HKN to other engineering students. Coming up in the near future is the Annual Banquet under the joint sponsorship of the IEEE and the Delta-Alfa Chapter.

**DELTA DELTA, University of Denver**—The highlight of Delta Delta Chapter activity in recent months was

the smoker held in January at the home of faculty advisor, Dr. Hank D'Angelo. This event was attended by advisors, active members, graduate students, and prospective members.

Several members of the chapter have tutored sophomore electrical engineering students in their circuits class.

**DELTA EPSILON, Ohio University**—Under the guidance of President Nick Alexandrides and faculty advisor Dr. Walter Fahey, Delta Epsilon Chapter enjoyed another active and productive semester. Ten new members were elected this fall, including faculty member, Dr. McFarland. The undergraduate pledges, being directed by actives Don Wenzlyk and Jim Kirk, are working on a project to collect firsthand information on the availability, locations, salaries, and general usefulness of summer employment opportunities for E.E. students. This information will be made available to all E.E. majors. Earlier this fall, pamphlets describing various E.E. fields were distributed among undergraduates. Editor John Barnum and other chapter members continued to write and publish “Nu's News,” a periodical newsletter containing technical material and articles of general interest to the E.E. department. The semester was highlighted by the initiation ceremonies and the annual fall banquet, at which guest speaker Dr. Fahey gave a most interesting address. Bob Anticole was chosen as the outstanding HKN member for his contributions to the chapter, including Banquet Committee Chairman, “Nu's News” articles, and other activities.

**DELTA ZETA, Washington University**—We initiated five seniors and three juniors into our chapter on November 16, 1965. Past National President, Dr. J. Koopman attended the initiation and the banquet which was held following the ceremonies. Dr. W. S. C. Chang, the new Chairman of our Electrical Engineering Department was the featured speaker. He led an interesting discussion on different types of graduate schools of Electrical Engineering.

**DELTA MU, Villanova University**—On November 19, Delta Mu chapter initiated eleven new members. The initiation was a tri-chapter ceremony, held in conjunction with Lambda and Beta Alpha chapters, and was followed by dinner and dancing. We were honored to have President Sheppard as a special guest and Dr. Warren of the University of Pennsylvania, as a guest speaker. Delta Mu observed a milestone at this affair when Miss Veronica Wyrwas was initiated. She is the first woman to become a member of our chapter.

During the first semester, Delta Mu continued its lecture series. These lectures are given on interesting and informative topics and are for the benefit of the entire Electrical Engineering department. It is hoped that

(Continued on page 24)

## THE BOTTLE GAME

A fierce hurricane shook the tiny ship. A group of sailors wrote their fears on a scrap of paper, slipped the note into a wooden cask and committed it to the sea. Their captain, Christopher Columbus, recorded the deed in the ship's log—and right now, somewhere on the seven seas, the historic document may still be floating.

There have been other fascinating messengers from the sea. One bottle, for example, was found resting on the bottom of a river in America—where it had gone down in a ship sunk during the Civil War. Another contained a piece of paper worth over \$12,000,000. And others have patched up marriages on the brink of disaster!

In 300 B.C., the Greek philosopher Theophrastus, walking along the shore, decided to use bottles to test his theory that the Mediterranean Sea got most of its water from the Atlantic Ocean. Tossed at intervals from a cruising Greek ship, the bottles drifted many watery miles—in the proper direction—to prove Theophrastus' point.

Centuries later, Benjamin Franklin used the floating bottle method to gather information on the little-understood currents of the Gulf Stream. Inside his bottles, Franklin sealed a paper containing his name, address and a request that the finder let him know where and when the floating questionnaire had been picked up.

The answers came from as far off as Newfoundland and Iceland; together with water temperature

studies conducted by Franklin, they helped define the dimensions of the Gulf Stream. Franklin forwarded the facts to the British Post Office, and English mail boats which had been bucking the Stream had easier, faster trips thereafter.

To this day the U.S. Navy's Maritime Security Division uses bottles with questionnaires inside to find out necessary information about currents from captains at sea. In one year alone, almost 400 “Bottle Papers” received replies—in eight languages.

Recently, a bottle dating back to the Civil War and bearing the name E. R. Squibb & Sons, was recovered from a Union gunboat sunk in 1862. Four years earlier, Dr. Edward Robinson Squibb,

former Passed Assistant Surgeon in the Navy, had founded what was to become the world-famous pharmaceutical firm which bears his name.

The molded, green glass bottle contained an almost colorless liquid. Smelling very faintly of brackish water, it was thought to contain nothing but water from the river. But tests conducted, together with examination of drugs available in Squibb's price lists for the early 1860's, confirmed that the bottle contained Potassium Chlorate, a drug prescribed at that time for a great variety of diseases.

In the U.S.S. Cairo, sunk by a Confederate mine in the Yazoo River, north of Vicksburg, this

(Continued on next page)



GEORGE S. SQUIBB, Vice-President of a renowned pharmaceutical firm, holds a bottle dating back to the Civil War and bearing the name of his company. The portrait is of Dr. Edward Robinson Squibb, a former Passed Assistant Surgeon in the Navy, who founded the drug firm in 1858.



messenger of history was preserved for more than 100 years in mud and water.

In 1940, George Phillips (nicknamed the "Bottle Parson") started sending his sermons to sea inside empty whiskey and beer bottles. Over 16,000 bottles were cast on the waters, and more than 1,400 replies came back! The bottle-borne crusade is reported to have mended broken marriages in Chicago, London, Montreal and other far-off spots.

Most profitable catch from a sea-borne bottle? Jack Wurm, a restaurant worker, found it in 1949 on the Pacific shore not far from San Francisco. Inside the bottle he found, written in pencil on brown wrapping paper, these glad tidings:

"To avoid all confusion I leave my entire estate to the lucky person who finds this bottle and to my attorney, Barry Cohen, share and share alike."  
(signed) Daisy Alexander,  
June 20, 1937

After long investigation it was revealed that Mrs. Alexander, a childless widow living in England, had long been a floating bottle enthusiast who frequently tossed bottles into the Thames River "to see where they would show up."

At last count, lawyers were still wrangling over the legality of Daisy's will, while Jack Wurm waited to find out whether he would inherit 50 per cent of her \$12 million estate, plus half interest in the \$160,000 annual income from her investments!

Besides curiosity and wealth, romance has been bottled too. Some years ago a mate on a freighter in the South Seas wrote his wish to find a wife, slipped it into a bottle and tossed it over-

board. An Australia-bound British liner found it, and the captain posted the message. It was read by a stewardess who, a little while later, invited the ship's crew to her wedding—with that sailor from the South Seas.

But wooing by bottle has its drawbacks, as well. Take the California girl who entrusted all her attributes—height, weight, age, measurements, color of eyes and hair—to the Pacific Ocean.

Ten months later she received a neatly penned letter from a Bolivian sailor. "You sound delightful," he wrote, "but how can I be sure you speak the truth about the other things when you write of your lovely blonde hair—in a peroxide bottle?"



#### THE OLD PROFESSOR SAYS:

The really big problem of higher education is that we are expected to teach *Imaginative Interpretation* and *Value Judgment* to students who enjoy riding motorcycles in campus traffic.

this program will become even better with the showing of educational films obtained from local companies.

Delta Mu will also continue the practice of submitting a "course evaluation" to the head of the Electrical Engineering department. This is an excellent method of telling the administration what the responsible student thinks of the educational procedures at the University. It is our hope that this evaluation will help to better Villanova's already fine Electrical Engineering department. With this same idea in mind, an annual "Outstanding Teacher" award will be initiated. It will be presented each spring to a faculty member who has "provided outstanding service to the student body and has shown profound dedication to the profession of teaching."

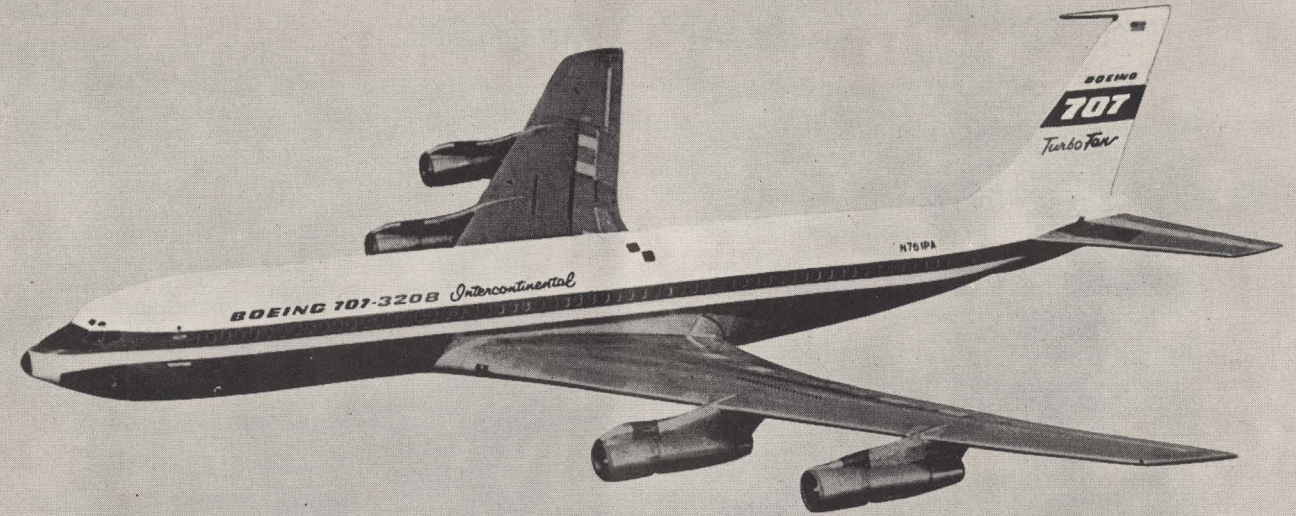
**EPSILON IOTA, San Jose State College**—The year 1965 was a busy year for our chapter. On May 15 Thomas L. Rothwell, one of the national directors of Eta Kappa Nu, presided at the installation of our Chapter into the national society of Eta Kappa Nu as the Epsilon Iota Chapter. Aiding Director Rothwell were members of the Mu Chapter from the University of California. It was Mu Chapter which initiated our first members into the Eta Chapter in January. Prior to the installation Prof. Glover, faculty advisor, aided Director Rothwell and members of Mu Chapter in initiating 28 new members into our Chapter. Present at the installation was former president of Eta Kappa Nu, C. T. Koerner.

On December 4, thirteen new members were initiated into the Chapter at the first initiation ceremony presided over by members of the Chapter, President Dale Pilgeram was presiding officer. Following the initiation a banquet was held with noted philosopher Dr. Fallico speaking on the engineer's responsibility in narrowing the gap between technology and the social sciences.

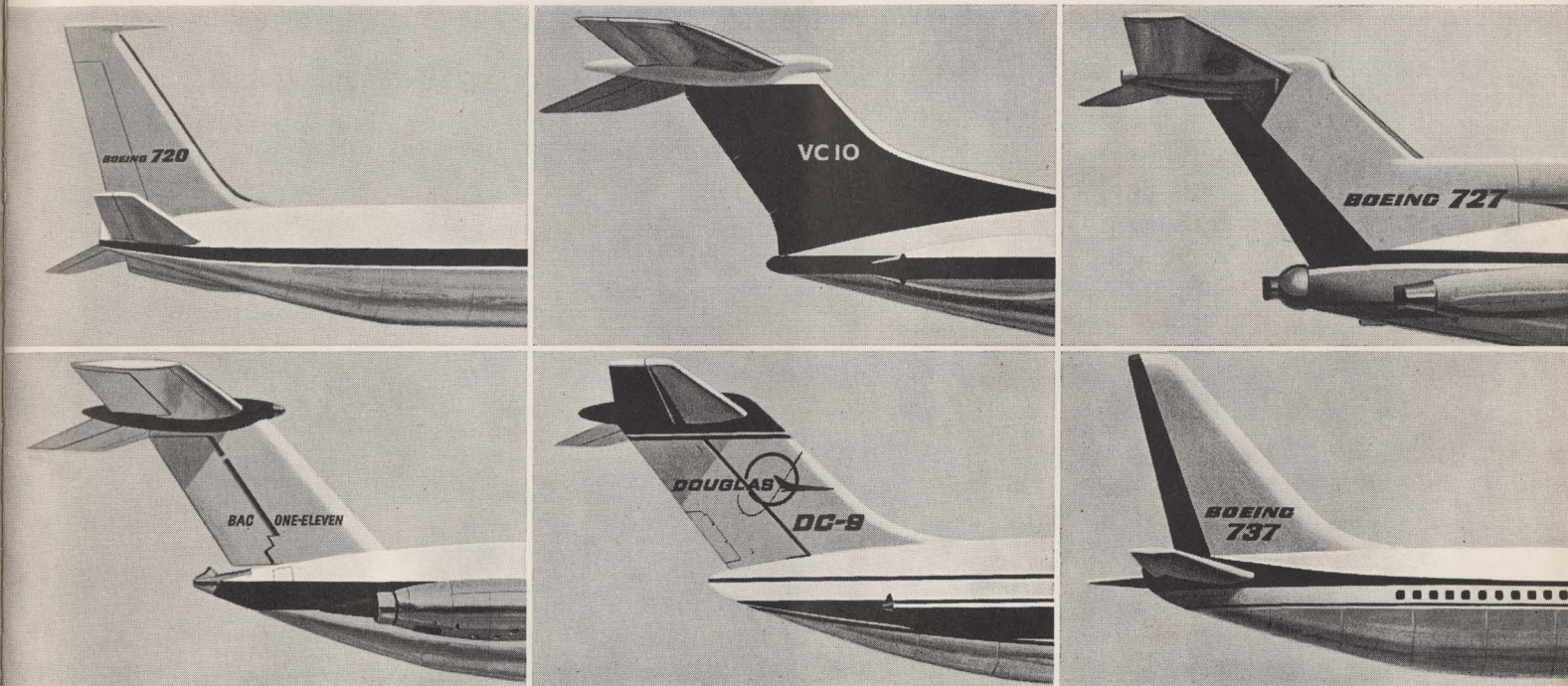
**EPSILON ZETA, Lowell Technological Institute**—Epsilon Zeta Chapter has had an active first semester at Lowell Technological Institute. The chapter has organized an educational printing service for the Electrical Engineering Department. This service involves printing up material, such as problem solutions, at the request of an instructor for distribution to the students. A great amount of work is done in this manner.

Chapter members conducted guided tours of the institute for local high school students and their parents. The visitors are taken through the school and shown the various facilities. The chapter guides answer as many questions as possible in an attempt to explain just what the institute has to offer the prospective college student.

The chapter has also conducted help classes for the sophomores. This program was started in mid-semester and, due to the response, will be continued next semester.



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# CHAPTER DIRECTORY

School	Chapter	City	State	School	Chapter	City	State
<b>A</b>							
Air Force Inst. of Tech.		Wright-Patterson AFB, Ohio		Minnesota, U. of	Omicron	Minneapolis	
Alabama, Univ. of	Delta Xi			Mississippi State U.	Gamma Omega	State College	
Arizona State U.	Delta Nu	Tuscaloosa, Ala.		Missouri Sch. of Mines and Met.	Gamma Theta	Holla, Mo.	
Arkansas, U. of	Epsilon Beta	Tempe, Ariz.		Missouri, U. of	Iota	Columbia	
Auburn U.	Gamma Phi Xi	Fayetteville Auburn, Ala.		<b>N</b>			
<b>B</b>				Nebraska, U. of	Beta Psi	Lincoln, Neb.	
Bradley U.	Delta Upsilon	Peoria, Ill.		Newark College of Engr.	Gamma Kappa	Newark, N.J.	
Brooklyn Polytech. Inst.	Beta Beta	Brooklyn		New Mexico, U. of	Gamma Chi	State College	
<b>C</b>				New York, The City College of	Delta Omicron	Albuquerque	
Calif. State Coll.—Long Beach	Epsilon Theta	Long Beach		New York U.	Beta Pi	New York	
California, U. of	Mu	Berkeley		North Carolina State College	Beta Zeta	New York 53	
Calif., Univ. of Southern	Upsilon	Los Angeles		North Dakota State U.	Beta Eta	Raleigh	
Carnegie Inst. of Tech.	Sigma	Pittsburgh		Northwestern	Gamma Tau	Fargo	
Case Inst. of Tech.	Zeta	Cleveland		North Dakota, U. of	Delta Rho	Grand Forks	
Cincinnati, U. of	Tau	Cincinnati, Ohio		Northeastern U.	Gamma Beta	Boston	
Clarkson College of Tech.	Gamma Gamma	Potsdam, N.Y.		Northwestern Tech. Inst.	Beta Tau	Evanston, Ill.	
Colorado State U.	Delta Pi	Fort Collins, Colo.		Notre Dame, U. of	Delta Sigma	South Bend, Ind.	
Colorado, U. of	Rho	Boulder, Colo.		<b>O</b>			
Columbia U.	Gamma Lambda	New York 27		Ohio State U.	Gamma	Columbus	
Connecticut, U. of	Beta Omega	Storrs, Conn.		Ohio U.	Delta Epsilon	Athens	
Cooper Union	Delta Chi	New York 3		Oklahoma State U.	Omega	Stillwater	
Cornell U.	Kappa	Ithaca, N.Y.		Oklahoma U.	Beta Xi	Norman	
<b>D</b>				Oregon State Coll.	Pi	Corvallis	
Denver, U. of	Delta Delta	Denver, Colo.		<b>P</b>			
Detroit, U. of	Beta Sigma	Detroit, Mich.		Pennsylvania State U.	Epsilon	University Park	
Drexel Inst. of Tech.	Beta Alpha	Philadelphia		Pennsylvania, U. of	Lambda	Philadelphia	
Duke U.	Delta Lambda	Durham, N.C.		Pittsburgh, U. of	Beta Delta	Pittsburgh, Pa.	
<b>F</b>				Pratt Inst.	Delta Theta	Brooklyn 5, N.Y.	
Fenn College	Epsilon Alpha	Cleveland		Purdue U.	Beta	W. Lafayette, Ind.	
<b>G</b>				<b>R</b>			
Georgia Inst. of Tech.	Beta Mu	Atlanta, Ga.		Rensselaer Polytech. Inst.	Beta Nu	Troy, N.Y.	
<b>H</b>				Rutgers U.	Gamma Epsilon	New Brunswick, N.J.	
Hawaii, U. of	Delta Omega	Honolulu		Rose Polytech. Inst.	Epsilon Eta	Terre Haute, Ind.	
Houston U.	Epsilon Epsilon	Houston, Texas		<b>S</b>			
<b>I</b>				St. Louis U.	Delta Psi	St. Louis, Mo.	
Illinois Inst. of Tech.	Delta	Chicago 16		San Jose St. Coll.	Epsilon Iota	San Jose, Calif.	
Illinois, U. of	Alpha	Urbana, Ill.		South Carolina, U. of	Delta Phi	Columbia, S.C.	
Iowa State College	Nu	Ames, Iowa		South Dakota Sch. of Mines	Beta Chi	Rapid City, S.D.	
Iowa State, U. of	Beta Iota	Iowa City		South Dakota State Univ.	Gamma Rho	Brookings, S.D.	
<b>J</b>				Southern Methodist U.	Gamma	Dallas, Texas	
John Hopkins U.	Gamma Upsilon	Baltimore, Md.		Syracuse U.	Gamma Eta	Syracuse, N.Y.	
<b>K</b>				<b>T</b>			
Kansas State U.	Beta Kappa	Manhattan, Kans.		Tennessee, U. of	Beta Phi	Knoxville	
Kansas, U. of	Gamma Iota	Lawrence, Kans.		Texas A & M	Gamma Mu	College Station, Tex.	
Kentucky, U. of	Beta Upsilon	Lexington, Ky.		Texas Tech. Coll.	Gamma Nu	Lubbock	
<b>L</b>				Texas, U. of	Psi	Austin	
Lafayette College	Gamma Psi	Easton, Pa.		Toledo, U. of	Epsilon Gamma	Toledo, Ohio	
Lamar State Coll. of Tech.	Delta Beta	Beaumont, Texas		Tufts U.	Epsilon Delta	Medford, Mass.	
Lehigh U.	Chi	Bethlehem, Pa.		<b>U</b>			
Louisiana Polytech. Inst.	Delta Gamma	Ruston, La.		Union College (inactive)			
Louisiana, Southwestern U. of	Delta Tau	Lafayette		Utah, U. of	Gamma Sigma	Salt Lake City, Utah	
Louisiana State U.	Delta Iota	Baton Rouge		<b>V</b>			
Lowell Tech. Inst.	Epsilon Zeta	Lowell, Mass.		Villanova U.	Delta Mu	Villanova, Pa.	
<b>M</b>				Virginia Polytech. Inst.	Beta Lambda	Blacksburg, Va.	
Maine, U. of	Delta Kappa	Orono, Maine		Virginia, U. of	Gamma Pi	Charlottesville, Va.	
Manhattan College	Gamma Alpha	New York 71		<b>W</b>			
Marquette U.	Beta Omicron	Milwaukee, Wis.		Washington U.	Delta Zeta	St. Louis, Mo.	
Maryland, U. of	Gamma Xi	College Park, Md.		Wayne State U.	Delta Alpha	Detroit, Mich.	
Massachusetts Inst. of Tech.	Beta Theta	Cambridge, Mass.		West Virginia U.	Beta Rho	Morgantown, Va.	
Massachusetts, U. of	Delta Eta	Amherst		Wisconsin, U. of	Theta	Madison, Wis.	
Miami, U. of	Epsilon Kappa	Miami, Fla.		Worcester Polytech. Inst.	Gamma Delta	Worcester, Mass.	
Michigan State U.	Gamma Zeta	East Lansing, Mich.					
Michigan Tech.	Beta Gamma	Houghton					
Michigan, U. of	Beta Epsilon	Ann Arbor					

## ALUMNI CHAPTERS

Boston—Melvin M. Weiner, 54 Harvard Ave., Brookline, Mass.; Philadelphia—L. H. Fink; Los Angeles—William E. Murray, 15543 Royal Oaks Ridge Rd., Sherman Oaks, Calif.; New York—Phil Carl, Amer. Elect. Power Co., 2 Broadway, New York City; Pittsburgh—J. E. Rupp, Union Switch & Signal, Swissvale, Pa.; Chicago—Joseph Agosta, Commonwealth Edison, 1319 S. First, Maywood, Ill.