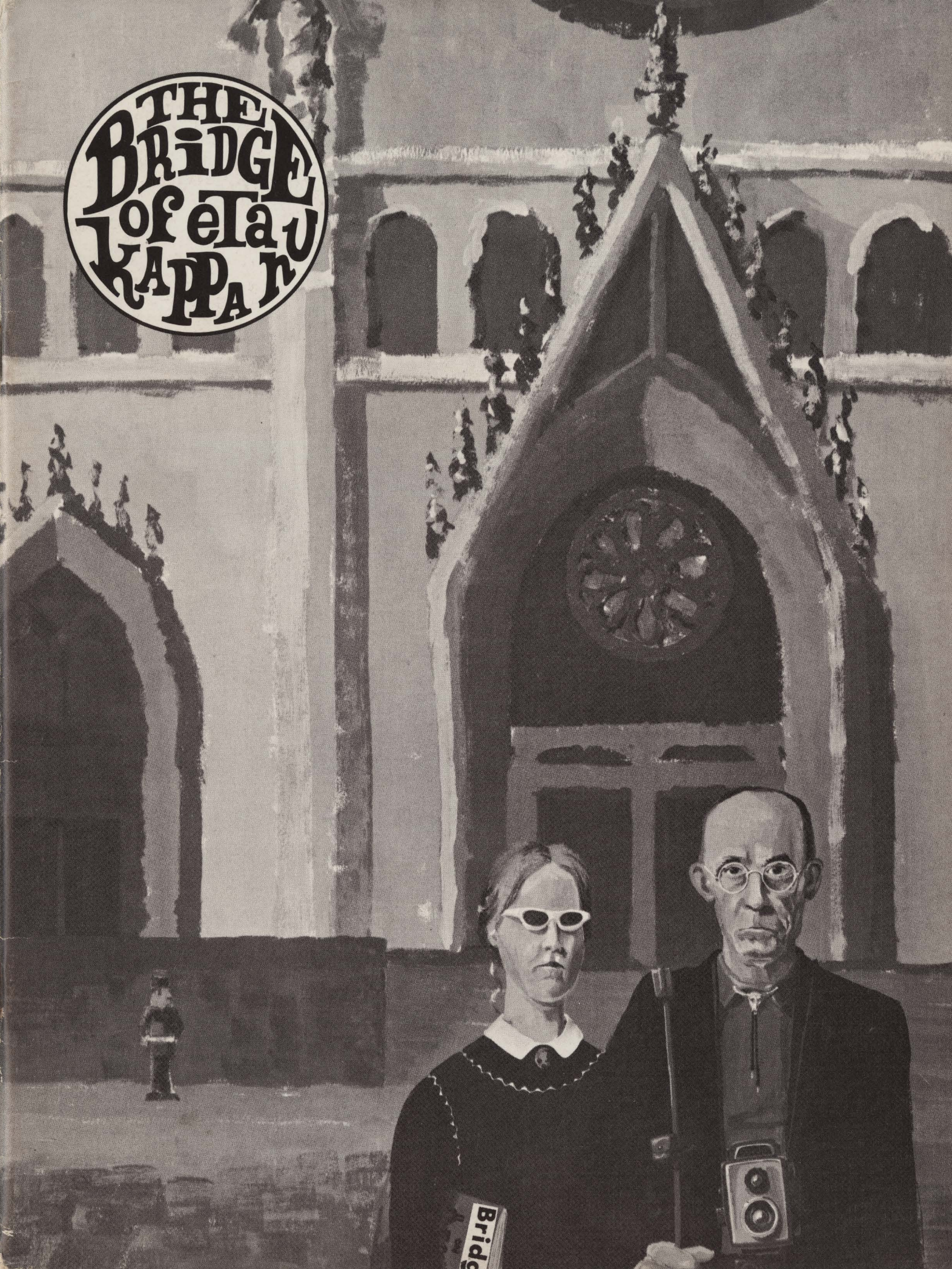


THE
BRIDGE
of eTau
KAPPA n





Pete Drobach has a knack for getting to the root of a problem.

High school students John Magish and John Ripley would be the first to agree.

They're both student members of a "big brother" program that Pete sponsors. Each week, they spend several hours of their own time helping less advanced classmates with their studies.

Pete is more than a sponsor. He's also a consultant—particularly when they're stumped by the logic of a tough "new math" problem.

But when Pete graduated from Rutgers in 1964, it wasn't these youngsters with their homework problems that brought him to General Electric. It was the chance to help people in industry solve tough technical problems. A career in technical marketing at General Electric gave him the opportunity.

Today, Pete's an application engineer in steel mill

drives and automation systems. His ideas on how to apply products from many of GE's 160 separate businesses enable his customers to improve the efficiency and productivity of their plants.

Like Pete Drobach, you'll find opportunities at General Electric in R&D, design, production or marketing that match your qualifications and interests. Talk to our man when he visits your campus. Or write for career information to: General Electric Company, Room 801A, 570 Lexington Avenue, New York, N.Y. 10022.

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ETA KAPPA NU

Electrical Engineering Honor Society

AUGUST, 1968, Vol. 64, No. 4

Editor and Business Manager
Paul K. Hudson

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

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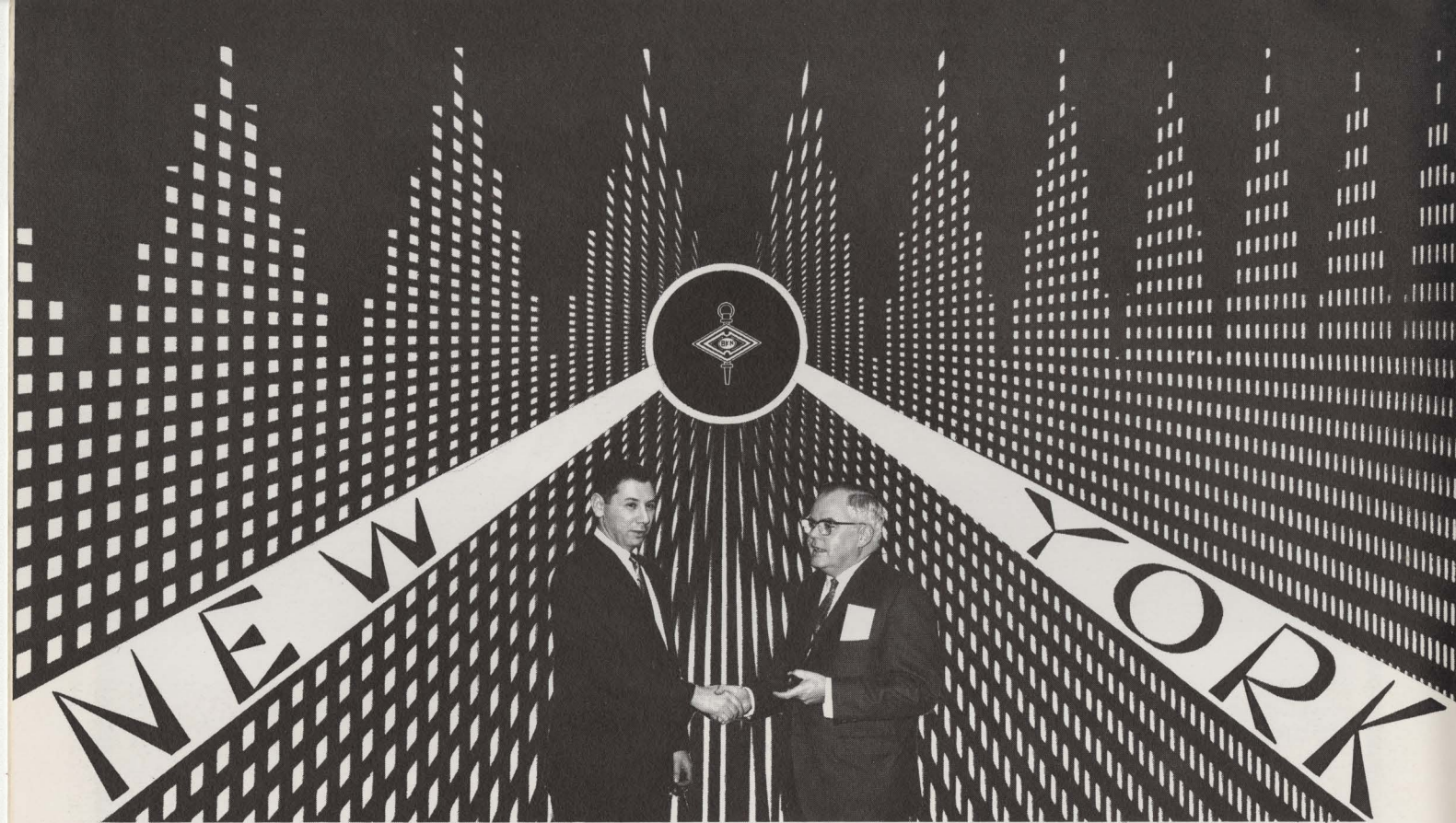
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OUR COVER

Take a copy of BRIDGE on your vacation. Even Paris can be dull at times.



America's Most Distinctive Magazine



HKN Award Dinner

by Robert W. Slade

Award Organization Committee

An atmosphere of progress, change and future challenge dominated the Eta Kappa Nu Award Dinner held March 18 at the Belmont Plaza Hotel, New York City.

The dinner — one of the best attended in recent years — honored three men active in fields virtually unknown to electrical engineers when the Award was established 32 years ago.

The Outstanding Young Electrical Engineer of 1967, Dr. Robert F. Elfant of International Business Machines Corporation, was recognized for his contributions to computer memory research. Honorable mentions went to Dr. George H. Heilmeyer of RCA Laboratories for his study of new effects in solids and liquids, and to Dr. Robert W. Lucky of Bell Telephone Laboratories for his contributions to the field of data communications.

Winners of the award and honorable mentions are selected for outstanding professional achievements, civic and social activities, and cultural pursuits.

They must be no more than 35 years old, with a B. S. E. E. or equivalent degree held no more than ten years.

The featured speaker at the dinner was Dr. James Hillier, vice president, RCA Laboratories, who discussed the future of R. & D. He observed that "the growth of R. & D. output, in the form of new products and new technology, seems to be on a collision course with the ability to generate the investment money required to feed it into our economy."

Dr. Hillier noted that the costs of exploiting a new technology are substantially larger than the cost of developing it; that the growth of R. & D. is rapidly outstripping the availability of investment funds to exploit it; and that good projects by present standards may not be able to meet the far more stringent requirements of the future.

He concluded that "those organizations which have been trying to develop incentives to increase the investment in R. & D. are really on the wrong track. They should be turning their attention to the development of incentives for greater investment in the utilization of R. & D. results — a significantly different objective."

Chairman of the Eta Kappa Nu 1967 Jury of Awards, which selected

the winners, was Frank A. Gunther, executive vice president and director, Dynamics Corporation of America and president, Radio Engineering Laboratories. Jury members were: Eugene D. Becken, vice president and chief engineer, RCA Communications, Inc.; John Farley, Switching Supervisor, Illinois Bell Telephone Company; S.B. Ingram, director of Technical Employment Center, Bell Telephone Laboratories; Edward A. Leach, vice president Sangamo Electric Company; Berthold Sheffield, Radio Corporation of America; William P. Smith, Dean of Engineering, University of Kansas; John V. Walsh, vice president of engineering, Sperry Gyroscope Division; and Roger I. Wilkinson, Bell Telephone Laboratories.

The list of candidates was presented to the Jury by the Eta Kappa Nu Award Organization Committee chaired by Berthold Sheffield. Committee members are: Robin Beach, Emerson D. Callahan, Reed Crone, Larry Dwon, Irving Engelson, Anthony F. Gabrielle, Edward E. Grazda, Willard B. Groth, Everett S. Lee, Edgar W. Markard, John M. Montstream, Harlan J. Perlis, Sheldon J. Raiter, Frederick A. Russell, Robert W. Slade and Roger I. Wilkinson.



Left to Right: Mrs. George Heilmeyer, Dr. George Heilmeyer, Mrs. Robert Elfant, Dr. Robert Elfant, Mrs. James Hillier, Dr. James Hillier, Dean William Smith



Left to Right: Dr. James Hillier, Dean William Smith, Dr. Robert W. Lucky, Mrs. Robert W. Lucky, Mrs. W. Lee Shevel, Dr. W. Lee Shevel.



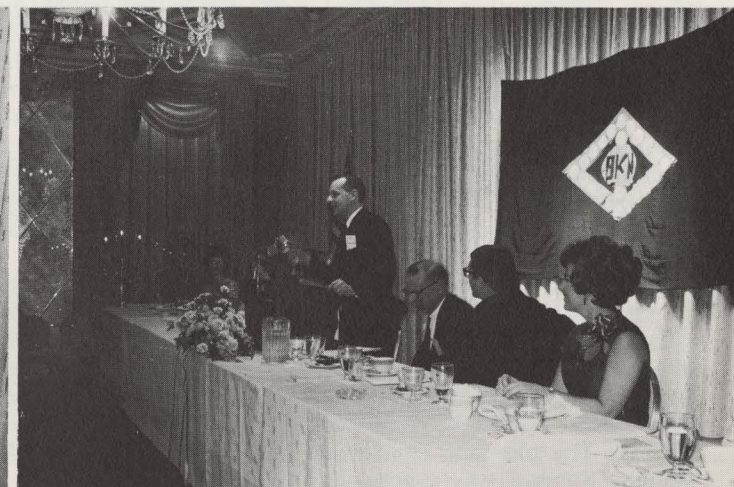
Left to Right: John Tucker, Craig Kirkwood, Mike Marcus, James Carlos, Robert Olsen, Eugene Boehne, Larry Dwon, Holmes MacDonald, H. L. Ablin, Steve Finn.



Left to Right: Carla Wilkinson, Sidney B. Ingram, Mrs. John Walsh, Mr. John Walsh, Mrs. Edward Leach, Mr. Edward Leach, Mr. Anthony Gabrielle, George Deanderas, E. Walder.



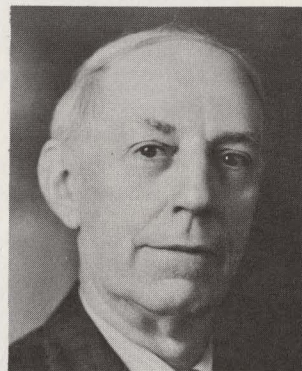
President William Smith, Mrs. Robert Elfant, Mr. Robert Elfant.



Dr. George Heilmeyer responds to his award.

The Conspiracy of EZRA CORNELL AND SAMUEL F. B. MORSE That Led To The Founding of Cornell University

ELLERY PAINE
Eminent Member



The most highly prized possession the boy had was a very small and very old axe that was given him by the man he called Grandpa Morse. He can not remember exactly when it was given him, but it was before he was six years old. The evidence to establish this fact is that the day his sister Olive was born his Grandmother Smith sent him to cut sassafras wood with his axe from which she extracted fluid supposed to be good for washing a baby's eyes.

The boy always enjoyed going with adults to spend a night at the Morse home. He never forgot his amazement to see Grandmother Morse put hot coals from the open fire into a covered container, and by use of its long wooden handle, move the container between the sheets of the bed in which he was to sleep that cold winter night. He had never before had such a warm bed to crawl into. The boy also was interested to watch the cooking of food over the open fire. There were no iron stoves in that house to be used for cooking food or warming rooms.

One Sunday morning the boy was amazed to see Grandpa Morse yoking his oxen in the barn yard. He asked if it was wicked to make oxen work on Sunday. The old man replied that he thought Sunday was a good day to draw stable manure into the field where potatoes were to be planted. The boy

watched the oxen being driven in the field and manure being dumped from the cart as people in horse-drawn wagons passed along the road on their way to church. After those people had passed from sight the oxen were brought to the barn and unyoked. When he had become older he learned that this kind old man apparently enjoyed doing unusual things which attracted attention.

On clear November mornings as the boy followed his line of traps over the pasture hill back of his home, in the distance to the south he could see another hill on which the house in which Jedidiah Morse was born. On those occasions the boy's thoughts were more on the hope he might find a skunk caught in one of his deadfalls than about Jedidiah of whom he heard the older members of his family speak. Jedidiah had graduated from Yale, and in 1789 produced the first books dealing with geography to be used in America.

He was interested to learn that Jedidiah's son Samuel was cousin of the old man who had given him the small axe. Then later he became interested in things electrical, he became deeply interested to learn that Samuel Morse had invented the telegraph, and was surprised that the telegraph had been invented by a man who had gained fame as a potrait painter.

The man the boy called Grandpa Morse was not his real grandfather. His Grandfather Paine died when the boy was seven years old, and Grandfather Smith, on his mother's side of the family, had lost his life as a Civil War soldier. But Grandfather Smith's brother John had married Frances Cornell, the younger relative of Ezra Cornell who helped to bring the telegraph into general use and had later founded the university that bears his name.

To the south of the boy's home in Woodstock, Connecticut at a distance about as far as a horse was supposed to be driven in a single day, was the town of Plainfield where the Cornell home was located. Aunt Frances, as the boy called her, was the last remaining member of the Quaker group who had lived in that region during several generations. The migration of the Cornell family to the west began about the time of the American Revolution when it was found there was insufficient land in that part of New England to support the increasing population with the rural life of that period.

As he rode the horse-drawn vehicle to visit the family of Uncle John Smith the boy knew when he had come to the Cornell farm before the house was in view. On that farm all stone walls stood straight and plumb instead of

the tumbled down condition of other farms. The wooden barways were all in perfect order and the weeds and bushes were cleared from the roadside.

Aunt Frances' older son was lured to the west in hopes of finding gold and a little later her younger son went to Kansas. The gold was not found but one of the two became owner of a large wheat farm in Washington and the other became a doctor and founded a hospital in a region that lacked medical facilities. Her unmarried daughter Anna Smith, was a teacher in Worcester living in an apartment with another teacher Sarah Averill.

At the age of 17 the boy passed the entrance examinations at Worcester Polytechnic Institute. A great depression had developed. The boy's father had little money but borrowed enough to cover tuition fees but not enough to cover the expense for room and board. Anna kindly invited the young man to live in her apartment and for him to pay years later. Had not Anna done this the study program could not have been carried out.

John Smith had died but Aunt Frances continued to live in the ancient Cornell house. During winters she was with daughter Anna. Aunt Frances was a great talker and her favorite

topic was her relatives, especially those of past times. She corresponded with Cornell relatives who lived as far away as California and Australia. As she talked the young man tried his best to listen in a polite manner but he was shocked on one occasion to have her stop talking, and after looking at him sharply for a moment to exclaim "Why Ellery, you do not seem at all interested to hear about your family relations."

Ezra Cornell made many visits with his Plainfield relatives when Aunt Frances was a young woman she remembered the stories he told about his activities which had brought him great wealth and fame. The young engineering student at Worcester soon became fascinated to hear his Aunt Frances tell about Morse and his association with Cornell in bringing the telegraph into the service of society. Never again did she have evidence that he did not show interest in what she said.

Ezra's father left Plainfield to live in Westchester County, New York where Ezra was born in 1807. According to modern standards Ezra had a meager education yet he did teach country school a term or two. He learned the trade of carpenter and worked in a machine shop for a year.

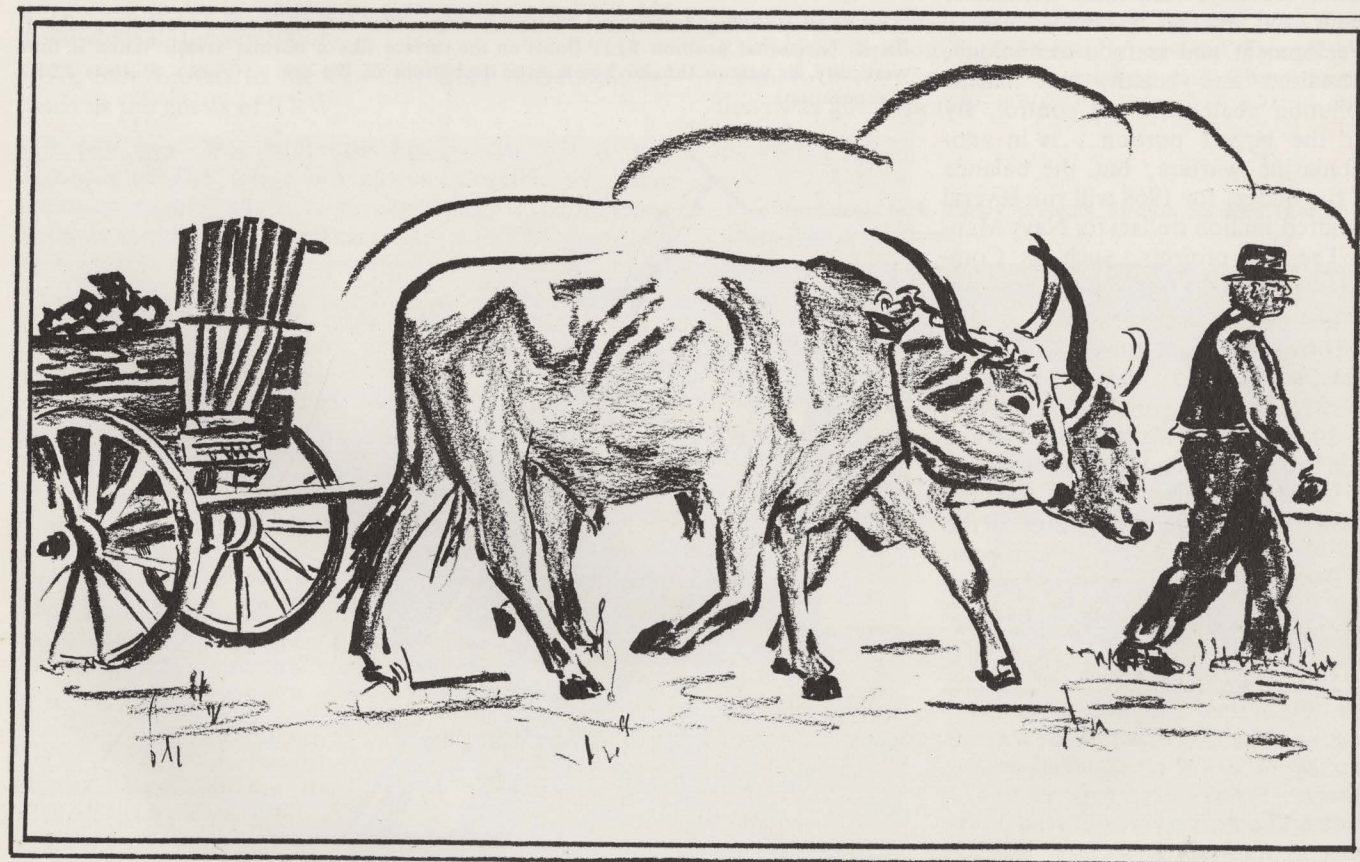
In 1826 Ezra moved to Ithaca where

he operated a mill for about eight years then joined his brother in farming and lumbering. He became interested in building plows and this brought him in contact with Samuel Morse who invented the telegraph in 1835 and in 1843 was granted \$30,000 by the Federal Government to build a telegraph line between Baltimore and Washington. Morse's plan was to bury an insulated conductor in the earth through which the electric signals were to pass. Ezra agreed to build a special plow to open the furrow in which the conductor was to be placed and to have charge of operating the plow and install the conductor.

According to the story Ezra told his relatives, it was the custom each night to send telegraph messages over the conductor which was buried. It was found that as the distance increased the signals became weaker, and finally failed completely. Morse was distraught and told Ezra "We are ruined."

Ezra replied that they were not yet ruined. He urged Morse not to announce the failure of signals to pass through the buried conductor, and to let him handle the matter the following day.

(Continued on Page 18)





First in a
special BRIDGE series.

EXPLORING & MINING FROM THE SEA

The government budget for marine science and technology this year covers many applications. Included are national security, minerals, chemicals, water and energy resources, fishery development and seafood technology, recreation and health, and marine pollution abatement and control. By far the largest portion... is in anti-submarine warfare, but the balance of the budget for 1968 will run several hundred million dollars for Navy Man-In-The-Sea projects, such as Commander N. Scott Carpenter's Sea Lab, and for non-military aspects.

The government timetable runs as follows: by 1975, we expect to be able to rescue men down to depths of 20,000 feet. This includes rescuing men from Navy submarines down as far as they will go. By that time the more promising geological areas of the continental shelf will have been completely surveyed and mapped around the United States, and a manned-bottom laboratory at least to a depth of 1,000 feet will have been established.

Dr. Brunetti is Assistant to the President of FMC Corporation. He was named by HKN as the Outstanding Young Electrical Engineer in the United States in 1941. Editorial Assistance by Kathleen Ryan.

A FIRESIDE CHAT with Cleo Brunetti

Construction of a nuclear power plant operating on the bottom will have been started.

Our Company has built a seagoing vessel for the Scripps Institution of Oceanography at La Jolla, California, called the FLIP. It is 355 feet long... At sea the vessel can be made to flip itself vertically. When it does, most of its 300 foot length goes underwater and five stories of laboratories remain above water. This provides a "stable platform" for scientists to conduct studies at sea. Even though it may encounter 35 foot waves, the vessel moves only a few inches up and down...

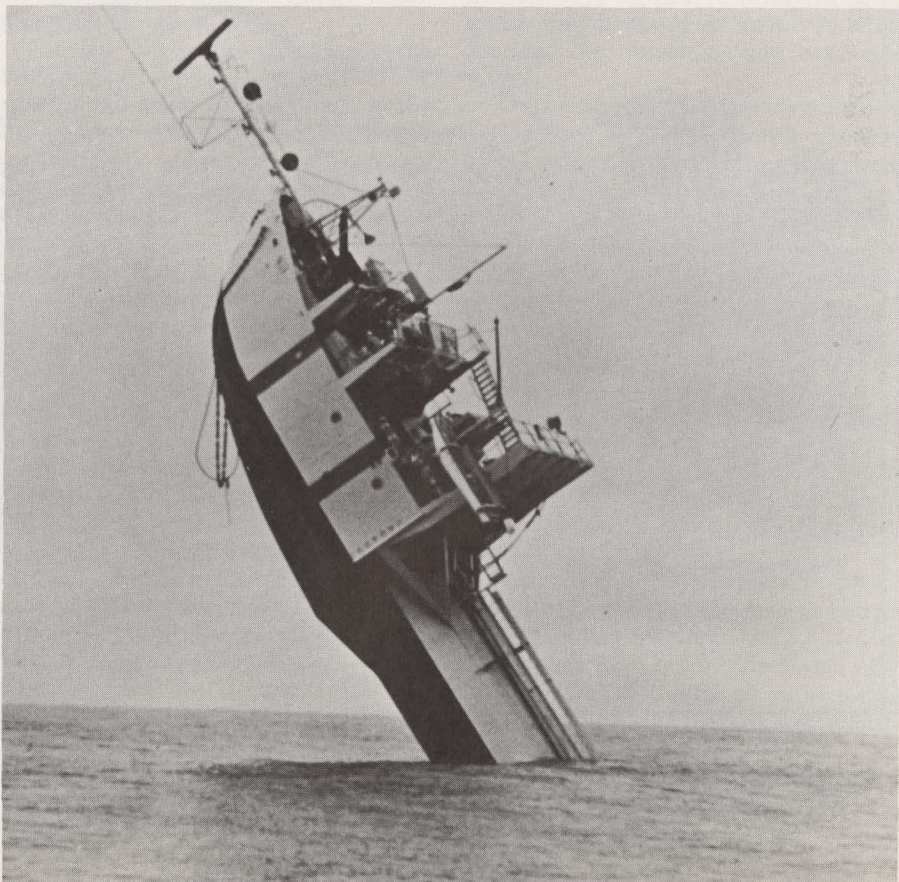
We are now working on a deep diving system (DDS) designed to carry workers from ship to a depth of a thousand feet. This system is to be used for salvage operations throughout the world. It consists of two main

units — a decompression chamber abroad ship and a diving capsule. Divers enter the water in the spherical diving capsule which takes them to the bottom and has an opening which allows them to go out and work on the ocean floor... They live in this system for something like three weeks, going up and down freely without danger of getting the bends, since the same pressure is maintained in all parts of the system, the decompression chamber, the diving capsule and the ocean bottom...

By 1975, we expect to have established manned-habitation at 6,000 feet, including underwater sea terminals. At that time we will be producing oil and gas from shelves below 1,000 feet and doing some preliminary mining of phosphorus and manganese nodules. Permanent ocean platforms,

(Continued on Page 18)

The FLIP (Floating Instrument Platform) ship settles into its vertical working position. In its horizontal position FLIP floats on the surface like a normal vessel. When it flips vertically, its narrow tubular base rests on the bottom of the sea. (Photo courtesy FMC Corporation)



Los Angeles Regional

by William Bonser

A regional visitation was held in Los Angeles on February 17, 1968. There were eighteen delegates from active chapters, two faculty advisors, and five members of the Los Angeles Alumni Chapter present.

Epsilon Nu	California State College of Los Angeles
Upsilon	University of Southern California
Epsilon Beta	Arizona State University
Epsilon Iota	San Jose State College
Mu	University of California, Berkeley
Epsilon Theta	California State College of Long Beach

We profited by the reports from previous visitations which indicated that informality is necessary.

Mr. Alex Kendall, past president of Los Angeles Alumni Chapters and presently associated with TRW Systems Group, arranged a tour for the TRW Space Park. This is one of the outstanding research and development centers of the world. Having the tour first set the participants at ease for the discussions which followed.

After the tour, Mr. Andrew Mienke, Jr. of TRW Public Relations made a short and very interesting presentation. This was followed by a short statement by one delegate from each chapter. The problem areas mentioned in these statements were used as a basis for discussions in the afternoon.

We then moved to the Pen and Quill restaurant for lunch as the guests of TRW.

A two hour discussion followed lunch, and it was tremendous. The delegates really exchanged ideas. These six chapters are all in relatively healthy condition but certainly not without problems.

LETTERS TO THE EDITOR

April 15, 1968

Dear Sir:

I received the May issue of *The Bridge* today. I especially enjoyed reading "Telescopes Through the Ages" and the advertisement of Western Electric. I was the first to solicit advertising in *The Bridge*. I worked at Hughes Aircraft Co., in Culver City and they were first to have an ad in *The Bridge* of Eta Kappa Nu. I believe the cover on the current issue is great.

Stanley "Ray" Wirth
1719 Vegas Valley Dr.
Las Vegas, Nevada

Epsilon Sigma Installed at UNIV. OF FLORIDA

On December 1, 1967, nineteen undergraduate students, fourteen graduate students, and six faculty members were initiated as charter members of the Epsilon Sigma Chapter of Eta Kappa Nu at the University of Florida. The ceremony took place in the Green Room at the Holiday Inn in Gainesville.

The initiation ceremony was conducted by John E. Farley, Vice-President of the national organization, and Dr. Charles E. Hutchison, National Director for the Eastern region. They were assisted by Colonel Tewes Kundel, Dr. Alan D. Sutherland, Dr. Arthur J. Broder-son, Dr. Eugene R. Chenette, Dr. Donald G. Childers, Dr. Marion E. Forsman, all University of Florida faculty members and long-standing members of Eta Kappa Nu.

Following the initiation ceremonies, a banquet was held in the Continental Room at the Holiday Inn. Mr. Farley presented the Charter of Epsilon Sigma Chapter to the acting Dean of the College of Engineering, John A. Nattress. Among the guests at the banquet were Mrs. Nattress, Dr. and Mrs. Wayne Chen, Chairman of the Department of Electrical Engineering, Dr. and Mrs. Jack R. Smith, Epsilon Sigma's faculty advisor. Donald A. Grooms of the College of Journalism and Communications was guest speaker.

Vice President Jack Farley presents Epsilon Sigma's charter to Dean John A. Nattress.



ELECTION YEAR 1968

In the spirit of this important election year, BRIDGE is pleased to present the following article on the subject **POLITICS OVER A CUP OF COFFEE**, as well as the special eight page supplement (starting on opposite page) entitled **THE FEDERAL CONSTITUTION**.

From the local school board to the major national campaigns — a candidate is handicapped if he hasn't made points and influenced votes over an informal coffee get-together. Ohio's Representative Donald E. Lukens(R), for example, estimates he attended more than 750 campaign coffees during his successful race for a seat in the 90th Congress.

But this brew is not new! Political history has always been laced with coffee. The coffeehouse was traditionally the place where the hottest issues of the day were stirred up. Fore-runners of the political club — such

famous coffeehouses as Will's, Buttons, the Green Dragon and Procope's — are ground into history itself.

The first coffeehouse was established in London in 1652. Within twenty years, coffeehouses had come to play so important a role in the social and political life of the day that Charles II attempted to repress them on the ground that they were "seminaries of sedition."

But history was being hatched over hot coffee and Charles II could not stop the flow. In spite of royal opposition, the free-thinking spirit of the English coffeehouse survived.

The French had a word for it — and how important a word is shown by the fact that our common term for restaurant is *cafe*, the French word for coffee or coffeehouse. At Procope's in Paris, Robespierre, Marat and Danton plotted the fall of Louis XVI and Marie Antoinette — cakes didn't help her with those coffee drinkers either! But Procope's didn't lose its head — in 1790 it was still around, draped in black to mourn the passing of that friend of the Republic, Benjamin Franklin — and still later it played host to a poor artillery officer named Bonaparte who was forced to leave his tricornered hat as security for unpaid coffee bills!

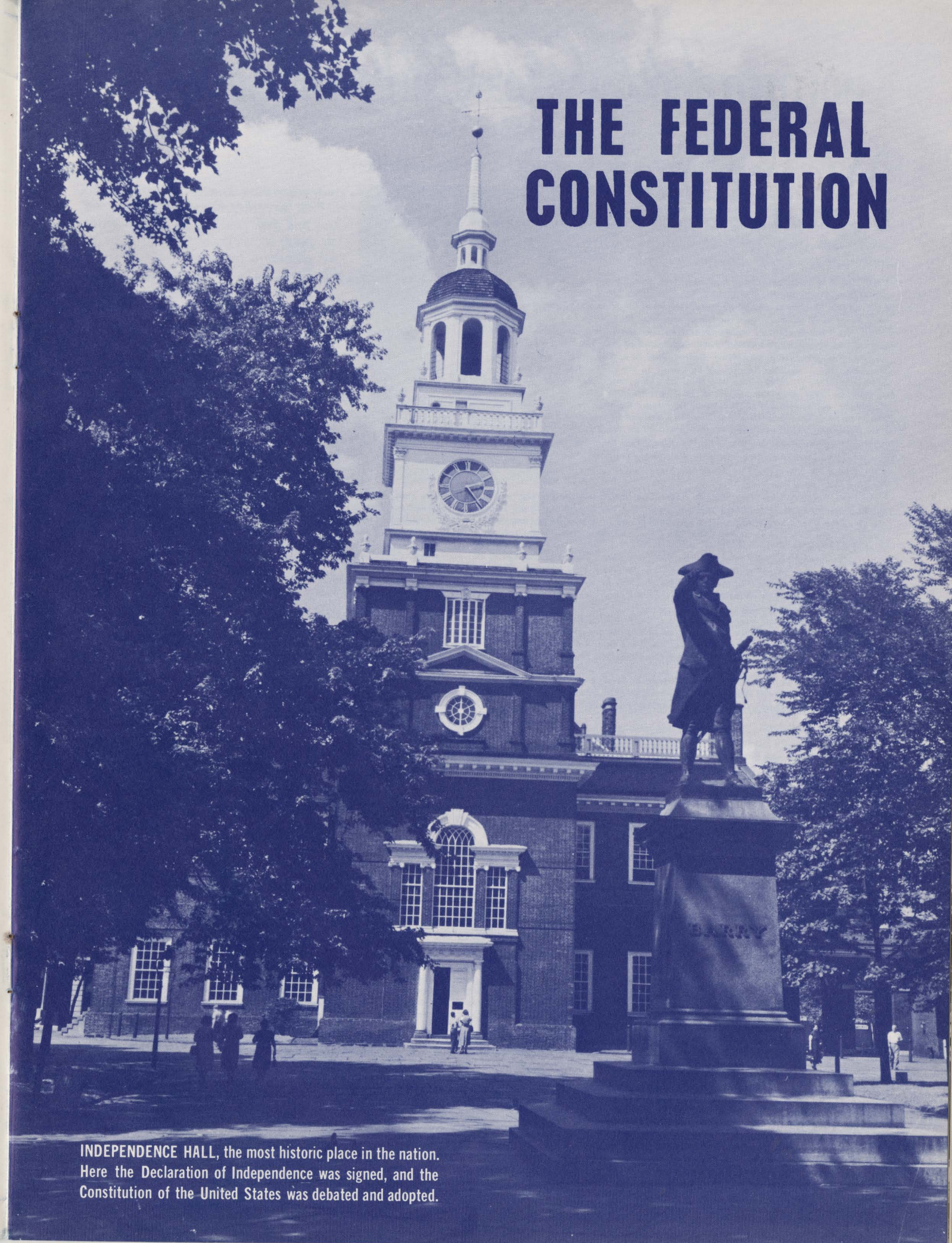
The spirit of coffee and caucus was soon imported to the New World. Boston's Green Dragon was by far the most celebrated of the American coffeehouses — and Daniel Webster called it the headquarters of the Revolution; but the King's Arms near Trinity Church was also well known. Rooms on its second story were used for public trials and political meetings.

This historic-gastronomic combination is as politically potent today as it was when John Adams led a band out of the Green Dragon to dispose of a great deal of tea! With an estimated 43,000 elections held in the United States every year, the campaign coffee gathering is made to order for down home politicking.

Among the more enthusiastic boosters of the campaign coffee is Sen. Howard H. Baker, Jr. who made especially effective use of the gatherings in his successful 1966 bid to become the first Republican ever elected to the Senate in the history of Tennessee. According to Senator Baker, coffee get-togethers give a candidate a chance to meet people not ordinarily involved in his campaign. He says the campaign coffee plays an important role in describing the "deadly serious business" of politics to voters.



THE FEDERAL CONSTITUTION



INDEPENDENCE HALL, the most historic place in the nation. Here the Declaration of Independence was signed, and the Constitution of the United States was debated and adopted.

The Constitution

We the People

of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common Defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this CONSTITUTION for the United States of America.

Article I.

SECTION 1. All legislative Powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives.

SECTION 2. The House of Representatives shall be composed of Members chosen every second Year by the People of the several States, and the Electors in each State shall have the Qualifications requisite for Electors of the most numerous Branch of the State Legislature.

No Person shall be a Representative who shall not have attained to the Age of twenty-five Years, and been seven Years a Citizen of the United States, and who shall not, when elected, be an Inhabitant of that State in which he shall be chosen.

[Representatives and direct Taxes shall be apportioned among the several States which may be included within this Union, according to their respective Numbers, which shall be determined by adding to the whole Number of free Persons, including those bound to Service for a Term of Years, and excluding Indians not taxed, three fifths of all other Persons.] The actual Enumeration shall be made within three Years after the first Meeting of the Congress of the United States, and within every subsequent Term of ten Years, in such Manner as they shall by Law direct. The Number of Representatives shall not exceed one for every thirty Thousand, but each State shall have at Least one Representative; and until such enumeration shall be made, the State of New Hampshire shall be entitled to chuse three, Massachusetts eight, Rhode-Island and Providence Plantations one, Connecticut five, New-York six, New Jersey four, Pennsylvania eight, Delaware one, Maryland six, Virginia ten, North Carolina five, South Carolina five, and Georgia three.

When vacancies happen in the Representation from any State, the Executive Authority thereof shall issue Writs of Election to fill such Vacancies.

The House of Representatives shall chuse their Speaker and other Officers; and shall have the sole Power of Impeachment.

SECTION 3. The Senate of the United States shall be composed of two Senators from each State, chosen by the Legislature thereof, for six Years; and each Senator shall have one Vote.

Immediately after they shall be assembled in Consequence of the first Election, they shall be divided as equally as may be into three Classes. The Seats of the Senators of the first Class shall be vacated at the Expiration of the second Year, of the second Class at the Expiration of the fourth Year, and of the third Class at the Expiration of the sixth Year, so that one-third may be chosen every second Year; and if Vacancies happen by Resignation, or otherwise, during the Recess of the Legislature of any State, the Executive thereof may make temporary Appointments until the next Meeting of the Legislature, which shall then fill such Vacancies.

No Person shall be a Senator who shall not have attained to the Age of thirty Years, and been nine Years a Citizen of the United States, and who shall not, when elected, be an Inhabitant of that State for which he shall be chosen.

The Vice President of the United States shall be President of the Senate, but shall have no Vote, unless they be equally divided.

The Senate shall chuse their other Officers, and also a President pro tempore, in the absence of the Vice President, or when he shall exercise the Office of President of the United States.

The Senate shall have the sole Power to try all Impeachments. When sitting for that Purpose, they shall be on Oath or Affirmation. When the President of the United States is tried, the Chief Justice shall preside: And no Person shall be convicted without the Concurrence of two thirds of the Members present.

Judgment in Cases of Impeachment shall not extend further than to removal from Office, and disqualification to hold and enjoy any Office of honor, Trust or Profit under the United States: but the Party convicted shall nevertheless be liable and subject to Indictment, Trial, Judgment and Punishment, according to Law.

SECTION 4. The Times, Places and Manner of holding Elections for Senators and Representatives, shall be prescribed in each State by the Legislature thereof; but the Congress may at any time by Law make or alter such Regulations, except as to the Place of Chusing Senators.

The Congress shall assemble at least once in every Year, and such Meeting shall be on the first Monday in December, unless they shall by Law appoint a different Day.

SECTION 5. Each House shall be the Judge of the Elections, Returns and Qualifications of its own Members, and a Majority of each shall constitute a Quorum to do Business; but a smaller number may adjourn from day to day, and may be authorized to compel the Attendance of absent Members, in such Manner, and under such Penalties as each House may provide.

Each House may determine the Rules of its Proceedings, punish its Members for disorderly Behavior, and, with the Concurrence of two thirds, expel a Member.

Each House shall keep a Journal of its Proceedings, and from time to time publish the same, excepting such Parts as may in their Judgment require Secrecy; and the Yeas and Nays of the Members of either House on any question shall, at the Desire of one fifth of those Present, be entered on the Journal.

Neither House, during the Session of Congress, shall, without the Consent of the other, adjourn for more than three days, nor to any other Place than that in which the two Houses shall be sitting.

SECTION 6. The Senators and Representatives shall receive a Compensation for their Services, to be ascertained by Law, and paid out of the Treasury of the United States. They shall in all Cases, except Treason, Felony and Breach of the Peace, be privileged from Arrest during their Attendance at the Session of their respective Houses, and in going to and returning from the same; and for any Speech or Debate in either House, they shall not be questioned in any other Place.

No Senator or Representative shall, during the Time for which he was elected, be appointed to any civil Office under the Authority of the United States, which shall have been created, or the Emoluments whereof shall have been encreased during such time; and no Person holding any Office under the United States, shall be a Member of either House during his Continuance in Office.

SECTION 7. All Bills for raising Revenue shall originate in the House of Representatives; but the Senate may propose or concur with Amendments as on other Bills.

Every Bill which shall have passed the House of Representatives and the Senate, shall, before it become a Law, be presented to the President of the United States; If he approve he shall sign it, but if not he shall return it, with his Objections to that House in which it shall have originated, who shall enter the Objections at large on their journal, and proceed to reconsider it. If after such Reconsideration two thirds of that House shall agree to pass the Bill, it shall be sent, together with the Objections, to the other House, by which it shall likewise be reconsidered, and if approved by two thirds of that House, it shall become a Law. But in all such Cases the Votes of both Houses shall be determined by Yeds and Nays, and the Names of the Persons voting for and against the Bill shall be entered on the Journal of each House respectively. If any Bill shall not be returned by the President within ten Days (Sundays excepted) after it shall have been presented to him, the Same shall be a Law, in like Manner as if he had signed it, unless the Congress by their Adjournment prevent its Return, in which Case it shall not be a Law.

Every Order, Resolution, or Vote to which the Concurrence of the Senate and House of Representatives may be necessary (except on a question of Adjournment) shall be presented to the President of the United States; and before the Same shall take Effect, shall be approved by him, or being disapproved by him, shall be repassed by two thirds of the Senate and House of Representatives, according to the Rules and Limitations prescribed in the Case of a Bill.

SECTION 8. The Congress shall have Power To lay and collect Taxes, Duties, Imposts and Excises, to pay the Debts and provide for the common Defence and general Welfare of the United States; but all Duties, Imposts and Excises shall be uniform throughout the United States;

To borrow money on the credit of the United States;

To regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes;

To establish a uniform Rule of Naturalization, and uniform Laws on the subject of Bankruptcies throughout the United States;

To coin Money, regulate the Value thereof, and of foreign Coin, and fix the Standard of Weights and Measures;

To provide for the Punishment of counterfeiting the Securities and current Coin of the United States;

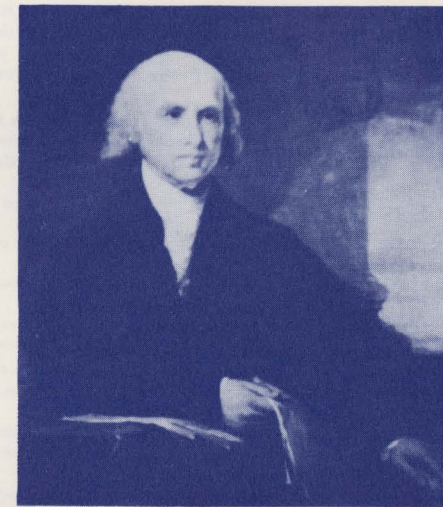
To establish Post Offices and post Roads;

To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries;

TAXATION AND THE FEDERAL CONSTITUTION

JAMES MADISON

President of the United States



Give me leave to say something of the nature of the government, and to show that it is perfectly safe and just to vest it with the power of taxation. There are a number of opinions; but the principal question is, whether it be a federal or a consolidated government. In order to judge properly of the question before us, we must consider it minutely, in its principal parts. I myself conceive that it is of a mixed nature; it is, in a manner, unprecedented. We cannot find one express prototype in the experience of the world: it stands by itself. In some respects, it is a government of a federal nature; in others, it is of a consolidated nature. Even if we attend to the manner in which the Constitution is investigated, ratified, and made the act of the people of America, I can say, notwithstanding what the honorable gentleman has alleged, that this government is not completely consolidated; nor is it entirely federal. Who are the parties to it? The people — not the people as composing one great body, but the people as composing thirteen sovereignties. Were it, as the gentleman asserts, a consolidated government, the assent of a majority of the people would be sufficient for its establishment, and as a majority have adopted it already, the remaining States would be bound by the act of the majority, even if they unanimously reprobated it. Were it such a government as is suggested, it would be now binding on the people of this State, without having had the privilege of deliberating upon it; but, sir, no State is bound by it, as it is, without its own consent. Should all the States adopt it, it will be then a government established by the thirteen States of America, not through the intervention of the Legislatures, but by the people at large. In this particular respect, the distinction between the existing and proposed governments is very material. The existing system has been derived from the dependent, derivative authority of the Legislatures of the States; whereas this is derived from the superior power of the people. If we look at the manner in which alterations are to be made in it, the same idea is in some degree attended

to. By the new system, a majority of the States cannot introduce amendments; nor are all the States required for that purpose; three-fourths of them must concur in alterations; in this there is a departure from the federal idea. The members to the national House of Representatives are to be chosen by the people at large, in proportion to the numbers in the respective districts. When we come to the Senate, its members are elected by the States in their equal and political capacity; but had the government been completely consolidated, the Senate would have been chosen by the people, in their individual capacity, in the same manner as the members of the other House. Thus it is of complicated nature, and this complication, I trust, will be found to exclude the evils of absolute consolidation, as well as of a mere confederacy. If Virginia were separated from all the States, her power and authority would extend to all cases; in like manner, were all powers vested in the general government, it would be a consolidated government; but the powers of the Federal government are enumerated; it can only operate in certain cases: it has legislative powers on defined and limited objects, beyond which it cannot extend its jurisdiction.

But the honorable member has satirized, with peculiar acrimony, the power given to the general government by this Constitution. I conceive that the first question on this subject

is, whether these powers be necessary; if they be, we are reduced to the dilemma of either submitting to the inconvenience, or losing the Union. Let us consider the most important of these reprobated powers; that of direct taxation is most generally objected to. With respect to the exigencies of government, there is no question but the most easy mode of providing for them will be adopted. When, therefore, direct taxes are not necessary, they will not be recurred to. It can be of little advantage to those in power to raise money in a manner oppressive to the people. To consult the conveniences of the people will cost them nothing, and in many respects will be advantageous to them. Direct taxes will only be recurred to for great purposes. What has brought on other nations those immense debts, under the pressure of which many of them labor? Not the expenses of their governments, but war. If this country should be engaged in war (and I conceive we ought to provide for the possibility of such a case), how would it be carried on? By the usual means provided from year to year? As our imports will be necessary for the expenses of government, and other common exigencies, how are we to carry on the means of defence? How is it possible a war could be supported without money or credit? And would it be possible for government to have credit, without having the power of raising money? No, it would be impossible for any government, in such a case, to defend itself. Then, I say, sir, that it is necessary to establish funds for extraordinary exigencies, and give this power to the general government; for the utter inutility of previous requisitions on the States is too well known. Would it be possible for those countries, whose finances and revenues are carried to the highest perfection, to carry on the operations of government on great emergencies, such as the maintenance of a war, without an uncontrolled power of raising money? Has it not been necessary for Great Britain, notwithstanding the facility of the collection of her taxes, to have recourse very often to this and other extraordinary methods of procuring money?

To constitute Tribunals inferior to the supreme Court;
 To define and punish Piracies and Felonies committed on the high Seas, and Offenses against the Law of Nations;
 To declare War, grant Letters of Marque and Reprisal, and make Rules concerning Captures on Land and Water;
 To raise and support Armies, but no Appropriation of Money to that Use shall be for a longer Term than two Years;
 To provide and maintain a Navy;
 To make Rules for the Government and Regulation of the land and naval Forces;
 To provide for calling forth the Militia to execute the Laws of the Union, suppress Insurrections and repel Invasions;
 To provide for organizing, arming, and disciplining the Militia, and for governing such Part of them as may be employed in the Service of the United States, reserving to the States respectively, the Appointment of the Officers, and the Authority of training the Militia according to the discipline prescribed by Congress;

To exercise exclusive Legislation in all Cases whatsoever, over such District (not exceeding ten Miles square) as may, by Cession of particular States, and the acceptance of Congress, become the Seat of the Government of the United States, and to exercise like Authority over all Places purchased by the Consent of the Legislature of the State in which the Same shall be, for the Erection of Forts, Magazines, Arsenals, dock-Yards, and other needful Buildings; — And
 To make all Laws which shall be necessary and proper for carrying into Execution the foregoing Powers, and all other Powers vested by this Constitution in the Government of the United States, or in any Department or Officer thereof.

SECTION 9. The Migration or Importation of such Persons as any of the States now existing shall think proper to admit, shall not be prohibited by the Congress prior to the Year one thousand eight hundred and eight, but a tax or duty may be imposed on such Importation, not exceeding ten dollars for each Person.

The privilege of the Writ of Habeas Corpus shall not be suspended, unless when in Cases of Rebellion or Invasion the public Safety may require it.

No Bill of Attainder or ex post facto Law shall be passed.

No capitation, or other direct, Tax shall be laid, unless in Proportion to the Census or Enumeration herein before directed to be taken.

No Tax or Duty shall be laid on Articles exported from any State.

No Preference shall be given by any Regulation of Commerce or Revenue to the Ports of one State over those of another: nor shall Vessels bound to, or from, one State, be obliged to enter, clear, or pay Duties in Another.

No Money shall be drawn from the Treasury, but in Consequence of Appropriations made by Law; and a regular Statement and Account of the Receipts and Expenditures of all public Money shall be published from time to time.

No Title of Nobility shall be granted by the United States: And no Person holding any Office of Profit or Trust under them, shall, without the Consent of the Congress, accept of any present, Emolument, Office, or Title, of any kind whatever, from any King, Prince, or foreign State.

SECTION 10. No State shall enter into any Treaty, Alliance, or Confederation; grant Letters of Marque and Reprisal; coin Money; emit Bills of Credit; make any Thing but gold and silver Coin a Tender in Payment of Debts; pass any Bill of Attainder, ex post facto Law, or Law impairing the Obligation of Contracts, or grant any Title of Nobility.

No State shall, without the Consent of the Congress, lay any Imposts or Duties on Imports or Exports, except what may be absolutely necessary for executing its inspection Laws; and the net Produce of all Duties and Imposts, laid by any State on Imports or Exports, shall be for the Use of the Treasury of the United States; and all such Laws shall be subject to the Revision and Control of the Congress.

No State shall, without the Consent of Congress, lay any duty of Tonnage, keep Troops, or Ships of War in time of Peace, enter into any Agreement or Compact with another State, or with a foreign Power, or engage in War, unless actually invaded, or in such imminent Danger as will not admit of delay.

Article II.

SECTION 1. The executive Power shall be vested in a President of the United States of America. He shall hold his Office during the Term of four Years, and together with the Vice-President, chosen for the same Term, be elected, as follows

Each State shall appoint, in such Manner as the Legislature thereof may direct, a Number of Electors, equal to the whole Number of Senators and Representatives to which the State may be entitled in the Congress: but no Senator or Representative, or Person holding an Office of Trust or Profit under the United States, shall be appointed an Elector.

[The Electors shall meet in their respective States, and vote by Ballot for two persons, of whom one at least shall not be an Inhabitant of the same State with themselves. And they shall make a List of all the Persons voted for, and of the Number of Votes for each; which List they shall sign and certify, and transmit sealed to the Seat of the Government of the United States, directed to the President of the Senate. The President of the Senate shall, in the Presence of the Senate and House of Representatives, open all the Certificates, and the Votes shall then be counted. The Person having the greatest Number of Votes shall be the President, if such Number be a Majority of the whole Number of Electors appointed; and if there be more than one who have such Majority, and have an equal Number of Votes, then the House of Representatives shall immediately chuse by Ballot one of them for President; and if no Person have a Majority, then from the five highest on the List the said House shall in like Manner chuse the President. But in chusing the President, the Votes shall be taken by States, the Representation from each State having one Vote; A quorum for this Purpose shall consist of a Member or Members from two-thirds of the States, and a Majority of all the States shall be necessary to a Choice. In every Case, after the Choice of the President, the Person having the greatest Number of Votes of the Electors shall be the Vice President. But if there should remain two or more who have equal Votes, the Senate shall chuse from them by Ballot the Vice-President.]

The Congress may determine the Time of chusing the Electors, and the Day on which they shall give their Votes; which Day shall be the same throughout the United States.

No person except a natural born Citizen, or a Citizen of the United States, at the time of the Adoption of this Constitution, shall be eligible to the Office of President; neither shall any Person be eligible to that Office who shall not have attained to the Age of thirty-five Years, and been fourteen Years a Resident within the United States.

In Case of the Removal of the President from Office, or of his Death, Resignation, or Inability to discharge the Powers and Duties of the said Office, the same shall devolve on the Vice President, and the Congress may by Law provide for the Case of Removal, Death, Resignation or Inability, both of the President and Vice President, declaring what Officer shall then act as President, and such Officer shall act accordingly, until the Disability be removed, or a President shall be elected.

The President shall, at stated Times, receive for his Services, a Compensation, which shall neither be encreased nor diminished during the Period for which he shall have been elected, and he shall not receive within that Period any other Emolument from the United States, or any of them.

Before he enter on the Execution of his Office, he shall take the following Oath or Affirmation: — "I do solemnly swear (or affirm) that I will faithfully execute the Office of President of the United States, and will to the best of my Ability, preserve, protect and defend the Constitution of the United States."

SECTION 2. The President shall be Commander in Chief of the Army and Navy of the United States, and of the Militia of the several States, when called into the actual Service of the United States; he may require the Opinion in writing, of the principal Officer in each of the executive Departments, upon any subject relating to the Duties of their respective Offices, and he shall have Power to Grant Reprieves and Pardons for Offenses against the United States, except in Cases of Impeachment.

He shall have Power, by and with the Advice and Consent of the Senate, to make Treaties, provided two-thirds of the Senators present concur; and he shall nominate, and by and with the Advice and Consent of the Senate, shall appoint Ambassadors, other public Ministers and Consuls, Judges of the supreme Court, and all other Officers of the United States, whose Appointments are not herein otherwise provided for, and which shall be established by Law; but the Congress may by Law vest the Appointment of such inferior Officers, as they think proper, in the President alone, in the Courts of Law, or in the Heads of Departments.

The President shall have Power to fill up all Vacancies that may happen during the Recess of the Senate, by granting Commissions which shall expire at the End of their next Session.

SECTION 3. He shall from time to time give to the Congress Information of the State of the Union, and recommend to their Consideration such Measures as he shall judge necessary and expedient; he may, on extraordinary Occasions, convene both Houses, or either of them, and in Case of Disagreement between them, with Respect to the Time of Adjournment, he may adjourn them to such Time as he shall think proper; he shall receive Ambassadors and other public Ministers; he shall take Care that the Laws be faithfully executed, and shall Commission all the Officers of the United States.

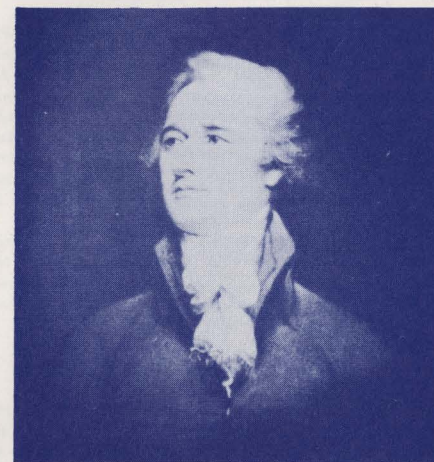
SECTION 4. The President, Vice President and all civil Officers of the United States, shall be removed from Office on Impeachment for, and Conviction of, Treason, Bribery, or other high Crimes and Misdemeanors.

Article III.

SECTION 1. The judicial Power of the United States, shall be vested in one supreme Court, and in such inferior Courts as the Congress may from time to time ordain and establish. The Judges, both of the supreme and inferior Courts, shall hold their Offices during good Behaviour, and shall, at stated Times, receive for their Services a Compensation which shall not be diminished during their Continuance in Office.

THE STATES AND THE FEDERAL CONSTITUTION

ALEXANDER HAMILTON Secretary of the Treasury



Gentlemen indulge too many unreasonable apprehensions of danger to the state governments; they seem to suppose that the moment you put men into a national council they become corrupt and tyrannical, and lose all their affection for their fellow citizens. But can we imagine that the senators will ever be so insensible of their own advantage as to sacrifice the genuine interest of their constituents? The state governments are essentially necessary to the form and spirit of the general system. As long, therefore, as Congress has a full conviction of this necessity, they must, even upon principles purely national, have as firm an attachment to the one as to the other. This conviction can never leave them, unless they become madmen. While the Constitution continues to be read and its principles known, the states must, by every rational man, be considered as essential, component parts of the Union; and therefore the idea of sacrificing the former to the latter is wholly inadmissible.

From the circumstances already explained, and many others which might be mentioned, results a complicated, irresistible check, which must ever support the existence and importance of the state governments. The danger, if any exists, flows from an opposite source. The probable evil is, that the general government will be too dependent on the state legislatures, too much governed by their prejudices, and too obsequious to their humors; that the states, with every power in their hands, will make encroachments on the national authority, till the Union is weakened and dissolved.

There are certain social principles in human nature from which we may draw the most solid conclusions with respect to the conduct of individuals and of communities. We love our families more than our neighbors; we love our neighbors more than our countrymen in general. The human affections, like the solar heat, lose their intensity as they depart from

the center, and become languid in proportion to the expansion of the circle on which they act. On these principles, the attachment of the individual will be first and forever secured by the state governments; they will be a mutual protection and support. Another source of influence, which has already been pointed out, is the various official connections in the states. Gentlemen endeavor to evade the force of this by saying that these offices will be insignificant. This is by no means true. The state officers will ever be important, because they are necessary and useful. Their powers are such as are extremely interesting to the people; such as affect their property, their liberty, and life.

What is more important that the administration of justice and the execution of the civil and criminal laws? Can the state governments become insignificant while they have the power of raising money independently and without control? If they are really useful, if they are calculated to promote the essential interests of the people, they must have their confidence and support. The states can never lose their powers till the whole people of America are robbed of their liberties. These must go together; they must support each other, or meet one common fate. On the gentlemen's principle, we may safely trust the

state governments, though we have no means of resisting them; but we cannot confide in the national government, though we have an effectual constitutional guard against every encroachment. This is the essence of their argument, and it is false and fallacious beyond conception.

With regard to the jurisdiction of the two governments, I shall certainly admit that the Constitution ought to be so formed as not to prevent the states from providing for their own existence; and I maintain that it is so formed, and that their power of providing for themselves is sufficiently established. This is conceded by one gentleman, and in the next breath the concession is retracted. He says Congress has but one exclusive right in taxation — that of duties on imports; certainly then, their other powers are only concurrent. But to take off the force of this obvious conclusion he immediately says that the laws of the United States are supreme; and that where there is one supreme there cannot be a concurrent authority; and further, that where the laws of the Union are supreme, those of the states must be subordinate; because there cannot be two supremes. This is curious sophistry. That two supreme powers cannot act together is false. They are inconsistent only when they are aimed at each other or at one indivisible object. The laws of the United States are supreme as to all their proper, constitutional objects; the laws of the states are supreme in the same way. These supreme laws may act on different objects without clashing; or they may operate on different parts of the same common object with perfect harmony. Suppose both governments should lay a tax of a penny on a certain article; has not each an independent and uncontrollable power to collect its own tax? The meaning of the maxim, there cannot be two supremes, is simply this — two powers cannot be supreme over each other. This meaning is entirely perverted by the gentleman.

SECTION 2. The judicial Power shall extend to all Cases, in Law and Equity, arising under this Constitution, the Laws of the United States, and Treaties made, or which shall be made, under their Authority; — to all Cases affecting Ambassadors, other public Ministers and Consuls; — to all Cases of admiralty and maritime Jurisdiction; — to Controversies to which the United States shall be a Party; — to Controversies between two or more States; — between a State and Citizens of another State; — between Citizens of different States; — between Citizens of the same State claiming Lands under Grants of different States, and between a State, or the Citizens thereof, and foreign States, Citizens or Subjects.

In all Cases affecting Ambassadors, other Public Ministers and Consuls, and those in which a State shall be Party, the supreme Court shall have original Jurisdiction. In all the other Cases before mentioned, the supreme Court shall have appellate Jurisdiction, both as to Law and Fact, with such Exceptions, and under such Regulations as the Congress shall make.

The trial of all Crimes, except in Cases of Impeachment, shall be by Jury; and such Trial shall be held in the State where the said Crimes shall have been committed; but when not committed within any State, the Trial shall be at such Place or Places as the Congress may by Law have directed.

SECTION 3. Treason against the United States, shall consist only in levying War against them, or in adhering to their Enemies, giving them Aid and Comfort. No Person shall be convicted of Treason unless on the Testimony of two Witnesses to the same overt Act, or on Confession in open Court.

The Congress shall have power to declare the Punishment of Treason, but no Attainder of Treason shall work Corruption of Blood, or Forfeiture except during the Life of the Person attained.

Article IV.

SECTION 1. Full Faith and Credit shall be given in each State to the public Acts, Records, and judicial Proceedings of every other State. And the Congress may by general Laws prescribe the Manner in which such Acts, Records and Proceedings shall be proved, and the Effect thereof.

SECTION 2. The Citizens of each State shall be entitled to all Privileges and Immunities of Citizens in the several States.

A Person charged in any State with Treason, Felony, or other Crime, who shall flee from Justice, and be found in another State, shall on demand of the executive Authority of the State from which he fled, be delivered up, to be removed to the State having Jurisdiction of the Crime.

No Person held to Service or Labour in one State, under the Laws thereof, escaping into another, shall, in Consequence of any Law or Regulation therein, be discharged from such Service or Labour, but shall be delivered up on Claim of the Party to whom such Service or Labour may be due.

SECTION 3. New States may be admitted by the Congress into this Union; but no new State shall be formed or erected within the Jurisdiction of any other State; nor any State be formed by the Junction of two or more States, or parts of States, without the Consent of the Legislatures of the States concerned as well as of the Congress.

The Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States; and nothing in this Constitution shall be so construed as to Prejudice any Claims of the United States, or of any particular State.

SECTION 4. The United States shall guarantee to every State in this Union a Republican Form of Government, and shall protect each of them against Invasion; and on Application of the Legislature, or of the Executive (when the Legislature cannot be convened) against domestic Violence.

Article V.

The Congress, whenever two-thirds of both Houses shall deem it necessary, shall propose Amendments to this Constitution, or, on the Application of the Legislatures of two-thirds of the several States, shall call a Convention for proposing Amendments, which, in either Case, shall be valid to all Intents and Purposes, as part of this Constitution, when ratified by the Legislatures of three-fourths of the several States, or by Conventions in three-fourths thereof, as the one or the other Mode of Ratification may be proposed by the Congress; Provided that no Amendment which may be made prior to the Year One thousand eight hundred and eight shall in any Manner affect the first and fourth Clauses in the Ninth Section of the first Article; and that no State, without its Consent, shall be deprived of its equal Suffrage in the Senate.

Article VI.

All Debts contracted and Engagements entered into, before the Adoption of this Constitution, shall be as valid against the United States under this Constitution, as under the Confederation.

This Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding.

The Senators and Representatives before mentioned, and the Members of the several State Legislatures, and all executive and judicial Officers, both of the United States and of the several States, shall be bound by Oath or Affirmation, to support this Constitution; but no religious Test shall ever be required as a Qualification to any Office or public Trust under the United States.

Article VII.

The Ratification of the Conventions of nine States shall be sufficient for the Establishment of this Constitution between the States so ratifying the Same.

Done

in Convention by the Unanimous Consent of the States present the Seventeenth Day of September in the Year of our Lord one thousand seven hundred and Eighty seven and of the Independence of the United States of America the Twelfth. In Witness whereof We have hereunto subscribed our Names.

Attest William Jackson Secretary

Delaware	George Read Gunning Bedford jun John Dickinson Richard Bassett Jacob C. Roach James Wilson	New Hampshire	John Langdon Nicholas Gilman
Maryland	Dan of Montpelier	Massachusetts	Nathanial Gorham Rufus King Wm. Saml. Johnson
Virginia	Dan. Carroll John Blair James Madison	Connecticut	Roger Sherman Alexander Hamilton
North Carolina	Wm. Blount Edw. Douthett Richd. Doak Wm. Williams	New York	Wm. Livingston David W. Kearney
South Carolina	Charles C. Pinckney Charles Pinckney Pierce Butler	New Jersey	Wm. Paterson Jonas Dayton Edw. Randolph Thomas M. Flinn
Georgia	William Few Abner Nash	Pennsylvania	Robert Morris Benjamin Franklin Thomas Mifflin James Wilson Gent

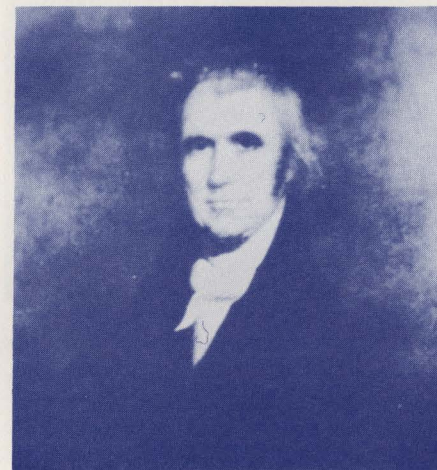
JUSTICE AND THE FEDERAL CONSTITUTION

JOHN MARSHALL

Chief Justice — The Supreme Court

The honorable gentleman, Mr. Henry, has expatiated on the necessity of a due attention to certain maxims — to certain fundamental principles, from which a free people ought never to depart. I concur with him in the propriety of the observance of such maxims. They are necessary in any government, but more essential to a democracy than to any other. What are the favorite maxims of democracy? A strict observance of justice and public faith, and a steady adherence to virtue. These, sir, are the principles of a good government. No mischief, no misfortune, ought to deter us from a strict observance of justice and public faith. Would to Heaven that these principles had been observed under the present government! Had this been the case, the friends of liberty would not be so willing now to part with it. Can we boast that our government is founded on these maxims? Can we pretend to the enjoyment of political freedom or security, when we are told that a man has been, by an act of Assembly, struck out of existence without a trial by jury, without examination, without being confronted with his accusers and witnesses, without the benefits of the law of the land? Where is our safety, when we are told that this act was justifiable, because the person was not a Socrates? What has become of the worthy member's maxims? Is this one of them? Shall it be a maxim that a man shall be deprived of his life without the benefit of law? Shall such a deprivation of life be justified by answering, that the man's life was not taken secundum artem, because he was a bad man? Shall it be a maxim that government ought not to be empowered to protect virtue?

He then stated the necessity and probability of obtaining amendments. This we ought to postpone until we come to that clause, and make up our minds whether there be anything unsafe in this system. He conceived it impos-



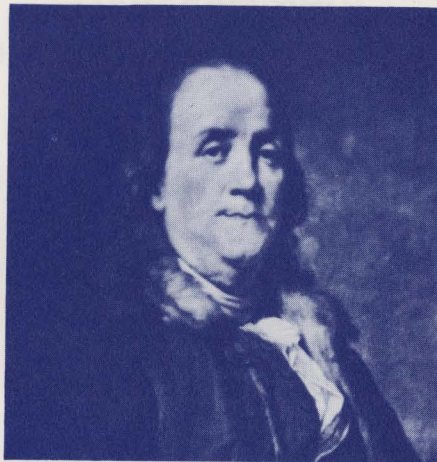
sible to obtain amendments after adopting it. If he was right, does not his own argument prove that in his own conception, previous amendments cannot be had? For, sir, if subsequent amendments cannot be obtained, shall we get amendments before we ratify? The reasons against the latter do not apply against the former. There are in this State, and in every State in the Union, many who are decided enemies of the Union. Reflect on the probable conduct of such men. What will they do? They will bring amendments which are local in their nature, and which they know will not be accepted. What security have we that other States will not do the same? We are told that many in the States were violently opposed to it. They are more mindful of local interests. They will never propose such amendments as they think would be obtained. Disunion will be their object. This will be attained by the proposal of unreasonable amendments. This, sir, though a strong cause, is not the only one that will militate against previous amendments. Look at the comparative temper of this country now, and when the late Federal Convention met. We had no idea then of any particular system. The formation of the most perfect plan was

our object and wish. It was imagined that the States would accede to, and be pleased with, the proposition that would be made them. Consider the violence of opinions, the prejudices and animosities which have been since imbibed. Will not these operate greatly against mutual concessions, or a friendly concurrence? He says, we wish to have a strong, energetic, powerful government. We contend for a well-regulated democracy. He insinuates that the power of the government has been enlarged by the convention, and that we may apprehend it will be enlarged by others. The convention did not, in fact, assume any power.

They have proposed to our consideration, a scheme of government which they thought advisable. We are not bound to adopt it, if we disapprove of it. Had not every individual in this community a right to tender that scheme which he thought most conducive to the welfare of his country? Have not several gentlemen already demonstrated that the convention did not exceed their powers? But the Congress have the power of making bad laws, it seems. The Senate, with the President, he informs us, may make a treaty which shall be disadvantageous to us; and that, if they be not good men, it will not be a good constitution. I shall ask the worthy member only, if the people at large, and they alone, ought to make laws and treaties. Has any man this in contemplation? You cannot exercise the powers of government personally yourselves. You must trust to agents. If so, will you dispute giving them the power of acting for you, from an existing possibility that they may abuse it? As long as it is impossible for you to transact your business in person, if you repose no confidence in delegates, because there is a possibility of their abusing it, you can have no government; for the power of doing good is inseparable from that of doing some evil.

APPROVAL OF THE FEDERAL CONSTITUTION

BENJAMIN FRANKLIN
Patriot



I confess that I do not entirely approve of this Constitution at present; but, sir, I am not sure I shall never approve of it, for, having lived long, I have experienced many instances of being obliged, by better information or fuller consideration, to change opinions even on important subjects, which I once thought right, but found to be otherwise. It is therefore that, the older I grow, the more apt I am to doubt my own judgment of others. Most men, indeed, think themselves in possession of all truth, and that wherever others differ from them, it is so far error. But, though many private persons think almost as highly of their own infallibility as of that of their sect, few express it so naturally as a certain French lady, who, in a little dispute with her sister, said: "But I meet with nobody but myself that is always in the right."

In these sentiments, sir, I agree to this Constitution with all its faults — if they are such — because I think a general government necessary for us, and there is no form of government but what may be a blessing to the people if well administered; and I believe, further, that this is likely to be well administered for a course of years, and can only end in despotism, as other forms have done before it, when the people shall become so corrupted as to need despotic government, being incapable of any other. I doubt, too, whether any other convention we can obtain may be able to make a better Constitution; for, when you assemble a number of men, to have the advantage of their joint wisdom, you inevitably assemble with those men all their prejudices, their passions, their errors of opinion, their local interests, and their selfish views. From such an assembly can a perfect production be expected?

It therefore astonishes me, sir, to find this system approaching so near to perfection as it does; and I think it will astonish our enemies, who are waiting with confidence to hear that our counsels are confounded like those of the builders of Babel, and that our States are on the point of separation, only to meet hereafter for the purpose

them, we might prevent its being generally received, and thereby lose all the salutary effects and great advantages resulting naturally in our favor among foreign nations, as well as among ourselves, from our real or apparent unanimity. Much of the strength and efficiency of any government, in procuring and securing happiness to the people, depends on opinion, on the general opinion of the goodness of that government, as well as of the wisdom and integrity of its governors. I hope, therefore, for our own sakes, as a part of the people, and for the sake of our posterity, that we shall act heartily and unanimously in recommending this Constitution wherever our influence may extend, and turn our future thoughts and endeavors to the means of having it well administered.

On the whole, sir, I cannot help expressing a wish that every member of the convention who may still have objections to it, would, with me, on this occasion, doubt a little of his own infallibility, and, to make manifest our unanimity, put his name to this instrument.

of cutting one another's throats. Thus I consent, sir, to this Constitution, because I expect no better, and because I am not sure that it is not the best. The opinions I have had of its errors I sacrifice to the public good. I have never whispered a syllable of them abroad. Within these walls they were born, and here they shall die. If every one of us, in returning to our constituents, were to report the objections he has had to it, and endeavor to gain partisans in support of

POLITICAL AND ECONOMIC RIGHTS WHICH PROTECT THE DIGNITY AND FREEDOM OF THE INDIVIDUAL

- * RIGHT TO WORSHIP GOD IN ONE'S OWN WAY.
- * RIGHT TO FREE SPEECH AND PRESS.
- * RIGHT TO PEACEABLY ASSEMBLE
- * RIGHT TO PETITION FOR REDRESS OF GRIEVANCES.
- * RIGHT TO PRIVACY IN OUR HOMES.
- * RIGHT OF HABEAS CORPUS —NO EXCESSIVE BAIL.
- * RIGHT TO TRIAL BY JURY—INNOCENT UNTIL PROVED GUILTY.
- * RIGHT TO MOVE ABOUT FREELY AT HOME AND ABROAD.
- * RIGHT TO OWN PRIVATE PROPERTY.
- * RIGHT TO FREE ELECTIONS AND PERSONAL SECRET BALLOT.

- * RIGHT TO WORK IN CALLINGS AND LOCALITIES OF OUR CHOICE
- * RIGHT TO BARGAIN WITH OUR EMPLOYERS AND EMPLOYEES.
- * RIGHT TO GO INTO BUSINESS, COMPETE, MAKE A PROFIT.
- * RIGHT TO BARGAIN FOR GOODS AND SERVICES IN A FREE MARKET.
- * RIGHT TO CONTRACT ABOUT OUR AFFAIRS.
- * RIGHT TO THE SERVICE OF GOVERNMENT AS A PROTECTOR AND REFEREE.
- * RIGHT TO FREEDOM FROM ARBITRARY GOVERNMENT REGULATION AND CONTROL.



VACATION IN PARADISE

Now's the time of year when you're probably beginning to think about your annual vacation and where you'd most enjoy spending it.

Before you settle for some place where high prices and blaring jukeboxes are hot on the heels of flocks of tourists, give a thought to one of the world's "undiscovered" attractions: the houseboats and flowerboats are spruced up, and everyone is ready to welcome visitors from the four corners of the world in India's "paradise on earth"—Kashmir!—a two hour flight from Delhi, India's capital.

For less than \$100 per week, you can summer in this idyllic spot which exotically blends the charms of Venice and Switzerland with those of the East.

Houseboats moored on Kashmir's Dal, Jhelum and Nagin Lakes, can be rented for as little as \$50 a week. At first glance, they look a little like Mississippi wheelers, but there the similarity ends. Some of them have not one, but two living rooms, two to three bedrooms with connecting baths, and flowered terraces for sunbathing and entertaining. Your rental includes the houseboat, its furnishings, and the services of a staff of four, one of them a cook in his own kitchenboat!

There's nothing to do except enjoy yourself in Kashmir. Just settle back and let the scenery and your surroundings weave their spell, as they have since the days of the Great Moguls in the 16th century.

When you leave your houseboat on the lake, and board a *shikara* (little boat), you can go to the mainland to marvel at the famous "Garden of Love," whose beautiful marble pavilions, terraces and fountains have survived over four centuries. Or stop to stroll through the avenues of cascades of the "Garden of Pleasure," or to see the "Garden of the Morning Breeze," which is the oldest of those in Kashmir.

If you want a change, you can take excursions into this Himalayan area, which is dotted with lakes — some of them afloat with lotus blossoms, others still and crystal clear.

On Gulmarg, a nearby mountain, you can play golf on a course which is 8,500 feet high. Or you might want to go on a *shikar* (hunt) and try your hand at shooting snow leopard, tiger, Kashmir stag and a host of other animals.

The city of Srinagar near Dal Lake, where many of the houseboats are moored, is a must on the itinerary of travelers to this area. One of the

most unique sights here are the houses with their gay flowering rooftops.

The bazaar of Srinagar is somewhat akin to a Hollywood epic showing scenes of the East. Men in fur caps and women in tent-like robes bargain endlessly under the awnings which cover the stalls. Horse-drawn *tongas* (carriages) clip by, and old men in turbans survey the scene as they draw thoughtfully on their *hookahs* (pipes). The stalls in the bazaar display a magnificent assortment of wares — carved woodwork, hand-painted papier mache items, shawls, carpets and semi-precious stones.

Kashmir has other beauties, too. The air is soft and soothing, the valleys are rich, the pastures green. A doctor might bottle this atmospheric and scenic "tonic" for the world weary, if it only could be bottled. But the charms of Kashmir can't be packaged. It may be easier and less expensive than you've realized, though, to go there and enjoy them for yourself!



MORSE & CORNELL

Morse agreed to hold the failure secret but still insisted that they were ruined for the failure of signals to pass must in time be known.

The next day Ezra ordered more oxen chained to pull the plow and told the drivers to keep the oxen going as rapidly as possible so a new record might be made. Ezra himself guided the plow and according to the story he told his relatives he watched until he saw a big rock he thought was firmly entrenched in the earth and then, instead of guiding the plow around the rock, he headed the plow into it and the plow broke.

Then word was passed to the public that laying the conductor had been halted for the plow had broken. No mention was made of the failure of signals to pass through the conductor already in the ground. Ezra at once went to consult the famous Joseph Henry who had made important discoveries in the electrical field and soon was to become director of the newly organized Smithsonian Institution. Henry suggested that the telegraph conductor be supported on wooden poles, using the glass device which had been developed to support lightning rods to protect buildings.

This was done and on May 24, 1844, the first official message was sent over the completed line with quotation from the Bible regarding the wonders God had wrought.

Some people considered the telegraph a fraud and would not believe the messages which were reported had actually been transmitted electrically. Some members of Congress who voted in favor of the grant of money to Morse were not elected to serve again at Washington. The further development of telegraph service in America was by private financing.

After the completion of the Washington-Baltimore line Ezra Cornell devoted his whole time to establish telegraphic communication between other pairs of leading cities of the country. He saw the advantage of a communication system covering the entire country and was instrumental in forming the Western Union Telegraph Company of which he became president. His activities in bringing this service into use brought him great wealth.

In 1858 Ezra settled on a large farm near Ithaca. On his visit to relatives in Plainfield about that time he told them that he had accumulated as much

wealth as he thought one man should have and was retiring and did not plan to gain more money. At that time he was about 50 years old. When his relatives asked what he was planning to do in retirement he said his problem was to find what was the best use of his fortune.

When the act to grant states public land for use in establishing colleges and universities was signed by Lincoln in 1862, Cornell used his influence to have New York pass a law which provided for that state to establish but one institution and to allow him to select and hold the public land available for New York. He contributed \$500,000 to help establish that institution at Ithaca, and the formal opening of the Cornell University was held in 1868.

On visits with relatives in Connecticut he told them of his extensive travels to examine public lands which still were open. His aim was to select land which he believed was of greatest future value. He chose some which had mineral resources, some with valuable timber and some that were good for

farming.

History records that after a time a protest was made in the New York Legislature that Cornell was using his influence in connection with land grants for his own personal profit and that Ezra raised no objections to the proposed investigation. He said he welcomed such an investigation for it would show he had acted to bring the greatest possible amount of money for the support of the university at Ithaca. By Ezra's selection of land and holdings it until values had increased, something like a million dollars came to the new university.

On one of his last visits in Plainfield his relatives protested that the name of the university at Ithaca was called "Cor-Nell" with accent on the last syllable. They said "Our name is 'Corn-ell' with accent on the first syllable. You should not allow that."

Ezra replied that his aim was to establish an institution where any person could study any subject, and that he was glad to have them pronounce its name in the way they liked best.

FIRESIDE CHAT

from whence technical and complex operations are possible down to 6,000 feet, are targeted for that date, as well as a world-wide buoy system for monitoring ocean weather conditions...

Ocean mining is having its problems in that, at present yields, the cost of obtaining the minerals from the ocean has been prohibitively high... We have looked into the possibilities of mining phosphorus and manganese and find it would be a long time before the projected costs can compete with land sources... It is hoped that marine mining technology will improve, bringing the cost down to where some of the minerals can be extracted competitively...

Most of the commercial experience in underocean technology has been obtained drilling for oil and gas off the shores of California, the Gulf Coast, Mexico, Alaska and the Persian Gulf. Some 6 percent of the total oil and gas produced in the United States came from off-shore locations. There are those who predict that within a few decades more oil will be produced off-shore than on-shore... (For off-shore wells) it will be nec-

essary to develop new platforms with better mooring and capable of being located at precise locations. It is still a very difficult task to move men and equipment to and from these rigs. Our company has been active in supporting the off-shore drilling industry and is capable of producing well-ahead equipment operating at depths as low as 600 feet. Most of today's off-shore drilling is done at much shallower depths, but... by 1970 we expect to be recovering oil at thousand foot depths beyond the edge of the continental shelf.

PHILADELPHIA

ALUMNI LUNCHEONS

on the first Monday
of each month,
OCTOBER to MAY
at the ENGINEER'S CLUB
Everyone Welcome !!

CHAPTER NEWS

GAMMA, Ohio State University—During the Fall Quarter, Gamma Chapter pledged eleven new members at Industrial Nucleonics. Here the Chapter also toured the home office research and manufacturing facilities as well as viewed a series of slides showing on line applications of Accuray products. Pledge duties included preparing the annual Newsletter of the Electrical Engineering Department. After completing this task, the pledges were initiated at a banquet held in The Coventry Inn in Worthington on December 1.

Other HKN fall projects include departmental coffee hours to promote student faculty communications and ground work on obtaining active participation of graduate students in HKN at Ohio State.

Early in Winter Quarter, Gamma Chapter sponsored a tour for all interested electrical engineering students to North American Rockwell in Columbus. Here flight simulation facilities were viewed.

DELTA, Illinois Technology — During the fall semester the Delta Chapter initiated 16 members into the fraternity. The banquet was held on Dec. 16, 1968 at George Diamond's Steak House. The guest speaker at the banquet was the National Vice President of HKN Mr. Jack Farley. His talk was about the organizations projects to acquaint the high school students and college freshmen with the ever widening field and challenges of electrical engineering.

IOTA, University of Missouri — The Iota Chapter of Eta Kappa Nu at the University of Missouri conducted tours over the engineering campus at Columbia on University Day last fall. Some 4300 high school students attended the event, which is held annually to give them an opportunity to tour the campus of the University of Missouri at Columbia.

The initiation ceremony for new electees was very impressive this semester, being completely conducted by members of the faculty. After the initiation of the largest pledge class in the history of Iota Chapter, it held a joint banquet with the Missouri Alpha Chapter of Tau Beta Pi.

UPSILON, University of Southern California — Began its activities for fall semester, 1967 on November 3 with the "Smoker". We introduced our new candidates for membership to the undergraduate and graduate members, and to representatives of Los Angeles Alumni Chapter. Student-produced films were shown and refreshments served to round out a very interesting and enjoyable evening.

We conducted our pledge-week from Nov. 13-17. The activities included constructing an HKN wooden key, displaying a coat-badger of a wheatstone bridge with a workable light, and meeting electrical engineering faculty members. The week was concluded

on November 17 with an evening of tests and interviews, and the informal initiation.

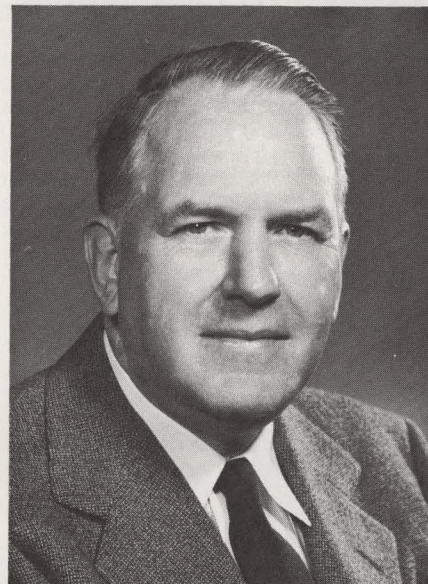
We held our formal initiation January 6, 1968. Nine graduate and seven undergraduate-student members were initiated at this ceremony. Our banquet followed the initiation and was held at the Chalon-Mart Restaurant in Los Angeles. For the second time, the banquet was held jointly with Tau Beta Pi Association. Our guest speaker was John A. Russell, Professor of Astronomy at U.S.C., who spoke on "Man's Place In Space."

Planned for "Engineer's Week" is a program on February 22, aimed at informing undergraduate Electrical Engineering students about graduate school. This will be sponsored by Upsilon Chapter and the student branch of I.E.E.E. Both groups will be working together to promote active student participation in engineering student-government and activities.

PI, Oregon State University — This last term, Pi Chapter at Oregon State University once again had its fall initiates compile and distribute the departmental student-faculty directory, which we sponsor. Following the initiation, a banquet was held. The speaker, a member of the history department who had just returned from a year of teaching at colleges in Saigon, discussed his impressions and answered the many questions his comments caused. Many remained afterwards discussing with him things he had said. During the present term, we have conducted tours during Beaver Open House, a day when high school students come down to look over the school.

BETA ALPHA, Drexel Institute — On December 2, 1967, the Beta Alpha Chapter of Drexel Institute of Technology initiated twenty new members. On January 4, 1968, (Continued on Next Page)

WHO'S WHO IN ETA KAPPA NU



Chairman of the Board of the American Electric Power Service Corp.

In addition, many of Dr. Kurtz's friends and former students have worked together to establish in the Iowa University Foundation an annual award to the outstanding senior E.E. Student. The award is known as the *Edwin B. Kurtz Merit Award* and is administered by The Beta Iota Chapter of HKN.

Professor Kurtz was born on December 10, 1894, in Cedarburg, Wisconsin, where he received his primary and secondary education. He attended the University of Wisconsin and received the Bachelor of Science in Electrical Engineering degree in 1917. Two years later he received the Master of Science in Electrical Engineering degree from Union College while employed by the General Electric Company in Schenectady, New York. The Doctor of Philosophy degree was awarded to him by Iowa State University in 1932.

Dr. Edwin B. Kurtz, former President of Eta Kappa Nu, and retired Professor and Head of Electrical Engineering at State University of Iowa, recently received two important honors. The Public Utilities of Iowa set up a fund of \$12,000 in the Iowa University Foundation to make possible an annual Engineering College lecture on some aspect of Electric Power. It is called the *Edwin B. Kurtz Lectureship*. The first lecture was given by Dr. Philip Sporn, Eminent Member of Eta Kappa Nu and

Dr. Kurtz is the author of seven books and forty-six papers. In addition to being a National President of Eta Kappa Nu, he has served the Association conceiving and assisting in the promotion of many different projects, such as the HKN Movie. Ed is definitely one of our oldest and best friends.

CHAPTER NEWS (continued)

BA sponsored the second annual student faculty "tea" held at a local nightclub. The current activities of the chapter include maintaining a list of graduate school catalogues, tutoring undergraduate students, sponsoring an HKN versus EE faculty bridge tournament (HKN and faculty currently tied at one victory apiece), playing basketball and bowling with other fraternities, and maintaining a student lounge in the EE building.

BETA DELTA, University of Pittsburgh

— This fall the Beta-Delta Chapter inducted fourteen new members into our organization. Their pledge duties included bringing our files up to date. We have engaged in a teacher evaluation program. This gives all the students in the Electrical Engineering department a chance to voice their praise or disapproval of the instructors whom they have encountered over the past school year.

We are presently trying to start a tutoring program in which the brothers will help the E.E. students who are having trouble with their course work. We are also beginning preparations for Engineer's Week which comes in the middle of March. At this time the University gives the engineers an opportunity to show what they can do. There are games, dances, and exhibits. Each department competes in ability, enthusiasm, and attendance. Eta Kappa Nu traditionally spearheads the effort of the Electrical Engineering department. Our pledges are usually given constructive tasks in this area.

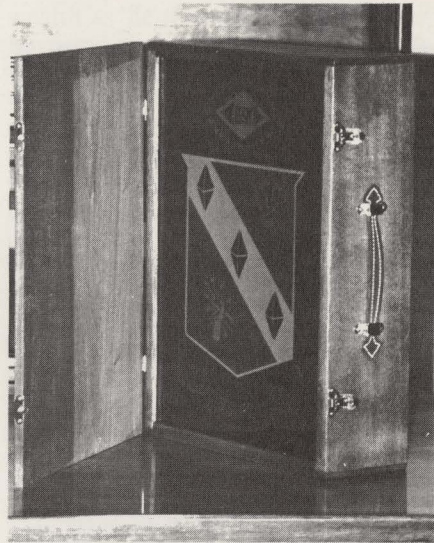
These three, teacher evaluation, tutoring, and Engineer's Week, are the main activities in which the brothers of Beta-Delta chapter are involved.

BETA THETA, Massachusetts Institute of Technology — This term the chapter inducted 57 members into Eta Kappa Nu. With such a large number of pledges we were able to conduct a variety of useful pledge projects such as:

1. Initiate a system of providing information about companies which recruit electrical engineering students for permanent and summer work.
2. Update and expand our publication of electrical engineering Graduate Schools.
3. Prepare a study of areas of specialization in electrical engineering and relate this to specific subjects of instruction available at M.I.T.

On January 12, an impressive banquet and initiation was held. Speaker for the banquet was Professor Jay W. Forrester of M.I.T.'s Sloan School of Management. He illustrated how the concepts of control theory are being applied to the study of the dynamics of businesses.

BETA IOTA, University of Iowa — The fall semester informal initiation was held on the night of November 17 and continued through the next morning. We then conducted our formal initiation in the afternoon of December 1. The formal initiation was followed by the honors banquet that evening. Five new members were elected.



Beta Theta's Light Box

We administered the E. B. Kurtz award which was started last year. We are now revising and improving the certificate and method of selecting the winner. The members of Eta Kappa Nu are to nominate candidates with the faculty making the final selection.

GAMMA THETA, University of Missouri

— Has had another active semester. Again this semester we have been able to award a \$200 scholarship with money raised by the selling of EE laboratory insurance. Also an extensive display of catalogs providing information from schools offering graduate work in EE has been constructed for use by EE students. A photograph display of EE instructors has been made and now sets in the front lobby of the EE building.

Gamma Theta was again happy to provide guides through the EE building on Parent's and Engineer's Days.

DELTA ALPHA, Wayne State University — Held initiation ceremonies for 11 new members. This brings the number of actives up to 34. Of particular interest was the pledge project. It was a joint effort by all

the pledges to make 5 lecturns for the initiation ceremonies. The general estimation was that these lecturns would add more meaning and dignity in the execution of the ceremony.

Then too, the Chapter has been interested in the establishment of a graduate school information library. This library would contain information pertaining to the various graduate schools around the country thus creating an avenue by which a student could obtain all the facts he desires to know. In affiliation with this assignment, the chapter is also endeavoring to publish a pamphlet in regard to Wayne's graduate school which may then be distributed to various schools in the nation.

DELTA BETA, Lamar Tech — This fall our efforts were concentrated into a joint effort with Chi Epsilon, the Civil Engineering honor society. Several afternoons a week were devoted to teaching a slide rule course. The project was considered very successful, primarily because of improved attendance over last year. Since our school is small, both honor groups found the joint effort beneficial.

We hope that a regional meeting similar to the one at Southern Methodist University last spring will materialize again. The meeting revealed activities of state-wide chapters and provided a number of ideas for improving chapter operation.

DELTA KAPPA, University of Maine

The activities of the chapter in the fall semester of 1967 included maintaining the Department Reading Room, tutoring of Sophomore Electrical Engineering students. Members of Delta Kappa assisted in a tour of the Electrical Engineering building for about 200 Boy Scouts. Plans were made for speaking to local high schools about electrical engineering as a career.

DELTA TAU, University of Southwest Louisiana

— During the fall semester of 1967, the Delta Tau Chapter of Eta Kappa Nu showed two films obtained from N. A. S. A. These films were ordered from their offices in Houston, Texas to be shown to the Electrical Engineering Department at our University. One film, "The Four Days

of Gemini 7", was a general information film, while the other, "Fifty Moon Landings A Day", showed the roll of the analog computer in simulating moon landings.

Our chapter has decided to purchase a file cabinet to consolidate our HKN records. We also co-sponsored, with IEEE, a Christmas dance for all engineering students and their dates.

Several other projects, including a field trip and the possibility of publishing a brochure for the EE Department, were considered. There has been no definite action taken on these proposals.

DELTA SIGMA, University of Notre Dame

— Delta Sigma had an active first semester and a dynamic spring term was forecast. The early activities included a graduate school seminar conducted for upperclassmen contemplating further studies. Three professors, each from a different college in the University, were present to give a diverse and complete view. A tutorial program was set up for the sophomore EE's to assist them in their endeavors. New members were traditionally selected and a banquet was held to welcome them.

The spring term was launched with an open house for all freshmen and was an overwhelming success, with more than a hundred "frosh" attending. A similar project is again planned in March with demonstrations in each of the laboratories as well as acceptance of new members. When warm weather arrives, the year activities will be concluded with a banquet and spring outing.

DELTA OMEGA, University of Hawaii

— The Delta Omega Chapter started its activities for the fall semester by holding a pledge luncheon at the East-West Center, University of Hawaii, on November 7, 1968. Prospective members were introduced and told about Eta Kappa Nu. Pledges this semester were required to make pledge bridges, visit schools to demonstrate electrical principles, organize the engineering study hall, and construct a permanent HKN bulletin board. Initiates will be inducted into the Delta Omega Chapter on February 3, 1968.

The Delta Omega Chapter continued to serve the Electrical Engineering Department by grading homework papers for several introductory courses. The Outstanding Sophomore award recognizing superior work in engineering was presented this year to Daniel S. Takai.

EPSILON ZETA, Lowell Technological Institute

— The first semester pledge period which started late ended on January 5, 1968. The senior pledges gave talks on subjects pertaining to electrical engineering while juniors had to prepare demonstrations which will be shown to visiting high school students later on this year. Other activities include help classes which are offered to all Junior and Sophomore EE students on a regular basis. Tours are also given to prospective LTI students a number of times throughout the year.

EPSILON IOTA, San Jose State College

— The fall semester of 1967 has witnessed an increased student interest in Epsilon Iota, as indicated by accepting to membership the largest group of pledges in the chapters history. On January 5, 1968 the initiation and banquet was held for seventeen new student and two graduate members. With such enthusiasm and interest Epsilon Iota should be able to accomplish much in the coming semesters.

The newly acquired "all engineering" study room has proven quite popular with the students and has found extensive use this semester. The pledges increased the esthetic value of the study room by hanging colorful pictures on the previously barren walls. The study room has also acquired several professional drafting tables, a soda pop machine, a subscription to the Wall Street Journal, and an enormous number of technical journals.

EPSILON KAPPA, University of Miami

— November 6th, 13th, and 18th were days full of activities for the members of the University of Miami Chapter of Eta Kappa Nu. On November 6th, the members had the privilege and pleasure of tapping future new members. On November 13th, the informal initiation was held in the Engineering Building. On November 18th, formal initiation was held in Room 180 of the L.C. Building. Following initiation a banquet was held and Leslie Coggins, President of the Epsilon Kappa Chapter of H.K.N., introduced all the new members. Professor Jackson Sells, Faculty Advisor to H.K.N., introduced the main speaker of the evening, Dr. Roger E. Nolte, Chairman of the Electrical Engineering Department, who clearly pointed out to his audience the importance and economic reward of pursuing graduate work.

EPSILON NU, California State College

— During the fall quarter, the Epsilon Nu Chapter at California State College at Los

Angeles initiated 12 new members into its chapter. The formal initiation of the new members was held on December 2, under the direction of Chapter President Richard Shull. A joint initiation-banquet with the membership of Tau Beta Pi was held following the initiation ceremonies.

As a service project for the school, the membership of the chapter decided to undertake a tutoring program for undergraduate engineering students. Due to the complete support by the members for this program, it was also decided to make this tutoring program a permanent service for the school.

EPSILON OMICRON, University of Delaware

— Inducted 17 undergraduates, four graduate students, and one faculty member this fall. Among the undergraduates was the first woman to be inducted by our chapter.

Undergraduate candidates were required to construct and wear a pledge pin bearing the Association's colors and containing at least one working electrical part. Several interesting and novel designs resulted.

The new members were honored at a banquet following the ceremony.

EPSILON RHO, Tennessee Technological University

— Recently concluded a busy fall quarter. The primary activities of the chapter consisted of the formal and informal initiation of several new members. One of the activities required of the new pledges for the informal initiation was the presentation of a program to the Freshman Engineering Society.

Immediately following the formal initiation the members of the chapter attended a banquet with Dr. Ballal of the Tennessee Technological Biology Department to the Freshman Engineering Society.

Other activities of the chapter included the formalization of the bylaws for the chapter.



Delta Alpha's Officers and Lecturns

NEW MEMBERS AT EPSILON NU

California State
Los Angeles





Miggs

The Great Sahara Mousehunt

Catherine Collins
and
Miggs Pomeroy

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On 13th March 1961, a group of fourteen people in six cars started from the North African coastal city of Benghazi for a trip across the Sahara Desert to one of the most inaccessible mountain ranges in the world—the Tibesti. The trip was made mostly for fun and adventure.

Liv Pomeroy, with the U. S. Information Service in Benghazi, was the leader of the expedition; he took his wife Miggs. Alan and Catherine Collins, his

brother-in-law and sister, came from New York, and Randolph Churchill and his son Winston from England. Dr. Henry Setzer was collecting mammals for the National Museum in Washington. The British Army stationed in Benghazi sent six soldiers under the command of Lieutenant Francis Gibb of the Royal Scots Regiment.

The fascinating account of this desert escapade is being published serially in the BRIDGE

25TH MARCH

THE MEN HAVE rigged tarpaulins, one by No. 4 so that Taffy and John can work without being fried alive and one

in front of No. 5 for us to loaf and lunch. Francis has taken Winston and Hank and two others to make a reconnaissance and see if they can find the marked track for Uweinat. The big group is for digging the car out should they bog. They find the track about ten kilometres ahead. A marked track consists of an iron post on the top of a dune, outcropping or any available high spot. Alternately cairns of rock are used; these are so obviously heaped up by man that they cannot be mistaken. The markers are approximately five kilometres apart and each should be visible from the one before or after it. However, the iron posts cannot be relied upon as they are sometimes blown down by the wind, and sometimes stolen for tent poles by Bedouin.

At camp Liv spends most of the day under his car repairing the speedometer; he is very sweaty and hot-looking when seen at all. Catherine and I have made Bikini tops from the bright orange distress-signal flags. We want to roll back into Benghazi with impressive tans. When the reconnaissance party has returned we all crowd under the tarp and eat bread-and-cheese, peanut butter (a discovery for the British who pick at it suspiciously but declare in favour), sardines packed in oil, which we decide has once seen the inside of a petrol-drum, and tinned fruit. Frank regales us with stories about officers, none of whom does he seem mad about. 'Noo,' he says, 'sum of them air verra wet, excusin' me, Misterr Gibb sorr.' There is no enthusiastic dissent from the other men. Liv tells them that all armies are alike and they are made quite happy hearing how hard an American soldier's life can be. Winston spends the afternoon napping with a book from his 'required reading' shading his face to keep the light out. Charlie is sun-bathing behind one of the cars. He is

very fair and will probably burn and thus can be his own first patient.

Unlike the wastes of Southern California, Arizona and New Mexico, this is no living desert. In some places—and this is one of them—it is completely devoid of life, and man or beast may die, and even the bacteria are not there to decay the flesh. Eventually the wind-blown sand cleans the bones down to a glaring sculpture in white. Distorted by shimmering layers of hot desert air, a heap of bones may look from a distance like a tall white spire, or, stranger still, a white cloud floating above the horizon. Only a couple of years ago a Polish explorer left Kufra for Uweinat with a guide and a pack camel. No one knows just what happened, a fight of some sort certainly. For in the night the guide 'folded his tent, like the Arabs, and as silently stole away'. He says that they ran out of water and that the Pole would not take his advice, so rather than die with his employer he returned to his home. The Pole was found two weeks later completely mummified. No kindly Mother Nature here. We have talked of dying of thirst. It is not quickly done. Some say the victim goes mad first. Certainly every bit of body-liquid is consumed, and when that is gone pain takes over. Liv thinks the eyes must be the first to go and the worst. Catherine agrees; nothing can be worse than to be blind and in such agony that there is no room even for fear. She is rather an eye-minded person in any case, and carries four pairs of glasses about her. She has a pair of sun-glasses, an extra-dark pair called elephant-glasses, glasses for ordinary use and for reading. She is always mislaying them and they turn up in various cars according to whom she has been visiting. Liv instructs her when dying of thirst to use the last bit of moisture to dampen a cloth or whatever is available to cover the eyes. As to thirst itself, that marvellously informative document *Desert Survival* (by Alonzo Pond and Paul Nesbitt) says if there is nothing to drink avoid eating, as food will not sustain you but only cause great agony. You can go seven days without food and if you are not rescued by then you are finished in any case. By no means drink alcohol, blood or urine, all of which contain a heavy residue of protein. If you have a camel available you may cut into his stomach and drink the liquid which, while not Coca-Cola, is apparently better for you than whisky, blood or urine. It is also said that if you gut the animal and crawl into the damp shady cavity thus created you will further prolong your chance of survival. Catherine and I wonder if it's worth it. We also think that a rescue unit might insist on your walking home well in the rear of the party.

The sun is boiling hot but the shade pleasantly cool. Despite the lack of life in this desert an armour-plated insect with striped legs has appeared out of nowhere. I've offered it bits of bread but it seems to want my toes. I've moved twice but it only follows me around. I'm afraid it's going to want to come to Tibesti with us. Anyway, I don't understand what it lives on out here where there is nothing. Liv thinks that it may have come in the car from Kufra, which gives one to think of what else may be in the cars. Catherine says in that case we can't abandon it here but it's not to travel in No. 2. She says it looks gaunt and hungry. The boys say if I'd just stop fidgeting about they will find out if it is a carnivore. I have retreated to the car where I am pretending to read. Not that I am afraid, of course. I notice that the others have all found excuses to take themselves off, leaving our six-legged stowaway to scamper from one cot, sleeping-bag or blanket to another.

The scorpions, which Liv promised Catherine would only be around an oasis, keep themselves pretty invisible, though we have seen tracks where they have scurried crab-like between our beds at night. Catherine, since she first heard that both scorpions and snakes will curl up into the toe of a shoe, has been taking her shoes to bed with her. She says that if they were dainty little

shoes it would be all right, but she keeps stumbling over them in her sleep. Hank has not bothered to set the traps out here. In some parts of the desert, such as this, you never see a mouse-track; in others, seemingly as arid, there are thousands of them. The foxes and jackals, so common in the oases, hardly ever venture into the real desert, though Hank thinks that they occasionally do, during the season when birds migrate.

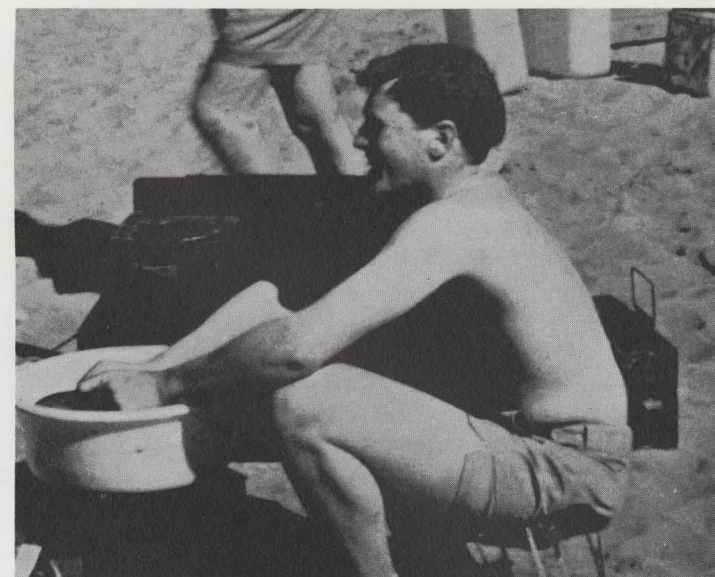
Birds more than anything else give one a realization of the immensity of the desert. It seems reasonable enough that a man or animal could die of thirst; but should not a bird, figuratively and literally, be above this? But even they are not, poor things. However swift their flight they have to go sometimes hundreds of miles to find water, and all of the time fighting air so thin they must use twice the energy and develop a thirst twice as fast as they normally would. Every bit of shade, outcropping of rock, the hulk of any abandoned truck, the north side of any jettisoned oil-drum harbours a few dried-up feathers or a pathetic little mound of white bones. For some reason wagtails and swallows suffer the most. Perhaps what I first thought was inquisitiveness was a desperate search for shade, for they often come into camp. On several occasions we have put water for them, but none of us have seen them take any. Hawks and falcons manage to survive in the bleakest spots, but then they have the migrating birds to feed on. We have seen many of them on the loneliest craggiest outcroppings. Where they have roosted, the ground below is littered with castings of feathers and bones.

Taffy and John are covered with black oil and glory. They have replaced the clutch-plate in No. 4 in ten hours. We will be able to start off at dawn. Liv has fixed his speedometer, and Francis has finished *The Black Baroness*. Not knowing how long we might be over the breakdown, he has been very military over 'water discipline' and we are all thirsty. Winston has been cheering us all on by saying that if the worst comes to the worst he will let us drink the hot-water-bottle water. We watch Venus set with pleasure tonight.

26TH MARCH

THERE IS WIND in the night, and while we intend to get off at dawn it is just too hard dragging ourselves out of our warm cocoons. Everything is covered with layers of dust. We can all hear the sand on our teeth; it is gritty like sugar, but doesn't dissolve. Hank is always good for a cheering word at breakfast but I'm afraid he gets no cheering responses. The Scots are dour and so are the English, the Welsh and the remaining Americans.

Obviously, almost no one goes to Uweinat. Trail-markers which have blown down have been left down. We do not have far to go but it is a bad sand day. Archie calls it 'fat lady' sand; we are not sure whether he is thinking of softness or roundness, for truly we are in a soft and dimpled land. At midday, we have found, the sand expands and its crust crumbles more easily. Personally, I do not think it needs an excuse to crumble. The track leads us through the dunes, but, track or no, we are not the trusting souls who left Benghazi two weeks ago. We line the cars up and wait while Francis and Archie and Frank set out at a brisk military pace to test out the sand. Where they can walk without breaking through we can risk following. At that, one car takes off at a time, and we watch with bated breath as first one and then another skims over the sand to the next dune, whence the walking party has already set out to test the forward stretch. I think the dunes look like meringues but Liv just says he doesn't like meringues, anyway. We drop in the afternoon to a gravel plain ridged by watercourses which have from time



Proof that Winston Churchill did wash dishes.

to time raged down the high black mountain that is Jebel Arkenu. There are two trees here with red skinned-alive-looking bark and thorny branches. One is split in half, both sides growing; the other is stunted, but a little Napoleon to be growing here at all. We all walk around and look in awe at these two trees. Later we hear that we have come through a 'forest'. We all taste the foully bitter melons which are on the ground near by. Hank says they are poison and I believe him. In the distance we can see Mount Uweinat, pink and craggy against the sky. Through binoculars one hill is quite transparent; you can see the other hills slope down behind or through it. This is my discovery, this glass mountain. Everyone studies it with awe. Hank photographs it. He is depressed not to have a scientific explanation and says it may be a ghost mountain.

We embark again but Archie spots a little animal at the foot of the Jebel. Three pair of binoculars are out in an instant. Hank, whose eyes are binocular anyway, shouts, 'Ammotragus lervia, Aoudad, Uaddan, where's my gun, Barbary sheep!' and ten men jump for guns with the speed of a bunch of guerillas who have sighted the national enemy. We race in towards the hills, Liv on the hood of one car taking careful aim, Hank shooting out of his window as he drives with his knees. The little animal stops munching whatever it was munching and stares for a moment, and then, as the cars race to a stop almost beside her, she turns and hops up the mountain. The men stumble out of cars. Liv's long legs catch on the sand tracks as he slides off the hood, and he lands on his knees and scrambles off at a crouch to take aim. A shower of bullets ping against rock. The little animal looks a very domestic sort of goat and for a moment Liv lowers his gun and says, 'My God, I think it's somebody's pet.' Someone asks 'Whose?' and the desert echoes with the thought.

A Barbary sheep is a most elusive creature, perhaps the most in this country. This one is small and reddish and it moves by levitation, hopping up one great boulder after another without visible effort while the men struggle in pursuit, with effort that is both visible and audible. They all grow smaller, and presently only the ping of bullets hitting stone is heard. Catherine is sitting tensely beside me saying her prayers, I think. Probably 'God help all nice little red goats and confound their enemies.'

'It's for science and dinner,' I cheer her, or try to.

Catherine mutters, 'I don't like science and we've still got plenty of hash,' and then she relents and hopes that nobody breaks

their neck, ankle or any other member. Whatever her prayers, it seems she has an inside track for the men come back hot, dusty and Barbary-sheepless.

Uweinat is a six-thousand-foot mountain range rising out of an alluvial plain, which latter we crossed with only two breakdowns. Both cars in question had an attack of carburettor trouble. The first to simmer to a stop, being the last car in convoy, signalled ahead frantically with horn, lights and mirror. No one, it seems, heard or saw. The stalled car sat, and its occupants simmered, until Francis, noticing something missing from his flock, turned back, unstuck the stuckee, sent him sailing on his way only to find his own carburettor clogged. Perhaps a desert djinn in this spot is unfavourable to carburettors.

From a distance Uweinat is air-brushed against the sky, all pink turrets and embattlements, Gothic cathedrals, and Norman walls. Climbing endless roads are processions of stately pink slaves, their dignity only interrupted when the mountain erupts into a leering gargoyle or five fat toes rampant into the sky. Below, the long-still avalanches of rock diminish in size as they come closer to the earth. We find Ain Zwaia nestled in a curve of the mountain's base and wonder at the dotting of brown-paper boxes. So completely are we fooled by the perfection of perspective of this place that we misjudge every distance and size. One kilometre into the base of the mountain turns into five, the paper boxes are houses and the avalanche of rocks are boulders as much as twenty and thirty feet high. The houses are Tebu huts, cocoon-shaped and made of fine palm-matting, but most of the people in this little spa live in caves formed by the toppled boulders. In front of one cave the flag of Libya announced the office and residence of Corporal Salam Abubaker, Chief of Police. If we are seeing everyone, and I don't see how it can be otherwise for they all want to shake hands, there are about twenty-six souls in this parish and seventy-five per cent of them are children. I think that we must be a welcome sight, for not only are visitors rare but the supply truck only comes here once in three months. Liv disappears with our passports and his golden tongue into the official cave, to exchange formalities and greetings. The rest of us go to drink and dunk our heads in running water and ogle at that great invention, the tap. The wheel is supposed to be man's greatest, but Catherine and I think the tap has first claim. The wheels within wheels we are not particularly concerned with. You turn the tap and water gushes forth. This is enough of a miracle. Of course, the men want to know where the water comes from and where the pump is and a lot of nonsense.

We make camp some five kilometres away at a village of boulders, well protected from the wind, we think. We are far enough from Ain Zwaia to fool the flies, or so, again, we think. The wind for the moment is quiet, but the flies are smarter than we by far. Some of them have hitched rides, some followed probably surf-boarding on our wake, some walked and some come by camel. We swat them and talk to them as we unpack. One car has gone back to Ain Zwaia to fill up our water jerry-cans. Hank has gone off to set traps. Frank has tea on the stove, and Catherine and I are looking into food boxes. Jack is hoisting his aerial and Winston is washing his face.

After dinner Hank, Liv, John and I take one car and one gun for a shoot. We want gazelle but we will be satisfied with mice. the moon is bright and we drive straight out from the mountain. It has not rained here in years. When it does rain torrents pour off the mountain and the plain is said to be green. The dry torrent-beds look almost like roads in the moonlight. One of them leads us to a camel pasture where some moisture must be trapped in a fold or fissure under the surface, for there is wiry grass here and bits of shrub that look like shredded wheat and which the camels eat without cream or sugar. There are also stunted thorn-trees.

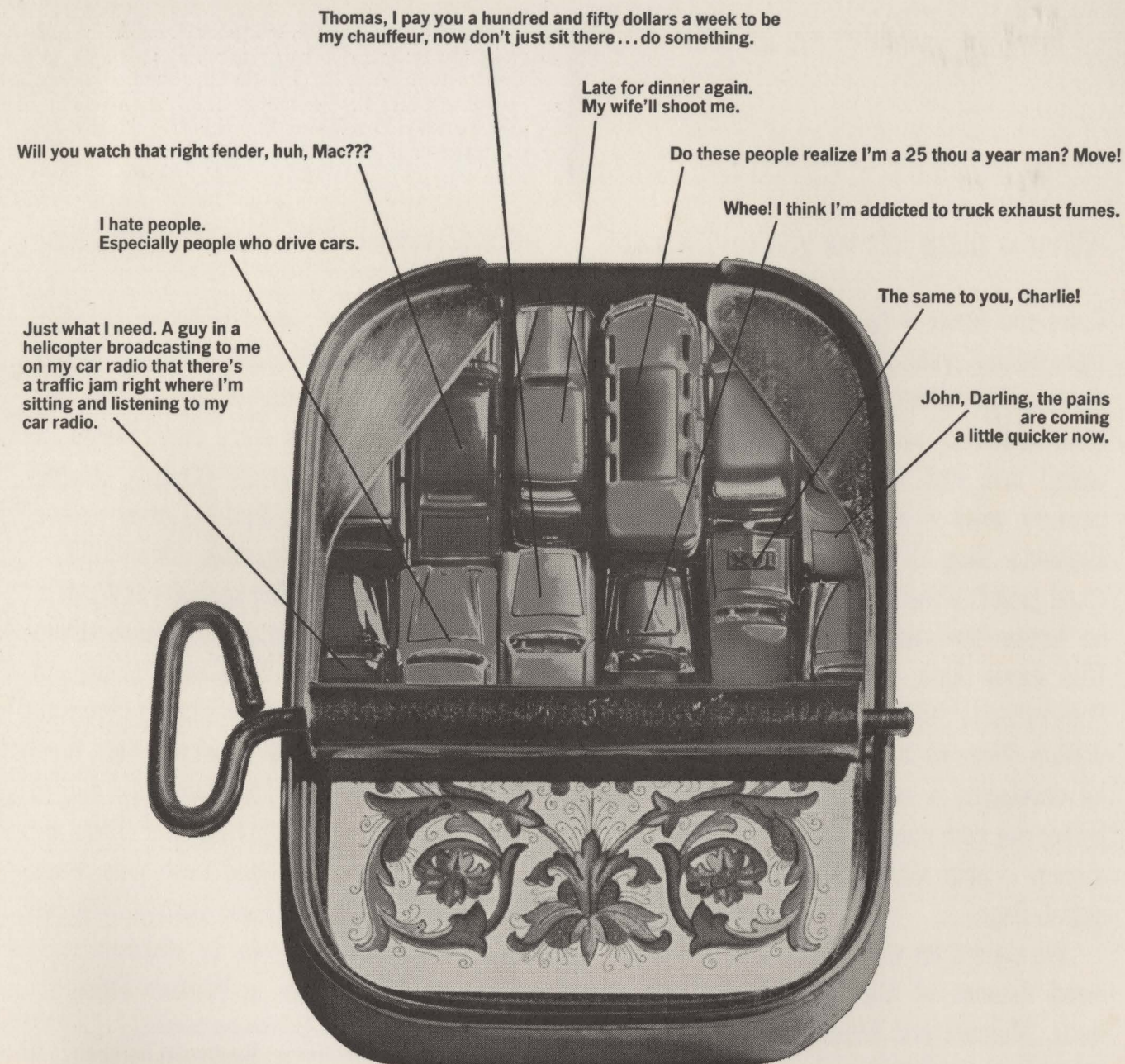
Discouraged at last, we turn back to the mountain, as impressive as ever except that now it is black instead of pink; the stars rain down on it, and at its base not a single light shines to welcome us home. Have we gone further south than we thought, are we coming into another mountain in the range altogether? Or have the others merely gone to bed and like good economical Scots turned out all of the lights? Hank is encouraging, perhaps afraid that I will worry. He says: 'We're right on the beam. We'll come in north of the camp and hunt fox along the base of the mountain. We're right on the beam.'

I refuse to be tranquillized. None of us has ever seen the silhouette of the mountain from this place before, so it seems to be axiomatic that we cannot know where the beam is, let alone be on it. 'We're lost,' I mutter crossly, and wonder just how cold the night will be in shorts and no sweater, how hard the sand with no cot or air mattress. The men are no better dressed than I, and I won't even be able to take female advantage and let them strip to keep me warm, without having three nude men on hand. Furthermore, being lost with a bag full of game would be one thing; I decide that there is an ignominy to being lost without having fired a shot. We come in at last to the base of the mountain and scoot along first to the north and then backtracking to the south. No camp, no Ain Zwaia, no beam. Hank continues to be cheerful, Liv optimistic and John silent. As for me, I bristle. But perhaps no one feels it but myself; I am like an inward-growing porcupine. I don't mind being lost but I want to be lost silently, so that I can enjoy the desert without undue cheer. And of course eventually we find Ain Zwaia, its little straw boxes attracting pools of starlight; its six adults, twenty children, four goats, two camels, its hordes of flies, all sleeping peacefully. From here we know the way home and we turn and skirt the mountain. Even now we almost miss camp. Among the boulders the cars are toys, dark and dwarfed. It is midnight when we come in and we are not particularly quiet, taking revenge by stumbling over our beds and rattling our wash-basins and tooth-mugs. They could have left one lead-kindly-light on.

Somewhere in the night a plane whines overhead. Probably running between Khartoum and Benghazi. It is strange to lie here and think of that bubble of comfort suspended so precariously over this hostile desert—well-turned hostesses with well-chilled martinis, children asleep under dimmed lights, crumpled mothers. As I search among the stars for that restless intruding red-and-green one, I do not envy them.

(Continued)

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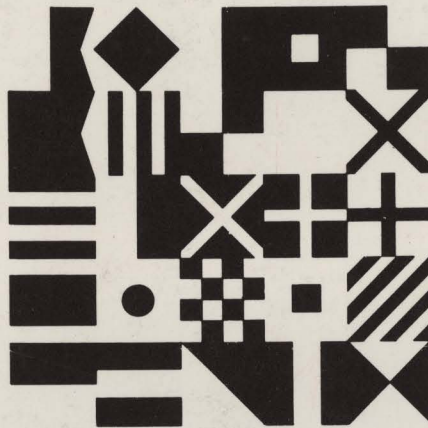
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