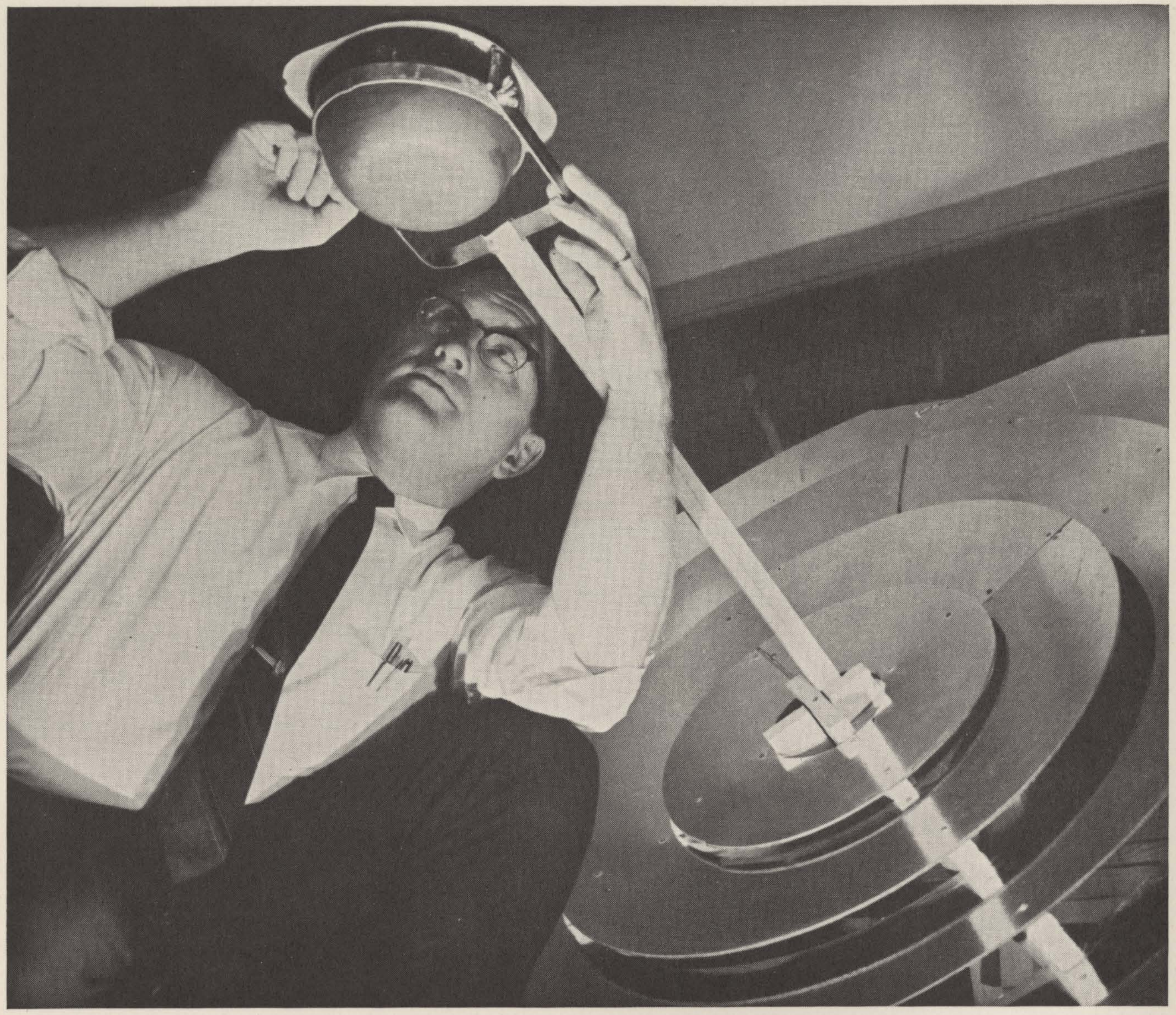
BRIDGE

Eta Kappa Nu

Maytime '68



BRIDGE HKN

OUR COVER

On a beautiful morning in May, any Eta Kappa Nu brother who needs this cover explained to him never should have been initiated in the first place.

ETA KAPPA NU

Electrical Engineering Honor Society

MAY, 1968, Vol. 64, No. 3

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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America's Most Distinctive Magazine

Real and Imaginary

Through the ages... TELESCOPES

Galileo Galifei, the Italian astronomer, used a two-inch-wide telescopic lens to first study the heavens in 1609. Using an improved telescope, on January 7, 1610, he saw four satellites of Jupiter, viewed craters on the moon, and made the observation that the Milky Way was an enormous cluster of stars. Drawing courtesy of Chrysler Corp.

The easiest way to do it is with mirrors — a new no-lens, wide-view-field telescope from a manned orbital lab above the earth's atmosphere used to fingerprint the stars.

A much earlier idea—a refracting telescope invented in 1608 by Hans Lippershey, a Dutch spectacle-maker—gave way a year later to the first complete astronomical telescope constructed by the Italian astronomer Galileo. As originally devised, the telescope used a monocular opera glass, composed of a convex and a concave lens fitted at opposite ends of a tube. Years after Galileo, telescopes still used a simple converging lens for an objective, but these telescopes produced very poor images and were far from satisfactory. In attempting to get a better picture, some of the early telescopes with objectives only four inches in diameter were made as long as 200 feet. It's a wonder that early astronomers saw as much as they did, considering the quality of their telescopes.

More than 200 years ago, men discovered that various kinds of glass refract the different colors of light unequally. The invention of achromaric lenses, effectively realized by John Dolland, brought forth the modern refracting telescope, considered unrivaled for exact astronomy. The comparatively long focal length of achromatic objectives produces a rather large scale image. but this automatically reduces the area of the sky that can be observed at any one time.

In 1672, Newton came on the scene, replaced the objective lens of a refracting telescope with a concave mirror, and the reflecting telescope was created. This type of telescope uses a parabolic mirror to gather as much light as possible from the region being observed. With very large reflectors, this region may not be larger than the area of sky covered by a pea held at arm's length.

We have come a long way from Newton's first reflecting telescope of one-inch aperture and six-inch focal length to the giant reflector on Mount Palomar, California, whose mirror is 200 inches wide. The Russians may go even farther. Noted in a recent article in the "New York Times" was an announcement of a Soviet telescope produced with a mirror 236 inches in diameter.

Significantly, the Space Division of Chrysler Corporation, in developing a no-lens, wide-view-field telescope, may

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CLARENCE LINDER

The Future Of Engineering IN THE U.S.

My subject is engineering — a very broad subject, but one which I have been thinking about and actively working with, in various capacities and incarnations, for a long time. I wish to preface my remarks by noting that I write as an individual, not as a representative of any organized group — neither engineering society, nor university, nor industry, nor any other.

An early father of the Christian church, Tertullian, coined in about the year 200 A.D. the word "ingenum," that is, invention or product of genius. A thousand years later the word "ingeniator," that is, engineer, came into use.

Early in the nineteenth century the British architect Thomas Tredgold defined engineering as "the art of directing the great sources of power in nature for the use and convenience of man." Nicholas Murray Butler, building upon Tredgold's definition, added, "engineering is the link, the bridge between man and nature; a bridge over which man passes to get into nature to control it, guide it, to understand it, and a bridge over which nature and its forces pass to get into man's field of interest and service." Butler went on to say that "the two outstanding careers in America are the two learned professions of medicine and engineering. Medicine concerns itself with the protection and care of the health of the race; and the other, Engineering, concerns itself with giving it new command over the forces of nature and bringing these forces more completely into human service."

These are vital definitions, because they establish two key ideas: first "invention"; and then "human service," or "use and convenience of man." Thus the nature of engineering — its basic characteristic — is that it deals in physical entities, and these entities must serve the needs and wants of people.

The history of our civilization is replete with the influence of engineering. Engineers have responded to the needs and wants of the many cultures contributing to the development of our civilization, and the increased complexity of man's existence is a reflection of the cumulative impact of engineering.

This cumulative impact is, of course, made up of a multitude of contributions, from the few and simple in ancient times to the many and complex today: engines to take the burden of work from the backs of men and animals and to transport men and goods; machinery to simplify and speed the processes by which the necessities of food, shelter and clothing are made available; products to make a more convenient and fuller life possible to man — anyone can easily list them out of his own daily experience.

Because these familiar results of engineering are so multi-faceted, it is natural to expect engineering work to be similarly multi-faceted. And indeed it is. But it is very important to remember that every contribution of engineering rests on three foundation stones common to all engineering:

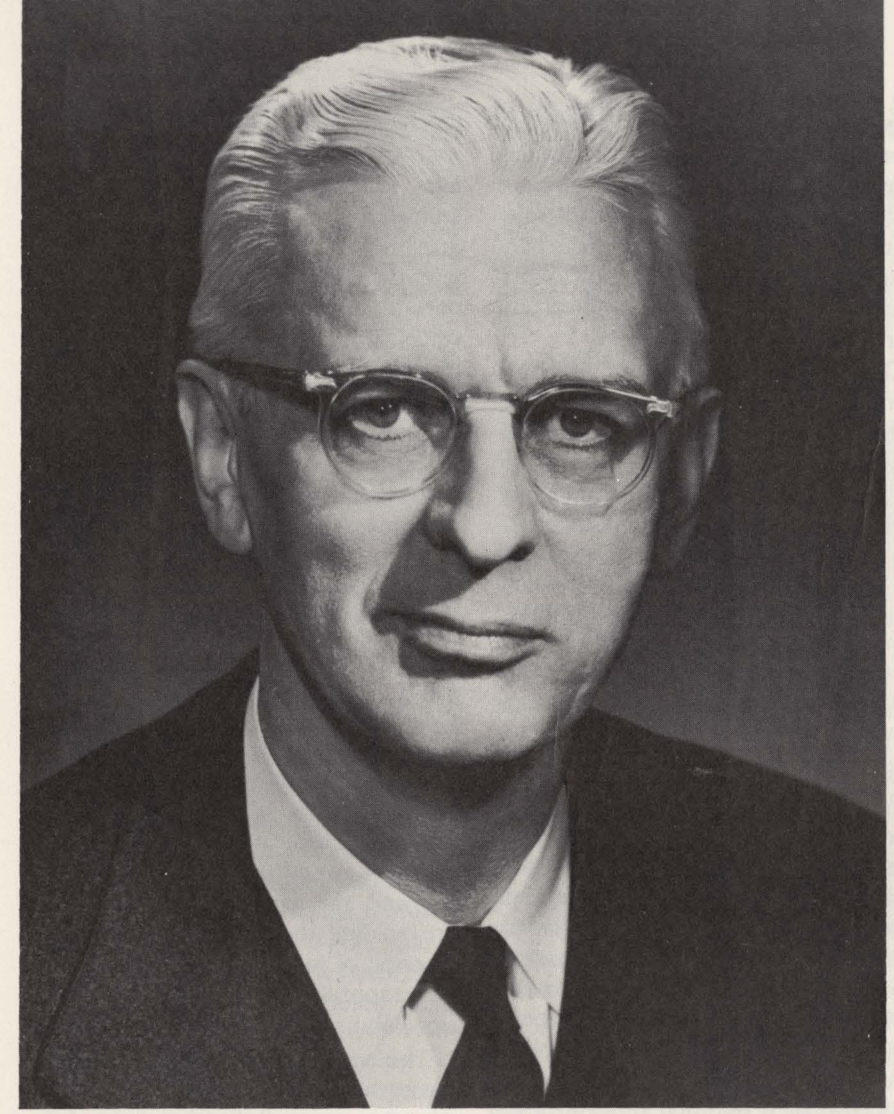
The materials found in nature.

The energies found in nature.

Information techniques by which man can sense, communicate, record, retrieve, and process information and use it to control natural phenomena for his own benefit.

Looking at engineering in this way illustrates some very important relationships. Engineering is closely related, through the foundation stones on which its inventive aspects rest, to the classical physical sciences. Engineering is equally closely related, through its human service aspects, to the life sciences and the behavioral sciences. Engineering neglects either at its peril, and I think neglect and misunderstanding here have indeed brought the engineering community into grave difficulties today.

Specifically, we have seen explosive developments of resources in the funds of knowledge and understanding through the sciences — not only in the physical sciences, but very importantly in the life and behavioral sciences as well. Yet there is a vacuum at the interface between engineering and these new resources. If nature abhors a vacuum, modern society does so even more and will rush in somehow to fill one when it exists. Scientists are doing precisely that — moving into the vacuum at the interface between themselves and engineering. Engineers stand aloof, puzzled and dismayed when engineering work is undertaken by those educated and trained and normally engaged in scientific pursuits.



If both scientists and engineers are to make their best contributions, we need to remind ourselves continually of both their common and their differing characteristics. Science, as we know it today — the search for knowledge and understanding of nature, and the codification of the information thus generated — came into being with the Renaissance. Engineering is concerned with the practical application for the benefit of mankind of the funds of knowledge and understanding in science and technology. Science moves from the specific to the general, and engineering from the general to the specific.

Ancient cultures probed rather gently at the edges of science. The Greeks were especially interested, though their interest was one of philosophical speculation, a mental exercise. Experiments to confirm their speculations were frowned upon. Archimedes apologized for his interest in invention and discovery, claiming them to be only pursuits for his own diversion and amusement. Science and engineering were strangers. Almost two thousand years elapsed before the influence of the Greek culture was modified; engineering walked most of the long roads to our culture alone. What world history and our society might have been, had the Greeks wedded science and engineering!

Much of today's engineering still drives its roots deeply into the technology generated by our forebears. Today all engineering is benefited by the availability and the flow of knowledge and understanding from science, though in some of the traditional disciplines of engineering, this flow and resulting benefit are at a low ebb. Some engineering came into being and grew out of scientific discovery. The physical, life, and behavioral sciences are having increased and shattering impact on engineering.

The resource interface problems are of great number. Each interface results in difficulty of communication, understanding and cooperative effort, whether it be the interface between the physical, the life and the behavioral sciences; between the disciplines of each of these classical sciences; between science and technology; or between the traditional disciplines of engineering.

Individual scientists are judged within the scientific community by their contributions to the funds of knowledge and understanding in science and to the scientific literature. Judgment of the individual engineer by the engineering community is much more complex. The identification spectra of environmental condition, of subject in product or service, and of functional role are wide; for example:

Engineering in a field with dynamic change in technology contrasted with a field not yet caught in the sweep of technological change.

Self-employment as contrasted with institutional employment.

Objectives related to defense and space contrasted with objectives related to civilian competitive enterprise.

Subjects ranging from a minute electronic device to a national transportation complex.

Functional roles encompassing research, development, design, production, operation, maintenance, management, and education.

We can define and identify rather precisely the activities engaged in and the results of these activities in science and engineering, but many persons nominally classified as scientists or engineers find they are working in both fields. World War II was a war of science and technology. Much was demanded of and much was contributed by both the scientific and engineering communities. The urgency of the great thrust into practical application of the latest in the basic sciences was accomplished by a movement into engi-

(continued on next page)

neering fields of men educated in science and previously occupied with the pursuit of scientific objectives. This movement has continued as the requirements of the defense, nuclear, and space programs have confronted the scientific and engineering community with an endless series of problems at the cutting edge of both science and technology. In reality the individual scientist and the scientific community work under a compelling economic and political need constantly to contribute information supporting the technology of our society. In this framework of economic and political compulsion, few scientists can avoid projecting their interests into the field of application. Much of the output of the scientific community is not immediately relevant to the wants and needs of our society.

In a like manner, though the total engineering community is sharply divided by the traditional disciplines, there is abundant evidence that the majority of presently employed engineers are not working within the disciplines in which they majored during their formal educational experience. And recent decades have seen a continued shift in the percentage of engineers institutionally employed as compared with those self-employed. Moreover, the last generation has seen a change in the pattern of work in the engineering community, from employment as an individual generalist to work as a member of a team of specialists.

In recent years our technological society has demanded and experienced a strong movement of persons from the scientific and engineering communities into positions of leadership and general management in government and in industry.

As a result of all this, the image of the engineer has blurred, even within the community of engineers. The individual engineer no longer fits into a simple and neat pattern.

Government has become a mighty force in giving direction and motivation to the best of our intellectual resources in science and in engineering, both in the academic world and in industry. The United States is engaged in world-wide competition for economic, political, and social leadership, a competition in which science and engineering play a dominant role. Our research and development expenditures are, in large part, both motivated and justified by the political tensions between East and West.

Over one million persons are now working in the fields of science and engineering in the United States. Dr. Wallace R. Brode, distinguished scientist, speculates that the number of persons in science and engineering in the United States will approximate six million in the year 2000, an increase from 1.4 per cent of the working group today to about 3 per cent of the working group thirty-five years hence.

The present allocation of funds for research and development in the United States provokes a question regarding balance. Reflection suggests the need for a much increased proportion of research and development devoted to more direct benefits for the individual, such as the conservation and development of our energy, mineral, and renewable resources; the application of technology to means of production, information processing and storage; a national transportation policy; concern for human health and comfort through environmental control; elimination of pollution of air and water; and the development of advanced diagnostic and therapeutic techniques.

The United States assumed world leadership in basic research after World War II. The National Academy of Science reports this significant transition and cites as evidence the substantial increase in the percentage of Americans among foreign memberships of the great academies of Europe since 1945, the increase of Nobel Prizes awarded to Americans, and also the increased number of references to American scientific journals in key British and German journals, far exceeding references to all other foreign journals.

The movement by the United States into a position of a leading nation in the world cannot be attributed solely to achievements in science and technology. The expanding geographical frontier, the unrestricted high volume of domestic markets, extraordinary supplies of fossil fuels, minerals, and renewable resources, have made growth with abandon possible. Despite their comparative lack of these natural advantages, Europeans continue as a force to be reckoned with in technology.

About one matter we can be very certain: Today science and engineering are irrevocably lashed together, with a resultant impact on and need for response from the engineering community — and particularly from the engineering societies and the engineering colleges.

Today the engineer stands in the midst of great complexity — complexity arising out of burgeoning problems in our society to which he must address his competence, and complexity arising out of the burgeoning of the information resource in the classical sciences and technology. Engineering and the engineering community are passing through a critical period, a period of momentous change, a time for reappraisal, reorientation, adaptation, and renewal.

The engineering community and its leadership bear upon their own shoulders the responsibility for some of the dimensions of the crisis and the initiative for reorientation and renewal. Because engineering is a demanding and exacting discipline and the engineer is in essence a conservative, institutions dominated by the engineer reflect his deep respect for that which has been tried and proven. Hence, the crisis is accentuated by the agonizing slowness of renewal by the institutions related to the engineering community.

The community has espoused its dedication to progress, but it has found it difficult to accept change. The community has pointed with pride to the past but has been hesitant to accept the consequences of an enlightened preparation for tomorrow. A large segment of the engineering community has considered the movement of the scientist into the engineering field, and the wide public recognition of the scientist's contribution in the engineering field, as an affront to the engineering community. Yet in 1963, more than four times as many doctorates were granted in the physical and life sciences as were granted in engineering. The community is dedicated to serving mankind, yet has given much of its organized energy to self-service. The community cannot escape responsible concern and involvement in the social consequences of its contributions. The engineering community is dedicated to subduing nature to the benefit of mankind but too frequently, without the essential social preparation, triggers the release of forces which whiplash our culture.

The institutionalized community, the learned engineering society, was organized in the mid-nineteenth century, around the then-relevant focal points of engineering interest, and chartered to promote the dissemination of information relevant to engineering work, to promote constructive interest and progress in engineering education, and to work toward the establishment of acceptable standards of ethics and morality in the performance of engineering work. These learned engineering societies were chartered and for many years led by young men. Today they are dominated by men of advanced ages. The older societies have not been sensitive to and responded to the emerging technologies, so the engineering societies have proliferated in response to the needs of the community.

The engineering societies have proclaimed interest in unity of the institutionalized community, but in reality they have been unable to achieve unity in purpose or in cooperation. The rapidly changing relationships between science and engineering, the growing funds of knowledge and understanding of science and technology, and the new focal points of engineering interest dictate an intimate relationship and cooperation between engineering societies in the dissemination of information. Yet only a few meetings are held each year under joint sponsorship of two or more engineering societies.

Significant changes are taking place in membership attendance patterns at society meetings. Entrepreneurs are sponsoring technical meetings in competition with the engineering societies. These meetings are well planned, conducted and attended; though costly to the attendees, they apparently fill a need not adequately met by the societies.

Members of the engineering community do not give adequate direct financial support to their learned societies. Society leadership is pre-occupied in providing financial subsidies to support the society programs.

The learned engineering societies are classified by the United States Internal Revenue Service as "scientific and educational institutions," and thus qualify as tax-free organizations under the Revenue Code. To be classified as tax-free, an organization must not be judged to influence or attempt to influence legislation; thus, the engineering community in the United States stands mute on the great social, political and economic issues of our time, issues of a technological culture, unwilling to pay the price of freedom of speech.

Up to this point, criticism has dominated my presentation. Now I can be optimistic in two respects. The first rests on the formation, in December, 1964, of the National Academy of Engineering. I hope that its relationships with the National Academy of Sciences will offer a prime means of solving those terribly complex interface problems and of easing the tensions while heightening the interaction between science and engineering. I hope also that the experience of the Engineering Academy may suggest changes in the organization and philosophy of the learned societies in engineering — and thus enhance their roles.

My second point of optimism leads me to ask you to consider another particular approach to the current crisis in engineering. I suggest as strongly as I know how to you that no man can live through a career in engineering in the future without continuing intellectual renewal.

About seven years is a presently acceptable estimate of the half-life of professional competence of young American engineers moving from their formal education experience into the active engineering community. This estimate will vary widely for individuals, of course, but for a particular person, this half-life is a function of his expectation of personal involvement and contribution in engineering; a function of his degree level — doctorate, master's, or bachelor's; a function of the curriculum of his college or university; a function of the environmental atmosphere of his college or university; a function of the environmental atmosphere of his college or university, the excellence of the faculty, faculty interest and involvement in the interface barriers, the opportunity for dialogue with faculty and students having prime interest outside his curriculum spectrum; a function of his interest in an appropriate learned engineering society; a function of the excellence of that society as measured by the adequacy of the meeting and literature programs provided for members; a function of the degree of enlightenment of his employer regarding the need for his continuing education; a function of the appropriateness of the methods of renewal made available to him.

To alleviate the crisis in engineering and also to bring relevance to the objectives and programs of the learned engineering societies, the future continuing educational needs of the individual engineers comprising the community offer a concern about which the organized community, the learned societies, could rally. Leadership in arousing and integrating the resources of the engineering community in education, in industry, and in government to provide a vital and comprehensive continuing program of intellectual renewal for individual engineers could provide a vehicle for bringing the present crisis in engineering and in the learned societies to a quick conclusion. Let us hope for aggressive leadership by the learned societies.

For many years the engineering community has related to formal engineering education through the Engineers Council for Professional Development, though without the unanimous support of the engineering societies. The Council has made an important contribution to engineering curriculum accreditation, though in this manifestation of unity the influence has been ultraconservative.

College and university administrative officers and faculties have often

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New Eminent Member . . .

GEORGE H. BROWN

Dr. George H. Brown, Executive Vice President of the Radio Corporation of America, was inducted into Eminent Membership in Eta Kappa Nu, in Boston, Massachusetts on November 2, 1967. The Boston Alumni Chapter was in charge of the arrangements, and the program was held in conjunction with the Northeast Electronic Research Engineering Meeting (NEREM).

Dr. Brown, was born in North Milwaukee, Wisconsin. He was graduated in 1930 from the University of Wisconsin with a B.S. degree in electrical engineering. In 1931, he received his M.S. from the University of Wisconsin. He received his Ph.D. from Wisconsin in 1933 and the Professional E.E. degree in 1942. In May 1962, Dr. Brown was honored by the University of Wisconsin with a Distinguished Service Citation for leadership in industry and engineering.

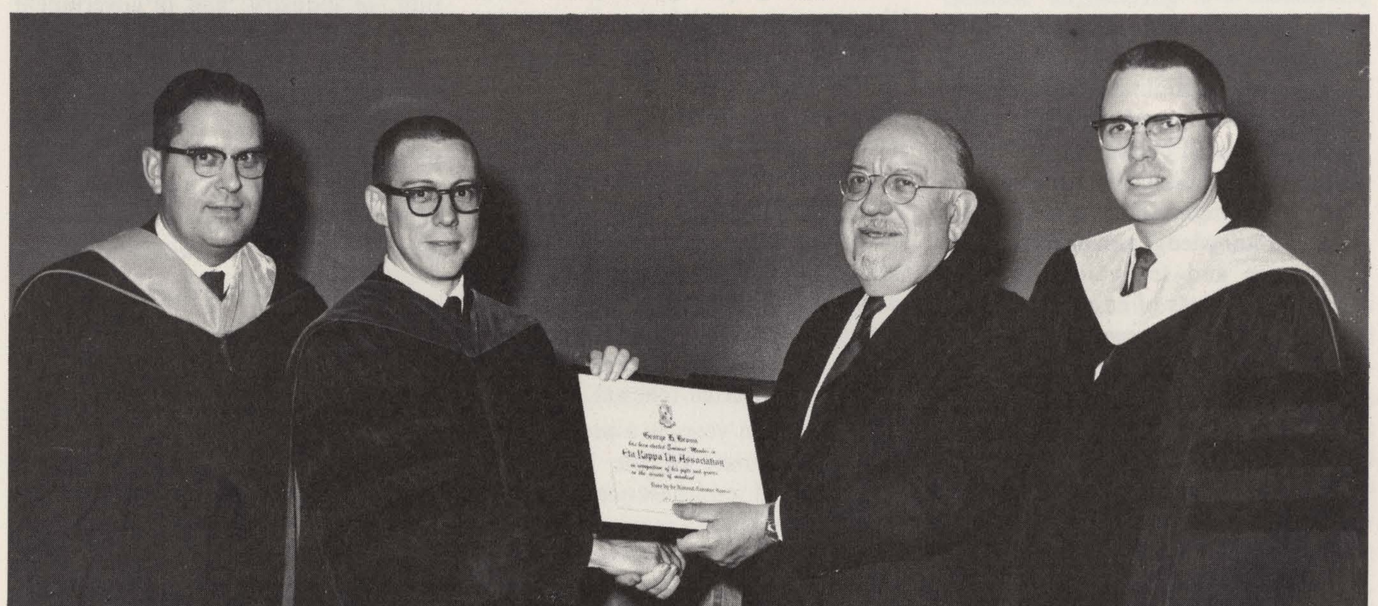
In 1933, Dr. Brown joined the Radio Corporation of America. Prior to World War II, he developed the Turnstile antenna, which has become a standard broadcast antenna for television. During World War II, Dr. Brown was responsible for important advances in antenna development, for the development of radio-frequency heating techniques, and he and his associates also developed a method for speeding the production of penicillin. At the end of the war, Dr. Brown received a war Department Certificate of Appreciation, "for his outstanding work in the research, design, and development of radio and radar antennas during World War II."

Since World War II, Dr. Brown has held various positions in RCA, including: Director of Systems Engineering; Chief Engineer of the Commercial Electronic Products Division; Chief Engineer, RCA Industrial Electronic Products; and in 1959, he was appointed Vice President, Engineering. In 1961, Dr. Brown was appointed Vice President, Research and Engineering, and in 1965, he was appointed to his present position.

He has made outstanding technical contributions to electronic communication and to modern television, particularly in antenna development and system design. Dr. Brown is the author of numerous articles and holds 79 U. S. patents.

Dr. Brown is a member of the Board of Directors of RCA and of RCA Communications, Inc. He is a Fellow of the Institute of Electrical and Electronics Engineers and the American Association for the Advancement of Science; a member of Sigma Xi, the Franklin Institute, and the National Academy of Engineering.

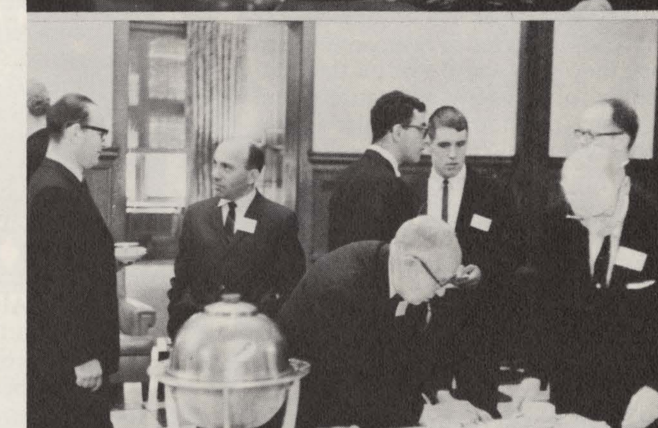
In May 1965, Dr. Brown received a citation for his contributions to international television at the Fourth International Television Symposium, and in 1967, he was awarded the Edison Medal by the Institute of Electrical and Electronics Engineers.



The induction team with Dr. Brown: — l to r, Mr. John A. Tucker, Past National Director, HKN, Administrative Officer, E. E. Dept., M.I.T. — Dr. Chalres Hutchinson, National Director, HKN, Professor of E. E., University of Mass. — Dr. George Brown — Dr. Bruce Wedlock, Past President, Boston Alumni Chapter, HKN, Professor of E. E., M. I. T.

PHILADELPHIA Regional Visitation

by Wayman A. Holland, Bridge Correspondent, Philadelphia Alumni Chapter



Sponsored by the Philadelphia Alumni Chapter of Eta Kappa Nu a Middle Atlantic Regional Visitation was held, Saturday, October 28, 1967. The host chapter was Lambda (University of Pennsylvania) and the meetings were held in the University Student Center, Houston Hall.

Mr. W. J. Johnson, Chairman of the Alumni Chapter, presided and called the meeting to order at ten o'clock, with greetings and a welcoming message. Present was Mr. John E. Farley, National Vice-president, who brought an inspirational word from Chicago, and Mr. Holmes McDonald, National Director also spoke a few encouraging sentences.

Delegations from the following chapters, listed in the order of their dates of installation, were present and each chapter president presented a verbal report concerning the status, program plans, interests, and achievements of his chapter:

1913	Lambda	University of Penna.	John Moore
1926	Chi	Lehigh University	Bob Surdi
1935	Beta Alpha	Drexel Institute	Frank Lally
1957	Gamma Xi	University of Maryland	Sean Dirkin
1958	Gamma Upsilon	John Hopkins Univ.	Tom Adams
1959	Gamma Psi	Lafayette College	Bill Thomas
1960	Delta Mu	Villanova University	Mark Dembroski

In addition to the student delegations there were faculty advisors of the following chapters: Chi (Lehigh), Beta-Alpha (Drexel), and Delta-Mu (Villanova); and as an honor guest, Mr. Irving Engelson, Chairman of the New York Alumni Chapter. There was also, in attendance among the delegations, a young lady, Miss Judy Kagle, a student senior in the University of Pennsylvania, Moore School of Electrical Engineering, a member of the Lamda Chapter of HKN. There was a total of thirty-one persons.

At noon a bountiful luncheon was enjoyed and the group was favored with an address by Mr. Larry Dwon, former National President of Eta Kappa Nu. Mr. Dwon's subject was "Are engineers good managers?" He aptly pointed out essential qualities for good management and urged young engineers to be first good engineers before striving to become managers.

In the afternoon three "round-table" groups met for discussion of general Eta Kappa Nu interests. These groups were led respectively by Mr. Thomas W. Williams, former National President; Mr. Howard H. Sheppard, former National President; and Dr. Octavio M. Salati, former National Director. Each group consisted, besides the leader, of faculty adviser, an alumnus, and four or five students.

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Resume of HKN Regional Visitation

O. M. SALATI
Past National Director

The group leaders for the roundtable discussions were: O. M. Salati, H. H. Sheppard, and T. W. Williams. The following topics were discussed:

1. *Candidate Selection*

There was considerable discussion on this subject. The constitutional requirement is that the candidate shall be in the upper quarter of his Junior class or the upper third of his Senior class at the start of the respective terms. It was felt by some of the chapters that this rule is too restrictive since a student may have failed one or more courses in his freshman or sophomore year and have done excellent work in his junior year. Thus, an excellent engineer is effectively barred from HKN.

2. *Initiation*

Three chapters, Univ. of Penn., Drexel and Villanova hold a joint initiation. Other chapters have had joint dinners with other honor societies, but the initiation was separate. Joint initiations and or dinners or dances with other HKN chapters or other honor societies is recommended since they may cut down on the total number of student obligations and they may promote fellowship among more students.

3. *Program Planning*

It appears that optimum times for initiations, dinners, picnics, etc. differ among the schools. Each school has its own optimum time.

The question of the best time for a Regional Visitation was not really explored. It is quite apparent, however, that it should be after the football season but before examination periods. The Fall of the year is probably better than the Spring, especially for students on the co-op plan.

4. *Campus Prestige*

This appears to be a problem for most of the schools since all too frequently campus "newspapers" refuse to carry campus news. Possible solutions are:

a. Have a member on the staff of the newspaper or other campus news media. This is a very effective way of getting publicity.
b. Send news items to the hometown newspaper of the student being honored.
c. Start own newspaper or newsletter.
d. Display the Bridge of HKN in appropriate places.

5. *Relations with HKN Headquarters*

The only problem mentioned was that of late arrival of keys for new initiates.

6. *Relations with Faculty*

A few schools appear to have problems concerned with recognition of HKN and its potential value to the school. A few suggestions for improving faculty-HKN relations are:

a. Pub nights, picnics or other student-faculty get togethers.
b. Assist in maintenance of student lounge or laboratories.
c. Aid to electrical engineering department during registration.
d. In cooperation with other E.E. student societies, participate in evaluations of faculty members and courses. Give this information to the director of the school.
e. Give an award for the outstanding faculty member.
f. Provide a trust fund for a portrait of a prominent faculty member. Alumni will frequently assist in this project.
g. Exhibit photographs of all faculty members.

7. *Relations with Alumni*

Not all of the schools were near HKN Alumni Chapters. Those that are should attend Alumni Chapter meetings when possible. They are always welcome. The Philadelphia Alumni Chapter meets on the first Wednesday of the month, October through May at The Engineers Club in Philadelphia, 1317 Spruce Street, for luncheon (12 noon). The Alumni are always willing to assist the students by lectures, tours of industrial plants and laboratories and job selection guidance.

8. *Chapter Finances*

All of the chapters were solvent. Some of them supplement their treasuries by modest dues in addition to part of the initiation fee.

9. *Student Aid*

A few chapters indicated that they are not getting prospective members because the pledges cannot afford the initiation fee. Two chapters are presently waiving the cost; they expect to be repaid. A suggestion was made that a trustee fund may be set up for this purpose. Contributions to the fund may be solicited from students, alumni and possibly the E.E. department. This item will be brought to the attention of HKN headquarters.

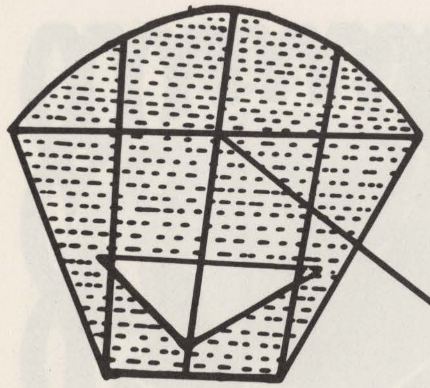
10. *Chapter Projects*

The following is a listing of projects that were reported on by the various schools:

a. Lectures to aid in the development of well informed engineers.
b. Prize to outstanding Sophomore or Pre-Junior E. E. student.
c. Table or cabinet display of HKN key, emblem, certificate and the latest copy of the Bridge.
d. Pledge projects: polish HKN casting and mount on plaque, interview all HKN brothers and staff members, essay.
e. Athletic events with other societies.
f. Construct and exhibit projects for E.E. open house.
g. Act as campus guides.
h. Outstanding Senior Award.
i. Award for best pledge plaque.
j. Tutoring programs, slide-rule classes.
k. Digest of top 40 graduate schools.
l. Write to former students presently in graduate school to get non-catalog information.
m. Summer job information service.
n. Lectures to stimulate Freshmen interest in Electrical Engineering.

Successfully executed projects are one of the best ways to publicize HKN.

Identification opposite page, left to right, 1st row, Larry Dwon, Frank Lally, Howard Sheppard and Jack Farley; 2nd row, Robert Surdi, Tav Salati and Jack Farley, Sean Durkin; 3rd row, E. H. MacDonald and Larry Dwon, John Moore, Wm. J. Johnson; 4th row, Tom Adams, Jack Farley and C. Holmes MacDonald, Tav Salati.



GO... FLY... A... KITE.

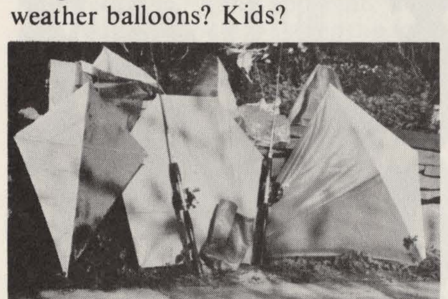
FUN.. FOR.. YOUNG.. AND.. OLD!!!

B.G. Hatch

It isn't really necessary to be weird to build and fly kites — but it helps! Almost any engineer can make it, especially by retirement. And I ask you: is it better to have an interesting, intriguing, sometimes frustrating hobby, like kite flying, or is it better to sit in front of the TV set, with one eye on the calendar and one eye on the clock?

Kite flying used to be considered a kid's hobby, especially in the spring, along with marbles — but no more! Kite flying is now a man's game. Of course, it is better for your kid and mine to build and fly kites — along with his Dad — than to roar up and down the streets in a jalopy, or a drag racer — or Dad's car. But kite making has progressed far beyond the scope of the 2-sticker and 3-sticker you and I knew when we were kids.

Today, the American Kite Flier's Association, headquartered in Silver City, New Mexico, is an organization of mature men and women who design, build, and fly kites as a hobby. The membership list includes many professionals — aerologists — who build and fly kites for the Weather Bureau, the Navy, the Signal Corps, NASA, to name a few. Who builds the kites to fly water shiiers? Who builds the kites, the parachutes, to bring instruments back to earth from weather balloons? Kids?



FLAT FACED 2 & 3 STICKERS

Take Harry Sauls, of Miami Beach: a mature man, of perhaps 70-ish, who designed and built kites to fly on steel cables from the stern of our trans-Atlantic convoys, to protect them from German dive-bombers and the large barrage kites to protect London during the WW-II blitz. Or take Domina Jalbert of Boca Raton: The last time I was at his laboratory — where he is working on certain unannounced projects — he was flying two kites, on nylon rope, from a two-handled geared winch on 2" x 2" angle iron A frame, in turn tied to his car. Others have designed trailers, with geared gasoline engines, to launch and haul in their kites. Even Santa Claus — Walter H. Scott, of Columbus, Ohio and Briny Breezes, Florida — my mentor and chief proselyter — flies his kite from an 8" stainless steel winch, wound by a ½" electric drill on a specially designed table, using 80# woven nylon line.

SIMPLE KITES

Let's look at a few simple kites even you and I can make — and fly:

We can all remember the standard 2-sticker of our childhood. Usually diamond shaped; sometimes square or rectangular; always requiring a tail to stabilize it; the transverse spar could be bowed back, or upward. It is a simple kite to make and with a little experimenting with the amount of tail, easy to fly. It comes in all sizes, and is the usual kite sold in the five-and-dime stores, for from 29 to 49 cents.

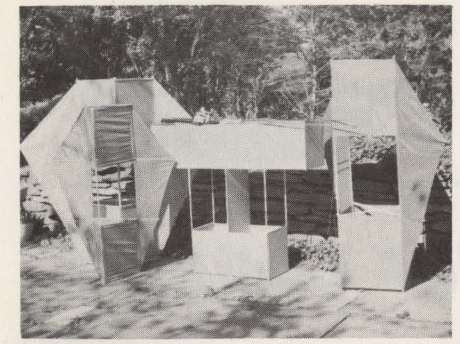
The next is the conventional 3-sticker. This is only slightly more difficult to build; it usually has more "pull" than the 2-sticker, due to larger area. It is still a flat-face like the 2-sticker, and requires a tail for stability. It has the appearance of a larger kite, although the spars may be the same length as the 2-sticker.

Both of these, and their many variations can be made of dowel rods, bordered with tight string, and covered with tissue paper, kraft paper, or light windproof cloth, and may be decorated to the builder's taste. Better than string is nylon monofilament fishing line.

Lately, plastic sticks have become available for most of the commercial small boys' kites: they are strong, flexible and usually straight. Bamboo is often recommended for spars: it has great cylindrical strength, but is difficult to fasten, and is seldom straight, especially in smaller sizes. Personally, I prefer straight grained western white pine for spars, ripped to dimension in my own shop. It is light, strong and supple, and quite universally available at the lumber yard or cabinet shop, often as scrap trimmings.

Covering material may be almost anything light, strong and easy to sew or glue. For a simple glue, there is nothing cheaper than flour and water. Elmer's white glue is ideal for cloth, paper, and porous substances; it is worthless for non-porous coverings like plastic bags from the cleaners or laundry. Kraft paper is a cheap, strong covering easily worked, and can be made taut with a little care. Nylon cloth is more colorful, harder to get, and more difficult to work, but is light, strong, and with care to avoid "pocketing," may be sewed or glued. It has the advantage of being waterproof, to a large degree.

SCOTT SLEDS



WINGED BOX KITES

Kite tails may be made from old sheets or other rags; from wadded-up newspaper tied into string at one foot intervals; or I prefer wind socks, made from scraps of old covering materials in the form of funnels, with a 3 or 4 string lead harness. These can be multipled as necessary to get the required stabilizing effect.

SCOTT SLED

From the simple, flat-faced kites, we advance to the Scott Sled. This is a copyrighted design by Frank Scott of Euclid, son of Santa Claus — (Walter Scott) previously mentioned. It is said that its proportions are quite critical. Basically, it consists of a flat sailing area, with two lateral wings or ventrals that act as bridles and scoops. In its pure form, 3 light, flexible longitudinal spars stiffen it fore-and-aft; it is allowed to take its own shape in the wind. Its disadvantage is that it collapses and dives when the wind moderates. To avoid a collapse in the air, it has been found desirable to add a cross stiffener — not too stiff — at the leading edge. A "V" vent of prescribed proportions, forward from the trailing edge allows escape of air, and gives the sled a built-in "tail." Thus, we have the first and simplest of the "tailless" kites. The Scott Sled will fly in a whisper; it will fly high overhead; it can be launched with a whip of a fly rod. I have built successful Scott Sleds 24", standard 36" and 48" long: they all fly. When asked how I dimensioned them, I said I proportioned them by slide rule. My hearer said I was fortunate: he did not know how to work a slide rule.

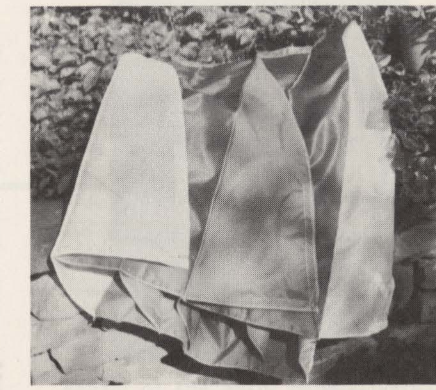
BOX KITES

Another form of "tailless" kite is the box kite. Here, imagination knows no limit. The chief advantage of a box kite is that it has a built-in vent, and "tail"; has multiple lifting surfaces giving great lifting power, and is quite stable in the air. It may be built square or triangular in the box section; boxes can be combined in multiple for various configurations; it can be built almost any size, for lifting power; it can be winged for greater lifting power, or it may be combined through transverse spars with other forms of kites. Scotty has flown a box kite continuously for 168 hours, without attention. With any breeze, he always has one or more box kites in the air over the Intracoastal Canal at Briny Breezes, in Florida.

One of the advanced forms of the box kite is the Harry Sauls barrage kite, made entirely of square sections, and reminding one of the Wright Brothers' first bi-plane, without engine, and tied together with bamboo and string. Flown at varying elevations and locations, this kite is credited with saving London during the blitz in WW-II; it also protected American convoys, flown from the stern of our slow vessels carrying supplies to beleagured Europe.

JALBERT AIRFOIL

A somewhat unbelievable kite is the Jalbert Airfoil. Made entirely without spars, its chambers fill with wind, forcing the top panel into the form of the upper surface of an airplane wing. This kite, too will fly in a whisper; perhaps it is the basis of motorless gliders. It can be made in almost any size, but the larger sizes require two or more men to launch and control them. I have seen two Jalbert Airfoils mounted on either side of a 2-foot triangular box kite that required two men merely to hold it, and I am told required 4 men to get it down out of the skies.

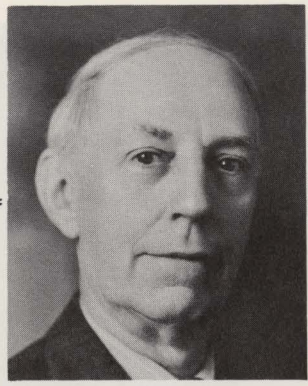


JALBERT AIRFOIL

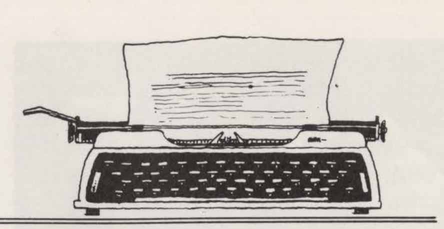
A "professional" recommended to me that I stock with "small" kites. They are easier to build; cost less; can if necessary be launched and handled by one man (I sometimes question this), and will give all the fun — and frustrations — of the larger kites. Using 30# monofilament, or 36# woven nylon line, it is absolutely essential to wear leather gloves, to prevent bad skin burns, and cuts, from the flying lines. A substantial fishing reel, designed to reel in real sporting fish, will NOT reel in a 36" or a 48" kite, pulling in a good breeze.

From these simple (and small) kites described, it is possible, if you are so inclined, to go into larger and more exotic forms, designs and sizes. Perhaps, as engineers, you can calculate the performance of a kite — with all the variations of wind velocity, air pressure, weight of line, load and lifting power. Perhaps, on the other hand, you will enjoy the fascination, experimentation — and frustration — of just "flying a kite."

When I was a small boy in New Orleans, I was too young to make my own kites. During my 39 years with the General Electric Company, I never had time to go fly my kite. Now, in my retirement years, I am having fun. I wish you the same.



LETTERS from Ellery



Canals In Our Country

Dear Friends,

In considering conditions during the years soon following the Revolution, as I have been doing in the several letters to the Family the story would be very incomplete without thinking of CANALS. This method of transportation goes back to most ancient times. The Romans built quite a system of canals in England and their virtue was well known in many parts of the world. In our country Washington had determined a canal to the west up the Potomac was needed before the Revolution began. Then too in the early 1700's a canal to connect Albany and Lake Erie was proposed.

The first canals actually to be constructed in this country were two short ones in Massachusetts to let boats pass two falls of the Connecticut River and one 60 or more miles long in South Carolina. These three were built in the 1790's. One of the short ones went around Turner's Falls to Montague, and the other short one went around the falls at South Hadley. The name Montague first came to my attention as I saw it was the name of a locomotive of New London Northern R.R. As you know I was completely fascinated by locomotives, especially the ones on N.L.N. R.R. which were all of them named. Montague was different from all others I saw and the reason was that it had "Inside Cylinders" hence did not carry the connecting rod so conspicuous to the front driving wheels and shining brass. To me it was a real wonder. And quickly I learned to identify it either by its puff, or bell, or whistle if it should pass in the night when I couldn't see it. It was named from the town where that first canal was built.

I think it is interesting that the canal in South Carolina to make possible for boats to pass from the Santee River to Charleston was built by a man who came to this country with the Hessians hired to fight by the English. This man was captured by the Colonial Army at the surrender of Saratoga. He as prisoner then aided the Colonists by doing engineering work in the south. And it was he who surveyed and supervised the canal which cost over a million dollars.

As soon as the war was over the matter of building canals became a chief issue. The point was that it costs much less to move a given weight a certain distance if it floats in water than to carry it in the heavy wheeled wagons of that age. In England at the same time they were building canals too. There they got at the construction of Railroads earlier than we did in this country and in England the object of the railroads was to bring goods to be transported down to the canals. It was not thought of then that in a few decades the rails would themselves take over the transportation from the canals.

The next canal in New England was to connect Chelmsford (later called Lowell) with Boston about 28 miles. This was built during the 1790's. With the rage to get "Turnpikes" for stages there was also a craze to get "Canals". Washington was trying to get the Chespeake & Ohio to open Washington to the west. It went very slowly and actually it was not in operation until the mid 1800's and never went beyond Cumberland and financially was a failure.

THE ERIE CANAL

The big boom for canals came on the actual completion of the Erie putting New York city in direct connection with Lake Erie. The effect of this canal in opening the country to the west was marvelous. The canal had enormous traffic and quickly paid for its cost. Then it was enlarged by being made both wider and deeper and that canal was still in active operation when I went to live in Schenectady. I was then filled with interest to learn the details of such operation as I had been when younger by learning about the wonders of Railroads. The difference was that I looked on the canal as something of the past. It in a way was to me "History" rather than something like "Electricity" the thing which I believed had a great future.

In general it was the canals that were the agents to open the great new west. The success of the Erie led to dozens of schemes for canals where there was the prospect of settlement.

PHILADELPHIA

To me in a way the most interesting of the canal developments was the one to connect Philadelphia with the Ohio River at Pittsburgh. The Erie Canal in a manner put Pennsylvania in the background as compared with New York. Pennsylvania must do something to catch up. The something was a canal. And it was built over the mountains, an engineering feat vastly more difficult than to put the Erie across the relatively level route. The job was done and the canal was operating when Dickens visited our country in 1842 to get material for American Notes and his novel that brought scenes in U.S. Dickens records the trip as unusual and delightful. And I am certain it was interesting to say the least.

To make that canal trip one stepped into a boat in mid Philadelphia and in due time he would step off in Pittsburgh. The first movement was up an incline. A stationary steam engine pulled the boat mounted on a wheeled car and then for some 90 miles it was pulled on land by horses to Columbia on the Susquehanna River. From that point to Hollidaysburg some 180 miles the boat was pulled up the Susquehanna and Juniata rivers by horses or mules. Then to Johnstown came the really exciting part of the trip. The boat was pulled up five steep inclines over the crest of the Allegheny Mountains and then dropped down by five inclines to be put in the water again. From that point to Pittsburgh was by canal with many "Locks". So that route to the west was open but this canal has not lasted as has the Erie because the mountains could be crossed cheaper by rail than by boat which needed so much land travel for the boat.

Another canal which quickly paid for itself and produced a marked change was the Michigan Illinois Canal that opened what now is Chicago to the Mississippi and so to the Gulf of Mexico. At the time of the Revolution but one white man lived in what we know as Chicago and in 1820 it was a very small village with no prospect of ever being of any account. I have mentioned the relative of Bryant the Poet who gave up his farm which was where now is the center of Chicago and moved to the place not far from Urbana (Bement) for he wanted to live in "a place which has a future". (His house still stands and in it Lincoln and Douglas made plans for their debates). In 1822 Lincoln in the Illinois Legislature helped pass a bill to authorize the Illinois-Michigan Canal. In due time the canal was opened and Chicago grew like the proverbial mushroom. The canal was what really made Chicago. This canal financially was a success but in time with railroads it went out of service until a half century ago the new "Barge Canal" along the same route was opened. I used to take our senior students to inspect the works near Joliet and I used to explain to the students "This canal lock before you is as large as any built for the Panama Canal". The traffic between Chicago and New Orleans (and to the Atlantic & Pacific oceans) is enormous at the present day.

The only really important canal still in use in New England is the Cape Cod. I have read that Miles Standish proposed that a canal be cut at that place to shorten and make more safe the sailing of boats between Plymouth and New York and other places. Recently I mentioned the proposal to connect Norwick and Worcester by canal but the railroad got ahead of the canal.

So we see that during the first quarter of the 19th century many "Turnpikes" were opened and during the next quarter century the railroads began to take the lead over "Canals". By about 1850 the interest in canals had reached its crest and about 4500 miles of canals were in service. As the mileage of railroads increased rapidly the use of canals decreased and this put out of commission about 2000 miles of canals by the year 1880. As I grew up and looked about me it was my thought that canals were a means of transportation of the past. So it was that when in Schenectady I supposed as I watched the boats on the Erie canal I was watching something soon to be wholly abandoned. That is one of my many ideas which I did not have correctly summed up. Two years after I left Schenectady the Eric canal was again being rebuilt to take larger boats and craft moved by engines instead of by horses and mules. I supposed the people in New York were on the wrong track to think it worth the great public cost of rebuilding their canal. I supposed the notion of the tremendous value to the state rendered by the original Erie canal made them believe their future prosperity depended on keeping their canal "Modern", was not true.

Many of the early canals were allowed to go out of service. Some of them were washed away by floods such as the disastrous one which did so much damage in the Dayton, Ohio region about 1913. To tell how wrong my idea of canals was I will say that today we have over 20,000 miles of canals in operation in our country. Some 10,000 miles of these are not over 9 feet deep so can be used only by the smaller boats. But you doubtless realize that now we are having a new interest in small motor driven boats and these smaller canals are quite adequate for such craft. You probably have noticed that in such papers as the Sunday Times maps of the canals which may be used by the boat fans are published and described. I have been interested to see from these maps what possibilities are open for boat trips. In the summer the canals up towards canada look luring. And in the winter the many possibilities

(Continued on Next Page)

ELLERY . . .

to go south and explore Florida look attractive. I used to go on river boats when I lived in Florida but long ago those steamers gave up. They couldn't compete with the modern auto and buses. But the water routes evidently still are open and in use especially for the family boats.

But it is a mistake to think the heavy traffic of freight on canals has vanished. Quite the reverse as is indicated by the fact that since 1929 when the total was 8.6 Billion Ton-Miles we now have well over 100 Billion Ton-Miles.

At present there are nearly 10,000 miles of canals in service with depth from 9 to 14 feet and 2000 miles of canals with depth over 14 feet and so are able to handle boats that really are large.

We can understand the great interest in canals when we realize that in the early days by horse-drawn heavy wagons it cost about $32 to transport a ton 100 miles but the cost when the first canals were opened dropped to $1.00. With the modern boats of course the figure is much smaller. When I was a boy Father took lumber to Webster by the old "Horse-Wagon" method. The round trip from woodlot was about 20 miles and that was a full day's work for man and pair of horses. Trips could be made only on alternate days. I assume the load carried was about one ton. To complete 100 Ton-Miles then would have taken five such trips and a time of ten days or about a third of a month. At that time wages for a man were about $1.00 per day and in old times the rate per day for a pair of horses or oxen was about twice what a man would receive. At these rates it cost per 100 miles $10 for the driver and $20 for the horses or $30 which checks with the haulage rate quoted above. Then there was a cost for wear and tear of the vehicle. I'm sure, however my Father never figured his cost for such hauling but it cost just the same.

One of the sad things about the canal building was that in general the work took the men into swamps where mosquitoes bit and the men became sick and many died. At that time it was considered that there would be the death of one man for about six miles of canal construction. When I got on the scene the figure for such cost I had in mind was that it took about one man's life for each million dollars of construction. This sounds large but the older figure for early 19th century days was much greater.

You may be interested in one problem of canal operation which puzzled me. When I first saw the boats going along the canal, with the horses or mules pulling, I wondered how the boats passed when two in opposite directions met. There was but one "Tow Path" and that sometimes was on one side of the canal and some of the way on the other side. With the horses and long tow rope and the boat behind just how would they manage to pass without getting tangled? Every day as I walked to and from my work in the factory beside the canal I saw the movement of boats and began to wonder about the meeting. I couldn't think how they could do the meeting without any snaggle. So one Saturday (Or Sunday?) when I was free I followed a boat determined to get the answer. I don't remember how many miles I followed before a boat in the other direction put in its appearance. Are you smarter than I and so see without my telling what happened?

Assume the tow-path was on the right hand side for the boat going east. The driver of the team going west pulled his team as far to the south side of the path as possible and stopped the team. The helms man on the boat steered his boat to the north side of the canal. That boat slowed its motion and its tow-rope sank down into the water. The other boat didn't slacken speed or change direction of team or boat. There was nothing to hinder the east-bound boat and it quickly was beyond the west-bound boat. When it had passed the other driver at once put his team into motion and the meeting was completed. When meeting with the tow-path on the other side of the canal the process would be reversed.

Then there was the question of how the teams went from one side of the canal to the other when coming to the place where the path went to the other side. That problem I could solve without going to see it done. But I actually went and saw an overhead bridge up which the team walked and crossed then turned under the bridge to keep the tow-rope from being tangled on the bridge.

From our present point of view the speed of the horse-drawn boats was distressingly slow. It took about five days to go from Albany to Buffalo or the time to go from Philadelphia to Pittsburgh was about the same and in both cases the boat kept in motion night and day. The boats I saw passing Schenectady had house for the family and barn for the draft animals. Stops would be made at proper times to put the horses or mules that had been pulling into the barn to eat and rest and replace them with animals from the moving boat. I have read that the travel for passengers on such boats became very boresome. The sleeping quarters were greatly crowded and the ventilation was almost non-existent. On boats carrying immigrants, each family carrying its own food, conditions were almost intolerable. But they were going to a new land of untold wonders so those people did not complain.

So after the Revolution life changed greatly with the introduction of power labor saving devices and new methods of transportation. The new transportation methods made possible great improvement in the Postal System. But about the mid 19th century electricity brought in the telegraph which made quick communication possible. Soon came the telephone and the other electrical methods of communication so now we can see and hear virtually all around the world from one place.

Now the youngsters are dreaming of going to places outside of the earth. The changes are as time passes coming faster and faster as a snow-ball grows more rapidly the larger it gets. What is to be the limit of these changes?

One thing seems clear. Humans still have problems as in the older times. But I shall always close by saying *GREATEST LOVE TO YOU ALL*

ELLERY PAINE
Eminent Member

NOTICE

As required by the Post Office, the BRIDGE mailing list is now set up numerically by Zip Codes which is not the same thing as alphabeticallyby states and cities. Therefore, when you send an address change to national headquarters you must send the old address and old Zip Code number as well as the new address and new Zip Code number.

The Great Sahara Mousehunt

Catherine Collins and Miggs Pomeroy

23RD MARCH

DURING THE NIGHT the wind blows hard from the south carrying a gale of sand over the saddle of the hills and piping it into our sleeping-bags. By turning round, heads north and strictly downhill, with only noses out for air, we manage to sleep a little. By morning we are coated with sand and, though the wind has dropped, it is cold and we are reluctant to get up. Liv collects Hank's traps, not one of which has been disturbed, and we breakfast on black tea and oatmeal blocks, one of the best of the 'compo' items. We break camp and set out along the base of the hills looking for wartime traces. Before long we come upon tracks which seem to have been made yesterday. We wonder who has come this way and why we heard nothing in Kufra of another expedition. We investigate a camp-site where a shining can of Palethorpe's sausages, the label only slightly faded, further misleads us until we see that it is dated 1939. Dry air has preserved the paintings in Pharaohs' tombs for five thousand years. If we leave it here will Palethorpe's pig one day become the treasure of a great museum? Having encircled the first outcropping of hills we turn south where a conical hill stands alone. It has a marker on top indicating that we are on the main Kufra–Sarra track. Directly eastward of this marker is another outcropping of hills, and here we enter a narrow pass into a broad valley or bowl among the hills. There are tracks leading in and almost immediately we find first a burnt-out Italian truck, and a little further on two British trucks with three graves beside them. Two of the graves are mounded up with stones, one is marked with a rough cross made from a packing-case. Further on is another British truck, its Egyptian licence plate still readable (the Long Range Desert Group was based in Cairo)and on the fender a Maori name, for this detachment of L.R.D.G. were New Zealanders. The vehicles are riddled with bullet and shrapnel holes, the sand littered with debris, fused glass, twisted metal, pieces of wool from sweaters and gloves, bullets, fragments of grenades. John Ferguson finds an Italian coin in the sand and rubble of one of the British trucks, presumably the one which carried the Italian prisoners. Winston finds the much-battered lens of a camera. We dig carefully for fear of disturbing live ammunition. I find a tin of bully beef which we open. The meat in it is shrunken and smelly but still moist. Had it been buried in the sand instead of exposed on the surface it might well have remained fresh; as it is it has been baking in the sun, cooling off at night, for more than twenty years. Under the trucks, oil from their engines lies in black ribbons.

We try to reconstruct the battle—the British convoy coming from the south, taken by surprise, three of its trucks cornered in this valley by the Italians. We imagine the feelings of the men left alone here. Francis and John who are soldiers must feel it in their bones; and Liv and Catherine and I have had war losses. Winston, while awed, is still young enough to be insouciant. We talk of opening the graves to identify them, but feel that we have no right to. It is a place that we shall all remember. Here is silence more than sadness and we intrude upon a desperate moment which, although done with twenty years ago, and part of history, we should perhaps not have come to disturb with our probing hands and voices.

On the way back to Kufra we scorn to navigate and lose ourselves for two groping hours. We have found sand-cliffs and an ancient lake-bed which we have raced across and a land of little dunes the size of haycocks which we ploughed amongst cursing the moment we so lightly deserted our own tracks, made yesterday, for a short cut. We come suddenly upon an oasis which we flounder through, bogging and sand-tracking repeatedly. We do not see any house or tent or sign of life and the date-palms are wild and untended. Out of the oasis on hard sand again we come upon camel tracks and follow them into another oasis where we find someone to set us right for El Giof. Over-confidence is one of the real dangers in desert travel and we feel that we have been lucky, though Francis scoffs that he could always have gone to work and found out exactly where we were. 'Along the coast of Italy?' we tease.

Back at the date factory we find that the plane is in and six R.A.F. men await us, with Jack Thompson and his unwelcome five-hundred-odd pounds of radio. No Colonel O'Lone, no Paul Barringer, no Alan. Also no oatmeal. There is a touching heart-shaped letter from our children and for Catherine a letter from Alan and a box of presents: two Tilly lanterns, a bottle of white petrol, sun-tan lotion and sweets for the 'troops'. He has also forwarded down to her letters from her two boys. Duff who is studying geology at Princeton, and for whom she is making her weighty collection of rocks, writes that he has heard that slaves can still be bought in the desert and while Princeton does not allow students to keep pets there is no ruling on slaves, so would she please bring back a couple. Pretty ones of course. Pom, aged nine, writes that he will come 'emdjutly' if she wants him and school is awful as usual.

Francis is fulminating because he has had no letter from his girl and because of the radio and the concise orders to take it no matter what else we may have to jettison. We discuss doing without some of our food, water or petrol and know that we cannot. Catherine sees more than one speculative eye turn on her boxes of stones and decides to hide them somewhere at the bottom of the load in car No. 2.

We have a chaotic evening with twenty people to feed. These include the R.A.F. who have not brought food or equipment of any sort with them, and the Greek doctor who runs the small hospital here. We have to eat in relays as we do not have enough plates or implements. Garbage is piling up, mail being read and answered; Francis is plotting tomorrow's course on the table surrounded by food, half-empty mugs and tins of melted butter. The R.A.F. stagger us by daring to ask for hot water to wash in. The stove is taken up with food preparation and the well is a hundred feet deep and icy cold. Only the women get their water drawn for them. We decide sourly that the R.A.F. is too clean anyway. But our soldiers see to their water and the friendly Greek doctor has beds brought for them from the hospital. They are taking a patient from his hospital to Tobruk tomorrow and they offer to take letters. Catherine writes to Alan, a long letter which he receives two months later on his return to New York. She thinks the R.A.F. carried it about as a mascot. While unprovisioned, the airmen did have a sort of picnic lunch with them and I have discovered bread and tinned salmon which I have confiscated without qualms.

While we have been to Jebel Sherif Hank has lost all of his steel traps for fox or larger animals. The loss is put to curious children who have doubtless had their fill of the archaic stick-and-stone snares of their forefathers. A plea to the Mutaserif is listened to with sympathy, but whatever efforts he makes to recover the traps are unfruitful. We have stayed overlong in Kufra and traps or no traps we must leave by dawn. Hank is depressed and we all feel for him.

24TH MARCH

TEA AND SHREDDED wheat and bully beef for breakfast at six-thirty. Everything washed up and packed up and ready to leave by seven-thirty-five. We've filled the airmen's thermos with tea but have no pots or eating-irons to spare so cannot leave them other food. In any case they'll be in Tobruk for lunch, so won't starve. We are off now for Uweinat, three hundred and twenty-five miles to the south-east, and almost on the Libyan–Egyptian–Sudanese border. Uweinat is an isolated mountain range where there are said to be some very fine primitive rock-paintings. The morning run is magnificent. We do a hundred miles in about four hours, stop for lunch under a boiling sun, with shade a two-by-four square directly behind the cars. With midday our luck has left us. We are in undulating dunes, roller-coasters of soft sand. All five cars have bogged repeatedly. For a while we are trapped among the crested dunes. Francis in the lead is our guinea-pig, to test out just how sheer each drop is. He thinks he should have danger pay. Even standing on top of these dunes, it takes a few seconds to realize just how precipitous the drop is, especially at high noon when the sun casts no helpful shadows. We test out the dunes, we sand-track, we are careful not to walk in front of any bogged car for fear of breaking what crust there is. It is as grim an afternoon as we have had and yet everyone is cheerful. Frank walks along from one rescued car to the next victim strumming his sand track like a guitar and singing as he goes.

And now No. 4 car has burned out her clutch. We are in soft sand and making camp is going to be tricky. We find a ridge or slight rise with patches of reasonably hard sand and we distribute ourselves about on this. Two days' camp, to repair No. 4, will break what crust there is, anyway, so perhaps we are being needlessly choosy. Taffy gets into overalls, Jack Thompson hauls out his portable aerial and rigs it with the help of a couple of the boys. Liv gets the charcoal fire going. We've opened a tin of ham and are making candied sweet potatoes. The British have never tasted them and are very suspicious. To make up for this barbarian dish we also serve apple sauce, biscuits, raisins, tea and whisky. The sun is down, plummeting over the edge of the earth like molten lead. The afterglow sweeps the desert, taking our breath away, and then it is dark and the stars spring out as though a switch had been touched. Venus sets at eight o'clock, such a sparkling green and red we think at first there is another camp across the desert from us and are cheered at the thought of other living creatures in this wilderness.

It is cold again tonight and Catherine has a pain in her neck, not figuratively, she says, but positively. She says that she got it hunched over writing her diary in the car. Desert travel being what it is, we don't think she is ever going to be able to re-read this document. Her normally neat handwriting has developed the archaic look of cuneiform. Winston, who hots up the water for the two Churchill bottles every night (same water used throughout the trip), tucks me in with Randolph's and contributes his own to relieve Catherine's crooked neck. My arm is out of the cast much of the time these days and not bothering me, but I'm glad of the bottle for my toes.

(Continued)

BOOKS

ENERGY CONVERSION

EDWARD M. WALSH

During the past decade significant advances have been made in the field of energy conversion. As a result of the availability of a high-temperature heat source, and the requirements of a power system for use in space, the direct conversion of thermal into electrical energy has become one of the most rapidly developing areas in the field of energy conversion. Thermoelectric, photoelectric, and fuel cell power supplies have already proved effective in space, while other systems, such as the magnetohydrodynamic, electrogasdynamic, and thermionic, are under development for land-based or space-bound energy conversion.

The nuclear reactor has become universally accepted as a nuclear-to-thermal energy converter, and now plays an important role in power utility planning, while for lengthy manned space missions the only practical energy source appears to be nuclear. Consequently, a basic knowledge of the principles of nuclear-to-thermal energy conversion is important to those involved in the design and operation of future space vehicles. *Ronald Press*

Tunnel Diodes

M. A. LEE, B. EASTER, H. A. BELL

As a new semiconductor device in 1957 the tunnel diode aroused considerable interest on account of its high-speed performance. As practical experience of the new device built up, this initial enthusiasm abated. It became apparent that device manufacture was not as free of problems as had been hoped, and that special problems were inherent in the application of a two terminal resistance active element. Enthusiasm for the tunnel diode had also been coloured by the state of the transistor art at a time just before the breakthrough in planar technology. However, continued device development yielded satisfactory tunnel diodes, and circuit work has shown two areas where the tunnel diode is particularly useful, as a low-noise microwave amplifier and as a fast switching element. In fact, the tunnel diode has achieved the distinction of being used as the low-noise pre-amplifier stage in the first "all solid-state" high-capacity long-haul microwave relay system to be put into regular communications service, and is currently the fastest switch available. *Chapman and Hall*

So You Want To Study Abroad

"Let's go" has become the rallying cry of thousands of young Americans who board ships and planes to spend a few weeks, months or even years abroad. Educational travel is great adventure, exciting and rewarding — but so is serious study abroad.

If you are one who wants to study abroad, then you must plan and prepare. It takes understanding to define your objectives, choose a program that best fits your needs, know how to prepare and, if you are a graduate student, where to seek scholarship aid.

Foreign study programs are available to undergraduate college students during the school year or for summer study, although it is generally recommended that American students go abroad for independent study only after graduation from college. College graduates fit more readily into life in the schools abroad on an independent basis. But, if you want to go, you must know *why* you want to go, *where* you want to go, *when* you should go, and *how much* it will cost.

The success of your project will depend upon your thoughtful investigation and advance planning. The right choice of country and educational institution is of great importance. And that means research and consultation. You should consult your own faculty adviser about your proposed study plan, or you might consult the leading clearinghouse of information in the field of educational and cultural exchange, the Institute of International Education.

The Institute's counseling division answers your questions on study opportunities in foreign countries through correspondence and personal interviews.

In order to have answers for the thousands and thousands of individuals who seek its help, IIE maintains comprehensive reference materials and a library of foreign university catalogues. It also distributes upon request descriptive outlines of university systems and enrollment procedures in most areas of the world. These include specific country information on language requirements, degrees offered, academic year fees, living accommodations and costs, scholarships — and suggest other sources of information.

Some of the questions that the Institute will help make you aware of in relation to studying abroad are: do you have the language proficiency for the country of your choice; is the course in your particular field of interest taught at the institution you wish to attend; can you "adjust" to a foreign university system; will you lose academic credits; will you find adequate housing; have you enough funds (because it is difficult to work your way through college there); what will you get that you can't get if you remain home; will the experience be stimulating and worthwhile?

A book that will give you insight into these problems — and many more — is IIE's *Handbook on International Study: For U. S. Nationals* which is recognized as a basic guide to study, training and exchange opportunities abroad. It presents data on systems and institutions of higher education in nearly 100 foreign countries. It also includes a listing of U. S. institutions that conduct undergraduate programs abroad during the academic year.

The Handbook is available in libraries throughout the country, or

(continued next page)

STUDY ABROAD...

can be purchased for $3.50 a copy from the Institute of International Education, 809 United Nations Plaza, New York, N.Y. 10017. The book also lists awards, special programs, information on teen-age exchanges, summer opportunities, organizations providing services to U.S. nationals going abroad, and government regulations affecting them during their travels.

Most of the young undergraduate Americans who go abroad each year are enrolled in United States colleges. Some, with permission of their home institution, plan their own programs and study abroad independently. Most are on college-sponsored programs. There has been an astonishing increase in the number of undergraduate study abroad programs in the last few years, accompanied by many problems which concern educators.

TELESCOPES...

offset Soviet gains. In 1930, Bernard Schmidt of the Hamburg Observatory revolutionized astronomical research with a new type of telescope. Called the Schmidt Telescope, a prototype of it—with a 48 inch correcting plate and 72-inch mirror—is a companion to the reflecting telescope on Mount Palomar. Now, the newest advances in astronomy may very well be made by the All-Reflecting Schmidt Telescope.

"The new instrument will make possible surveys of the universe in the far ultraviolet spectrum. Lens-type telescopes filter out the high intensity ultraviolet ray."

When adapted for use on the Manned Orbiting Research Laboratories, the Schmidt telescope will consist of two mirrors (one 15 inches in diameter and the other 30 inches) mounted at either end inside a 10-foot-long metal cone, with a sighter or view finder affixed along-side the cone.

Project scientist Lewis C. Epstein, principal developer of the revolutionary telescope, points out that the Chrysler telescope acts as its own camera. "It will be designed to operate as a very slow movie camera with each exposure taking at least 30 minutes".

Telescopes in outer space may also bolster the advances made by the radio telescope on earth. In 1931, Karl G. Janksy of the Bell Telephone Laboratory detected radio static which originated somewhere from bodies in outer space far removed from earth. The "radio starts" soon were located and studied by the radio telescope, a type of radio receiver equipped with large antennas that act as direction finders. Their one advantage is that they can work day and night to penetrate the Milky Way's vast clouds of interseller dust that are absolutely opaque to visual light.

In effect, then—with the turbulent, dusty atmosphere surrounding the earth finally removed—the clarity of photographs taken from telescopes in outer space should be spectacular and discovery-laden.

Another American first!

LINDER...

been thwarted by the engineering community in efforts to overcome the academic difficulties of adapting to the demanding realities of the present and of the world to come in science and engineering. Sensitive, creative and courageous response and action by educators who recognize the new relationships between science and technology, the increasing importance to engineering of the life and behavioral sciences, the new focal points of interest in engineering and the lack of relevance of the traditional disciplines to today's engineering — these have been and still are being challenged by strident voices in the engineering community.

An important key to the eventual passing of the crisis in engineering thus may lie in vigorous leadership by the academic community. It is heartening to see an increasing impact resulting from the assumption of this leadership by some colleges and universities. An influential and growing segment of the engineering community understands and applauds this favorable evidence.

About two thousand years ago Vitruvius, the Roman engineer, observed that the engineer "should be a man of letters, a skillful draftsman, a mathematician, familiar with historical studies, a diligent student of philosophy, acquainted with music, not ignorant of medicine, learned in the opinions of lawyers, familiar with astronomy and astronomical calculations. He should be fair-minded, loyal and, what is more important, without avarice, for no work can be done, truly done, without good faith and clean hands. Let the engineer not be greedy, nor have his mind busied with acquiring gifts, but let him with seriousness guard his dignity by keeping a good name."

To be sure, it may well be unrealistic in the modern world to expect every engineer to develop all the qualifications Vitruvius laid down, yet his perceptiveness of centuries ago still speaks urgently to the community of engineering. What Vitruvius demanded of the individual then, society demands of the engineering community today.

ACHTUNG!

DAS MACHINE IST NICHT FUR GERFINGER-POKEN UND MITTENGRABEN. IS EASY SCHNAPPEN DER SPRINGENWERK, BLOWENFUSEN UND POPENCORKEN MIT SPITZERNSPARKEN. IST NICHT FUR GEWERKEN BY DAS DUMMKOPFEN. DAS RUBBERNECKEN SIGHTSEEREN KEEPEN HANDS IN DAS POCKETS UND WATCH DAS BLINKENLIGHTS.

CHAPTER NEWS

EPSILON CHAPTER, Penn State University — In October, Epsilon Chapter held a smoker for the new pledges. Lawerence Perez, Assistant Dean of the Engineering College was the featured speaker. On November 20, twenty-four new members were initiated. Awards were given for the best pledge book, key, and the best pledge project essay. The ITT REFERENCE DATA FOR RADIO ENGINEERS handbooks were sold during the winter term to engineering students. The chapter also continued its weekly tutoring sessions for freshmen and sophomore engineering students. As in previous years the annual banquet will be held during the spring term.

KAPPA, Cornell University — Normally, the Kappa Chapter holds a banquet each semester to welcome our new members and to promote more student faculty interaction. This past fall semester, the banquet was replaced by a cocktail party with faculty wives and members' dates invited. The atmosphere of the big Red Barn and the singing of the Cayuga Waiters made it a memorable occasion. In fact the response was favorable enough to make it a regular fall activity.

Along with promoting social interaction between students and faculty, Kappa Chapter also acts as a feed-back concerning academics. Each semester surveys are used to evaluate courses from the students point of view, and then are made available to the faculty.

OMICRON CHAPTER, University of Minnesota — During the fall quarter Omicron chapter initiated eight seniors and one junior. An investigation was made into the possibility of offering a tutorial service for the undergraduate EE courses, but the department felt there was no need for this.

At present, plans are being made for participation in Campus Carnival, a charity fund raising event, and in the Institute of Technology Week exhibits. A social event is also planned for winter quarter.

BETA EPSILON, University of Michigan — During the fall semester of 1967, the Beta Epsilon chapter of Eta Kappa Nu initiated seven new members at a ceremony in the Michigan Union on November 29th. Pledge projects during the semester included the initiation of a project to involve members in the counseling of high school students interested in engineering studies, also looking into the possibility of lounge facilities for electrical engineering students on Michigan's new North Campus, and aiding in suggesting possible changes in the curriculum offered at Michigan. Beta Epsilon also joined with other honoraries and with Tau Beta Pi to provide qualified people to maintain a tutoring program to aid undergraduate engineering students in their studies. We look forward to even greater participation during the Winter semester this year.

BETA XI, University of Oklahoma — This semester marks the 25th anniversary of the Beta Xi Chapter of HKN. This event was recognized at the fall banquet on December 15 for faculty and HKN members. Present at the banquet was Professor Gerald Tuma, who was elected faculty sponsor for the coming semester at a prior chapter meeting. Incidentally, Professor Tuma was an initiate in the first HKN pledge class at O.U., in 1943.

At the banquet the new members were also recognized.

BETA OMICRON CHAPTER, Marquette University, Milwaukee, — on Wednesday, October 25, 1967, the biannual Smoker was held in Parlors A & B of the Holiday Inn Midtown, 2611 W. Wisconsin Ave. This Smoker allowed the prospective pledges and present members of HKN to meet each other on an informal basis.

Fourteen undergraduates were initiated into the Beta-Omicron Chapter on December 1, 1967. In honor of this occasion, immediately after the initiation a steak dinner banquet was held at Nino's Restaurant.

In addition to conducting help sessions for sophomore and junior EE classes, members are also visiting local high schools to talk to the students and answer their questions about Marquette and the College of Engineering.

The Chapter is continuing its efforts to establish an alumni chapter, and is preparing to sponsor the Annual All Engineering Honoraries Dinner Dance this spring.

BETA PI, City College of New York — This term marked the retirement of Prof. Henry B. Hanstein as faculty advisor to our chapter, a position he has held almost totally since the chapter's formation. At our bi-annual dinner party, held this term at the Hotel Victoria Abbey, tribute was paid to Pro. Hanstein in the form of a plaque commemorating his many years of unselfish devotion. Our traditional **Outstanding Sophomore Award** was redesignated in his name, and James Cunningham was its recipient.

After a highly successful orientation program our chapter has added 17 new members to its ranks. Prof. Paul Karmel was elected to become the new faculty advisor of the Beta-Pi chapter.

BETA RHO, West Virginia University — During the fall semester of the 1967-68 school term, Beta Rho Chapter initiated eight new undergraduate members and one faculty member, Dr. R. E. Lee. The new members were honored at the traditional semester banquet in which the chapter advisor, Prof. E. C. Barbe provided entertainment as guest speaker.

Among the semester activities was the joint purchase and operation with IEEE of a coffee pot for the electrical engineering department. Keeping the coffee pot filled and maintaining operation throughout the day was one of the pledge duties for the new initiates. Other activities include preparations for a special spring semester banquet.

GAMMA-BETA, Northeastern University — Thirty-seven brothers were brought into Gamma Beta Chapter at the fall initiation. The ceremony was followed by a banquet at which Dr. C. W. Dunlop of NASA Electronics Research Center was the speaker. Plans are being made for our spring initiation which will be unique in that we anticipate initiating evening school students for the first time in our Chapter's history. We are pleased to report that the teaching program at Boston Children's Hospital is being continued this year. Under this program, some of the brothers are teaching basic passive circuits, followed by basic electronics, to a group of electrocephlograph

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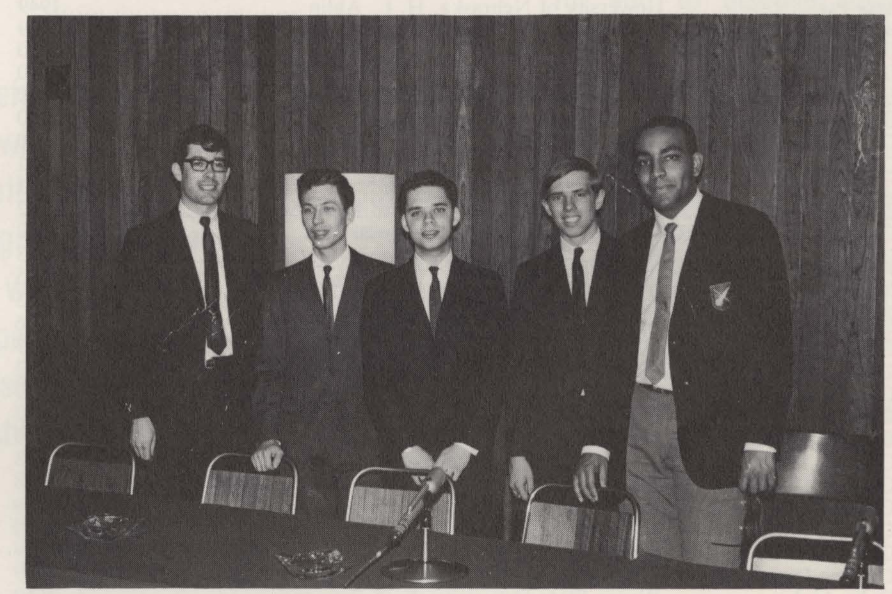


Officers of Beta Theta Chapter — M. I. T. — at a recent initiation. Left to right, Craig W. Kirkwood, Robert L. Voit, Kenneth P. Wacks, Craig T. Pynn, and Alan M. Gilkes

CHAPTER DIRECTORY

Alpha	University of Illinois, Daniel Hang	1904
Beta	Purdue University, Sabbagh-Kramer	1913
Gamma	Ohio State University, J. Gilfert	1907
Delta	Illinois Institute of Technology, E. Jones	1909
Epsilon	Pennsylvania State University, C. Holt, Jr.	1909
Zeta	Case Institute, P. Hoover	1910
Eta	Branches	
Theta	University of Wisconsin, J. Asmuth	1910
Iota	University of Missouri, G. Zobrist	1911
Kappa	Cornell University, Bryant	1912
Lambda	University of Pennsylvania, O. Salati	1913
Mu	University of California, C. Dalziel	1915
Nu	Iowa State University, C. J. Triska	1916
Xi	Auburn University, J. L. Lowry	1920
Omicron	University of Minnesota, E. R. Chenette	1920
Pi	Oregon State University, J. Engle	1921
Rho	University of Colorado, J. Maler	1922
Sigma	Carnegie Inst. of Tech., T. Hockenbery	1922
Tau	University of Cincinnati, R. H. Raible	1923
Upsilon	University of Southern California, W. Rusch	1925
Phi	Union College, Thomas Hoffman	1926
Chi	Lehigh University, W. Hollabaugh	1926
Psi	University of Texas, F. Bostick	1928
Omega	Oklahoma State University, J. Walden	1930
Beta Alpha	Drexel Institute of Technology, M. N. Kaplan	1935
Beta Beta	Polytechnic Inst. of Brooklyn, J. J. Bongiorno	1936
Beta Gamma	Michigan Tech., W. T. Anderson	1936
Beta Delta	University of Pittsburgh, D. E. Rathbone	1937
Beta Epsilon	University of Michigan, R. F. Fosher	1937
Beta Zeta	New York University, R. Cotellessa	1938
Beta Eta	North Carolina State University, W. T. Easter	1938
Beta Theta	Massachusetts Inst. of Technology, John Tucker	1939
Beta Iota	State University of Iowa, C. Kime	1939
Beta Kappa	Kansas State University, J. E. Ward, Jr.	1939
Beta Lambda	Virginia Polytechnic Institute, M. H. Hopkins	1939
Beta Mu	Georgia Institute of Technology, F. Nottingham	1941
Beta Nu	Rensselaer Polytechnic Institute, C. Close	1942
Beta Xi	University of Oklahoma, Gerald Tuma	1942
Beta Omicron	Marquette University, J. K. Sedivy	1945
Beta Pi	City College of New York, Paul Karmel	1946
Beta Rho	West Virginia University, E. C. Jones	1947
Beta Sigma	University of Detroit, G. Chute	1947
Beta Tau	Northwestern Technological Inst., J. VanNess	1948
Beta Upsilon	University of Kentucky, L. Bach	1948
Beta Phi	University of Tennessee, J. W. Waller	1948
Beta Chi	South Dakota School of Mines and Tech., C. W. Cox	1949
Beta Psi	University of Nebraska, H. L. Ablin	1949
Beta Omega	University of Connecticut, G. Dombrowski	1949
Gamma Alpha	Manhattan College, F. E. Weiser	1950
Gamma Beta	Northwestern University, W. Remillard	1950
Gamma Gamma	Clarkson College, A. G. Lindgren	1950
Gamma Delta	Worchester Polytechnic Inst., R. Krackhardt	1950
Gamma Epsilon	Rutgers University, D. Malony	1950
Gamma Zeta	Michigan State University, M. G. Keeney	1951
Gamma Eta	Syracuse University, J. Brule	1951
Gamma Theta	Missouri School of Mines and Met., McPherson	1952
Gamma Iota	University of Kansas, W. Smith	1952
Gamma Kappa	Newark College, R. Anderson	1953
Gamma Lambda	Columbia University, T. E. Stern	1955
Gamma Mu	Texas A & M., H. M. Barnard	1955
Gamma Nu	Texas Technological College, W. Phillips	1956
Gamma Xi	University of Maryland, J. H. Rumbaugh	1957
Gamma Omicron	Southern Methodist University, G. Schmalling	1957
Gamma Pi	University of Virginia, O. R. Harris	1957
Gamma Rho	South Dakota State University, W. Gamble	1957
Gamma Sigma	University of Utah, R. Stephenson	1958
Gamma Tau	North Dakota State University, D. Peterson	1958
Gamma Upsilon	John Hopkins University, C. F. Miller	1958
Gamma Phi	University of Arkansas, B. Webb, Sr.	1959
Gamma Chi	New Mexico State University, H. Brown	1959
Gamma Psi	Lafayette College, J. Reifsnyder	1959
Gamma Omega	Mississippi State University, C. Monier	1959
Delta Alpha	Wayne State University, E. A. Szmanski	1960
Delta Beta	Lamar State College of Tech., R. Carlin	1960
Delta Gamma	Louisiana Polytechnic Inst., R. M. Steer	1960

(Continued on Page 24)

SENIORS . . .

Opportunities are available for students interested in M.S. and Ph.D. level study and research in Electrical Engineering. Areas of specialization are Circuits, Communication, Computers, Control, Electric Power and Energy Conversion, Electromagnetic Fields and Waves, and Physical Electronics. Financial Assistance is available for qualified M.S. and Ph.D. level students. Write Chairman, Electrical Engineering Department, University of Missouri at Rolla, Missouri 65401.

CHAPTER NEWS (continued)

technicians. Other projects include the gathering and cataloguing of graduate school information and outlining of a number of projects available to seniors as an aid in choosing a suitable project for the senior laboratory requirement.

GAMMA XI, **University of Maryland** — The brothers of the Gamma Xi Chapter of HKN undertook a series of programs to aid the Electrical Engineering Department at the University of Maryland in its relationship with the student body. Before classes had started in the fall, the first phase went into effect. Members took turns assisting at registration, thus relieving the advisors of many routine matters. Plans are now underway to continue this service for the spring semester registration. Once classes had resumed, a tutoring program was established for the underclassemen in their basic EE courses.

In order to acquaint engineering students with their faculty, the Chapter, with the assistance of the pledges, constructed a mahogany and glass faculty display case. This case houses a picture and a list of the degrees of each member of the engineering staff.

Plans are now being completed for the Annual Open House for the College of Engineering. A ten-minute film and three projects will demonstrate some aspects of electrical engineering that are taught by the Department. The Open House will be held in February.

GAMMA PHI, **University of Arkansas**— Gamma Phi Chapter has been instrumental in refurnishing the Electrical Engineering Undergraduate Lounge with a grant made available to the chapter by International

(Continued on Page 24)

Delta Delta	University of Denver, P. D. Smith	1960
Delta Epsilon	Ohio University, W. Fakey	1960
Delta Zeta	Washington University, R. J. Koopman	1960
Delta Eta	University of Massachusetts, J. Fitzgerald	1960
Delta Theta	Pratt Institute, A. Seidman	1961
Delta Iota	Louisiana State University, R. T. Nethken	1961
Delta Kappa	University of Maine, W. W. Turner	1961
Delta Lambda	Duke University, E. Kraybill	1961
Delta Mu	Villanova University, J. J. Hicks	1961
Delta Nu	University of Alabama, R. E. Lueg	1962
Delta Xi	Air Force Inst. of Tech., R. A. Hannen	1962
Delta Omicron	University of New Mexico, D. C. Thorne	1962
Delta Pi	Colorado State University, R. M. Wainwright	1962
Delta Rho	University of North Dakota, J. Dixon	1962
Delta Sigma	University of Notre Dame, L. Stauder	1962
Delta Tau	University of Southwestern Louisiana, W. H. Hall	1962
Delta Upsilon	Bradley University, J. Jones	1962
Delta Phi	University of South Carolina, H. Noland	1962
Delta Chi	Cooper Union, E. W. Starr	1962
Delta Psi	Saint Louis University, G. E. Dreifke	1963
Delta Omega	University of Hawaii, B. S. Granborg	1963
Epsilon Alpha	Cleveland State University, E. A. Klingshirn	1963
Epsilon Beta	Arizona State University, A. V. Donnelly	1963
Epsilon Gamma	University of Toledo, O. W. Muckenhirn	1963
Epsilon Delta	Tufts University, R. Goldner	1964
Epsilon Epsilon	University of Houston, T. N. Whitaker	1964
Epsilon Zeta	Lowell Institute of Tech., J. E. Powers	1964
Epsilon Eta	Rose Polytechnic Institute, C. A. Rogers	1965
Epsilon Theta	California State, Long Beach, C. E. Williams	1965
Epsilon Iota	San Jose State University, C. Glover	1965
Epsilon Kappa	University of Miami, W. C. Knopf	1965
Epsilon Lambda	Vanderbilt University, R. Bourne	1966
Epsilon Mu	Arlington State University, C. W. Jiles	1966
Epsilon Nu	California State, Los Angeles, V. Payse, Jr.	1966
Epsilon Xi	Wichita State University, C. H. Dunn	1966
Epsilon Omicron	University of Delaware, M. G. Young	1966
Epsilon Pi	Princeton University, L. P. Davisson	1967
Epsilon Rho	Tenn. Tech. University, S. G. Lele	1967
Epsilon Sigma	University of Florida, J. R. Smith	1967

Paper Company. These furnishings consisted of eight leatherette swivel chairs, one conference table, and one combination magazine and bookcase rack.

Present plans consist of completing the acquisition of the various miscellaneous articles to complete the furnishings in the lounge and helping to instill better faculty-student relations in the Electrical Engineering Department at the University of Arkansas in Fayetteville, Arkansas. Activities for the spring semester include a banquet and a social outing.

GAMMA TAU, North Dakota State University —Gamma Tau chapter of HKN initiated 21 new members on December 12, 1967. Four of the new members are on the faculty of NDSU.

Following the initiation, a banquet was held at the M & J Steak House. The number attending included many faculty members and wives and girlfriends.

Phil Hetland of the Physics Dept. was the guest speaker, and he gave a very thoughtful talk on the emptiness of the life of the average modern man today.

The chapter is holding help sessions once a week for students struggling through sophomore physics. Turnouts at these sessions have been good, with up to 20 in attendance.

An effort is being made in the form of initiation projects to find the names and addresses of all graduates of the Electrical Engineering department of NSU. Much progress is being made in this area by the enthusiastic students involved.

Another project under active investigation is the development of new exhibits for Sharivar, the annual NDSU open house, which lasts a weekend and attracts many parents and alumni from a wide area. New exhibits are expected in the fields of electronics, power systems, and computer science.

DELTA NU, University of Alabama — The activities of Delta Nu chapter were centered around a new project to promote interest for prospective members and to perform a useful service for the E.E. department. Among ideas discussed were "help sessions" and plans for participation in the Engineer's Day activities in the spring.

On December 13, 1967, Delta Nu initiated seven new undergraduate members. Following the initiation was an informal supper party at the home of Dr. R. E. Lueg, our chapter advisor. New officers were elected for the following semester.

EPSILON THETA, California State, Long Beach — The fall 1967 semester was very successful for the Epsilon Theta chapter. The chapter's tutoring service continued to expand in both the number of classes and number of students tutored. The chapter initiated ten members this semester. Following the initiation ceremonies a banquet was held at the Jolly Roger Inn across from Disneyland.

The pledge projects included the formation of a job file of the local industries and a file on graduate schools.

The semesters activities were highlighted with a very successful Christmas-New Years party.

NEW YORK ALUMNI CHAPTER — The New York Alumni Advisory Council of HKN met on December 13, 1967 at Newark (N.J.) College of Engineering in order to discuss means of stimulating interest in the New York Alumni Chapter. Professor Fred Russell had very kindly arranged for the use of the NCE Alumni Lounge and for an excellent dinner and refreshments preceding the meeting.

Several very practical suggestions were made and one of these — a theatre party — is being planned for early in 1968. It was suggested that, if successful, this event could in the future support an HKN scholarship fund. Other suggestions included a dinner party to precede the theatre event, a welcoming social for new classes and a metropolitan chapter get-together. The undergraduates of the numerous NY alumni chapters are to be invited to meet at NCE during the fall, and the graduates to meet in New York City in April.

Larry Dwon pointed out one reason for the diminished activity in New York. The chapter, he felt, suffered particularly because Bell Telephone Laboratories had moved from New York to New Jersey. He therefore suggested two separate groups under New York Alumni guidance, a New York group and a metropolitan New Jersey group. The New York chapter, he said, was at one time recognized as a most active chapter, and service organization, and could again rise to the forefront. He cited some past successes of the chapter. The national organ, "The BRIDGE" was founded in NY, as were also the Eminent Member Award, the Outstanding Young Electrical Engineer Award, and the College chapter Activities Award. In addition, during the depression, the New York group ran a very successful employment exchange.

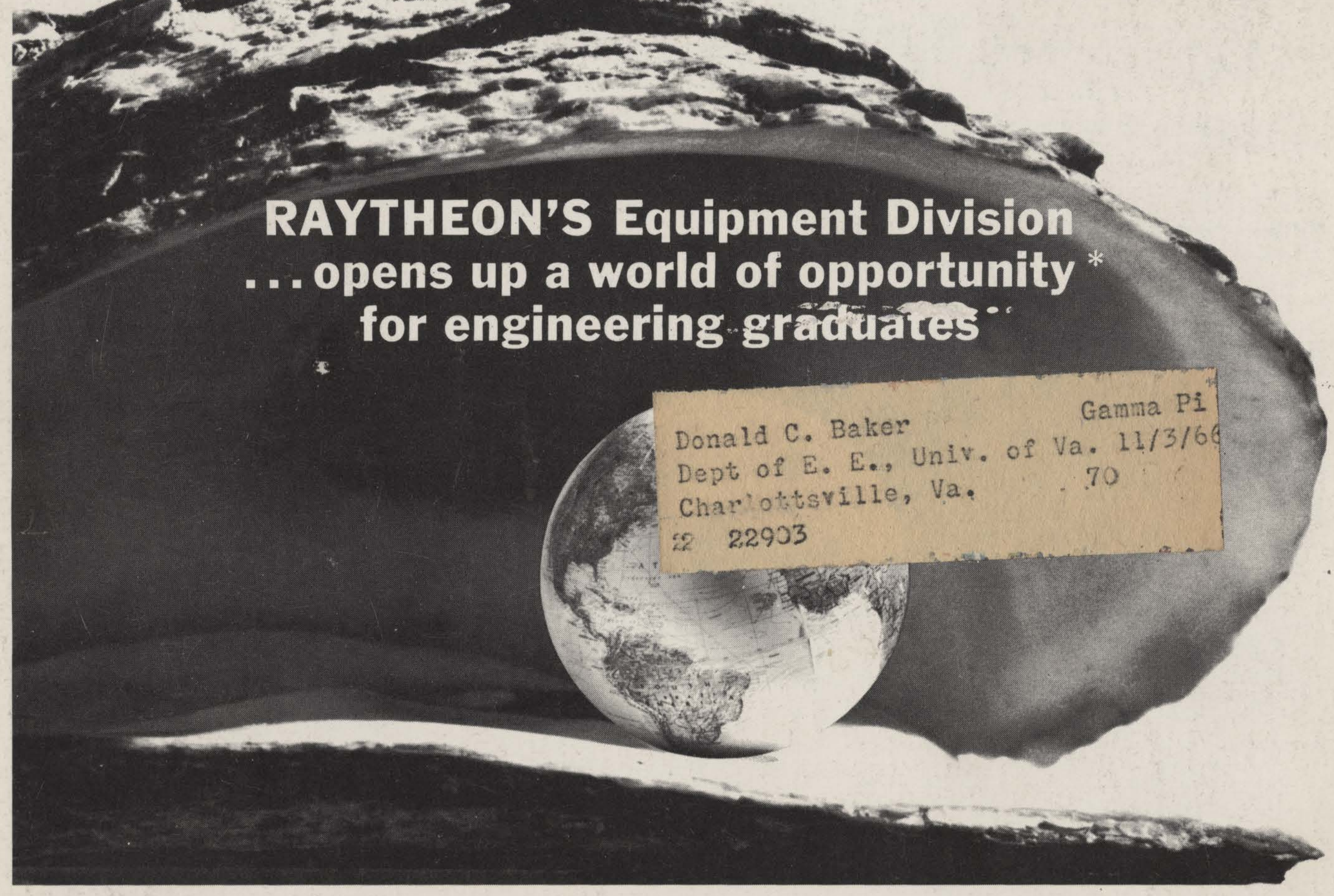
The Council meeting was attended by past and present officers of National and New York Alumni Chapter including brothers Bob Deasy, Larry Dwon, Irv Engelson, Willard B. Groth, Al Lefkow, Ben Lewis, Leon Nock, Hal Perlis, Fred Russell, Roger Wilkinson and Bert Sheffield.

FROM THE MAIL BAG

Dear Sirs:

I received my current copy of *The Bridge* today. I especially enjoyed reading *"Cycles and Bells"* and the advertisement from Westinghouse. I found the article on *"Investments"* enlightening.

Gary David Gray
Santa Ana, California



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