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(2) Submit the form by January 1 of the year in which you want to begin graduate studies.

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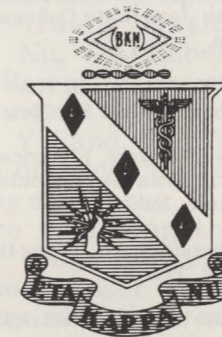
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ETA KAPPA NU

Electrical Engineering Honor Society

NOVEMBER, 1969, Vol. 66, No. 1

CONTENTS

Real and Imaginary	2
National Directory.....	2
Santa Barbara Chapter.....	3
New National Officers	4
New York Regional.....	6
A Fireside Chat.....	8
Special Supplement.....	9
Review of Chapter Reports.....	18
Letters From Ellery	19
Kansas Regional	20
Great Sahara Mousehunt.....	22
Chapter News.....	23

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OUR COVER

The Broadwalk on the campus of the University of Illinois, Urbana, on a busy afternoon. The Illini Union is in the background.

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

The history of

CANDY

Candy—that wonderful sweet treat, by gum—has a history as chuck full of fascinating problems as a box of chocolate has fillings.

It all began thousands of years ago in ancient Egypt when, good children were given a honey-based confection made with nuts, figs and spices.

Oriental, however, came up with another sweet thought—assorted fruits preserved in a honey solution.

In the Middle Ages a confection, concocted from sugar, rose water, and "gum dragon", was administered only to those who were ill, and the medicine was mixed in with the sweetness.

Later, Europeans preferred a more elaborate recipe which is still popular today. It was marzipan, prepared—then as now—by pounding almonds and

pistachoes into a paste and blending this with sugar and egg white.

Historians do not bother to mention whether "sugarplums" (so popular in nursery rhymes) were actually made with genuine plums, but we know they were enjoyed in England in the 17th century. The English were also responsible for the birth of candymaking as an industry. The occasion was the famous 1851 exhibition, when manufacturers of other countries came, saw, tasted—and duplicated the goodies.

Americans, of course, got into the act. By the middle of the 19th century 380 well established small factories were offering a variety of lozenges, stick candy and jujube paste. This last is obsolete today, but two new confections took its

(Continued on page 24)



NATIONAL DIRECTORY

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Anthony Gabrielle, National Vice President, American Electric Power Co., 2 Broadway, New York, N.Y.

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SANTA BARBARA IS EPSILON TAU

Epsilon Tau Chapter of Eta Kappa Nu was formally installed at the University of California at Santa Barbara on May 29, 1969.

An induction team consisting of William Bonser, HKN Director, Professor Vincent Giroux, faculty advisor of Epsilon Nu, George Haan, President of Epsilon Nu, Dr. Robert MacMillan, President of Los Angeles Alumni Chapter, and George Yelland, Pacific Telephone Company, all from the Los Angeles area, had the pleasure of seeing this new chapter come into existence.

Director Bonser opened the ceremony with the reading of the chapter's charter. The team then inducted thirty-four (34) initiates which included two professional members. These men are Dr. John Skalnik, Chairman of the Electrical Engineering Department and Charles Harrison, Assistant Dean of Engineering.

Following the induction ceremonies, an installation of officers was held. Charter President Donald Gibson was presented the chapter gavel from the National Association.

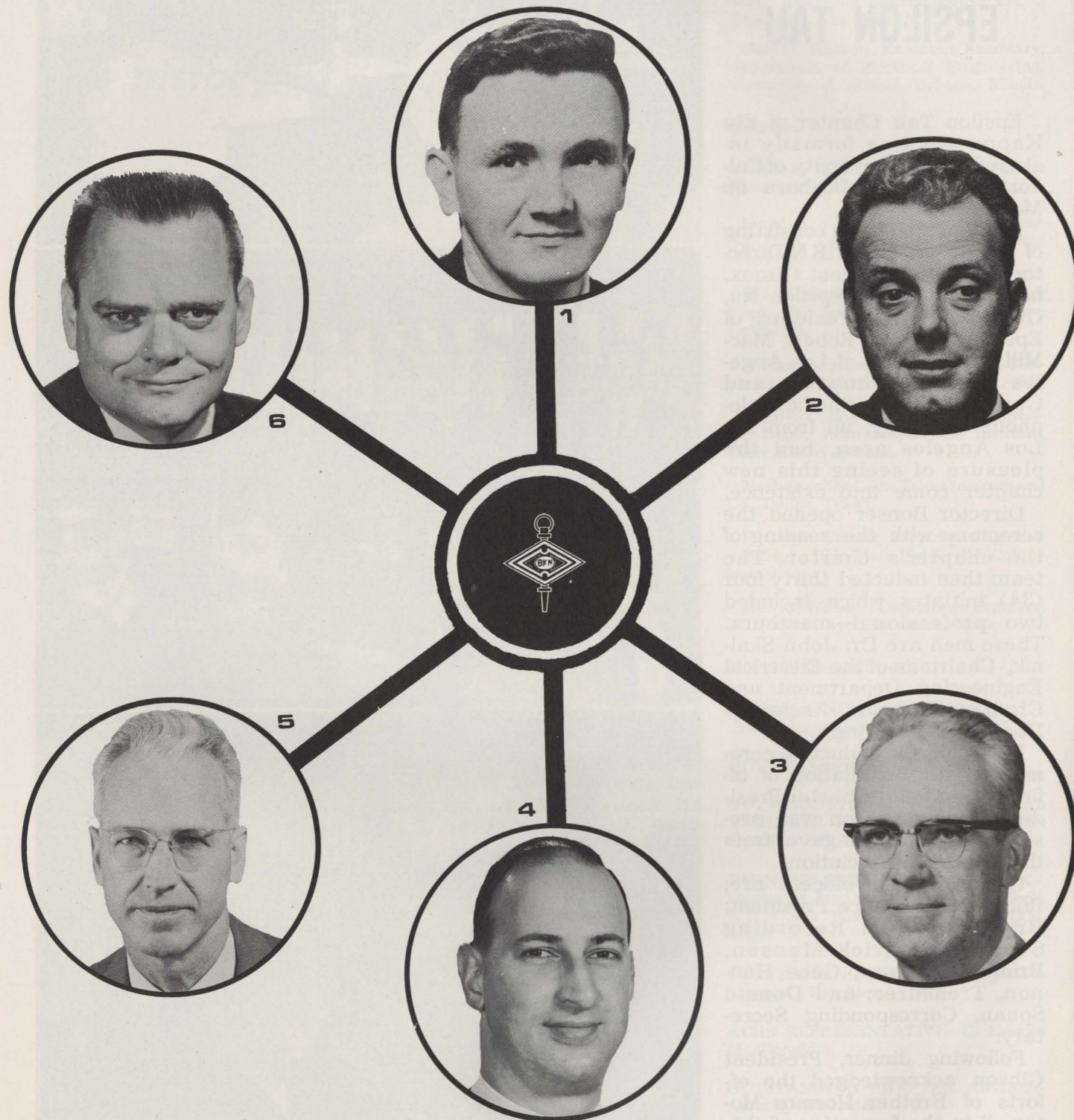
Other Charter officers are; Robert Farley, Vice President; Bryan Boswell Recording Secretary; Erick Mansen, Bridge Secretary; Gene Hannon, Treasurer; and Donald Spaan, Corresponding Secretary.

Following dinner, President Gibson acknowledged the efforts of Brother Hormoz Motanedi in the formation of this chapter and brought greetings

(Continued on page 24)



NEW OFFICERS AND DIRECTORS



1. Our new National President, Professor John Hancock, Head of the School of Electrical Engineering at Purdue University, Lafayette, Indiana received his Ph.D. degree from Purdue in 1957. During the following eight years, he moved from Assistant Professor in Electrical Engineering in 1957 to Associate Professor in 1960 and full Professor in 1963; in 1964, in addition to his teaching and research duties, he was named Director of the Electronics Systems Research Laboratory within the Electrical Engineering School. In September of 1965, he became Assistant Head of Electrical Engineering for Research and, in October of the same year, moved into his present position as Head of the School of Electrical Engineering.

During this period from 1957, he has also acted at different times as electronic scientist and staff consultant at the U.S. Naval Avionics Facility, Indianapolis, Indiana, as a member of the technical staff at Hughes Research Laboratories, Culver City, California, and as a consultant to Ramo-Wooldridge Corporation, Los Angeles, California, Emerson Electric Company, St. Louis, Missouri, ITT Kellogg Space Communication Laboratory, Ft. Wayne, Indiana, Page Communications Systems, Washington, D.C., as well as to General Electronics Laboratory at Cambridge, Massachusetts.

He has credited to him over twenty-five published articles in scientific journals and presentations at national and international conferences. The book, "An Introduction to the Principles of Communication Theory", McGraw-Hill, 1961 is used in numerous universities, and a second book is forthcoming entitled "Signal Detection Theory", also by McGraw-Hill.

2. Vice President for the coming year will be Mr. Anthony Gabrielle, Assistant Head of the System Operating Division, American Electric Power Corporation, New York City.

He received his Bachelor's and Master's degrees in electrical engineering from M.I.T. and holds a second Master's degree in Industrial Management from M.I.T. A past president of the New York Alumni Chapter, he has been active in Eta Kappa Nu affairs for many years.

He has published widely in technical journals and has been very active in community affairs. He has been a leader in Community Chest Drives, and officer of Municipal Civil Defense and a YMCA leader.

3. The east Central Region will be represented by Dr. F. Carlin Weimer, Vice Chairman of the Electrical Engineering Department at Ohio State University.

He received the B.S. in EE degree from Ohio University in 1938 and the M.Sc and Ph.D. degrees from The Ohio State University in 1939 and 1943 respectively.

He has had industrial experience in engineering at Delco Products and A.C. Spark Plug Divisions of General Motors Corporation and research experience at Massachusetts Institute of Technology and the University of Illinois as well as The Ohio State University Research Foundation. He has also served as a consultant to several industrial and research organizations.

He was active in reactivating Gamma Chapter of Eta Kappa Nu after World War II and served as its Treasurer and Faculty Advisor.

4. Mr. Melvin M. Weiner was elected to represent the Eastern Region. He received the

S.B. and S.M. degrees in Electrical Engineering from M.I.T. in 1956, having been enrolled in the cooperative honors program. He is presently a Consulting Engineer in private practice. He is the author of more than a dozen papers, and the holder of two patents in the areas of physical electronics, optics, magnetics, and electromagnetics.

He is a past President of the Boston Alumni Chapter and is responsible for the establishment of National Engineer's Week and the Motor Vehicle Safety Group.

5. Professor Ed. C. Glover of San Jose State College will represent the Western Region of HKN. He received the BSEE degree from Kansas State College and the A.M. in Mathematics from Colorado State College. He has been Professor of EE at San Jose since 1951. Prior to that he was Chairman of the EE Department at California. Also he was a Research Engineer for Dalmo Victor Co., and a Design Engineer for Consolidated Vultee Corp.

6. Elected to represent the West Central Region is Mr. Mark Shepherd, Jr. Mr. Shepherd was elected President of Texas Instruments Incorporated, just under 20 years after joining the company. He received the BSEE degree from Southern Methodist University and the M.S.E.E. from the University of Illinois. He was appointed executive vice president of T.I. in 1961, elected to the Board of Directors in 1963, and became president in 1967.

He is Chairman of the Board, Southern Methodist University Foundation for Science and Engineering, and a member of the Board of Trustees of the University. He is a member of the Board of Directors of the American Management Association.

NEW YORK REGIONAL

On April 19, 1969 eight chapters participated in the third Eta Kappa Nu New York Regional Visitation held within the offices of the American Electric Power Service Corporation in New York City.

Mr. John Provanzana, Chairman of N.Y. Alumni Regional Visitation called the meeting to order at ten o'clock and officially welcomed the attending members. Mr. Alan Lefkow, Vice President of N.Y. Alumni Chapter was then called upon to preside over the meeting. Mr. Walter McAdam, represented the National Board of Directors.

For the remainder of the morning session the delegates presented a report of their chapter's achievements and any existing problems. These problems were fully discussed and solutions presented during the afternoon session.

Below is a synopsis of each chapter's accomplishments:

Delta Theta—PRATT INSTITUTE—Mr. J. Cannatelli

During the past year this chapter has initiated a program to foster a harmonious relationship between the college and the surrounding community of Bedford Stuyvesant. Phase one of this program consists of sending several volunteer members, toys and books to a local hospital. Since this project has proven successful it will be continued on a permanent basis. Hopefully by this coming autumn the program will incorporate several more phases.

The Delta Theta chapter, due to its small enrollment, decided to join forces with IEEE. This combined group is presently engaged with a "Moon Bounce Project." They are also seeking permission from NASA to communicate with the astronauts on the next moon shot. The point was brought up that most of the necessary equipment for these projects was solicited from companies. They have discovered that to be successful in obtaining any form of sponsorship it is necessary to present to these companies an organized plan outlining the utilization of the desired supplies.

BETA Pi—City College of the City University of N.Y.—Mr. J. Moscovice, Mr. Jo Lo Cicero, Mr. J. Franco

Beta Pi Chapter has a similar program as Delta Theta. The chapter is interested and involved in establishing concord between the

university and the neighboring community. They have made their tutoring services available to the SEEK program, a program where high school students with low scholastic standings are given a chance to prove that they are capable of meeting the university's standards.

At the next induction dinner they will honor a member of the faculty with their annual "Teacher of the Year" award.

The main problem encountered within the chapter is apathy. To encourage members to attend the meetings they have had to threaten delinquent individuals with suspension. Needless to say the officers are not satisfied with this solution.

Gamma Alpha—Manhattan College—Mr. R. Bagnell, Mr. K. Bedford

In order to eliminate any apathy that might exist Gamma Alpha has evolved into a social honor society. They have sponsored faculty members sporting events, dinners and picnics.

Pledges are required as part of their initiation to develop pertinent electrical exhibits for the College's "Campus Day". In this way underclassmen and visiting high school students can gain a little more insight into the activities of an electrical engineering student.

This chapter conducts special meetings whereby the Juniors can obtain information pertaining to the courses listed in the schools' catalog.

The major difficulty encountered is the lack of continuity in chapter operations. This problem has arisen since the officers assume their positions in September of their senior year, and remain in office for the full school year. Hence, when the next group of officers take over the following year there is no one remaining to explain the duties of each position. Steps are being taken to use the faculty adviser as the link between one administration and the next.

Gamma Kappa—Newark College of Eng.—Mr. W. Tukroszek

Gamma Kappa, situated within a slum area, has also been concerned with improving the college's relationship with the community. Several of their members are teaching within "The Second Chance Program."

Their other function is to aid the Electrical Engineering Department in any way possible. Enlarged "Schmitz Charts" were constructed for demonstration purposes and a biography of the faculty was published so that a student, interested in a specific field, could determine which professor would most likely be able to guide him.

This chapter has experienced some difficulties in obtaining lecturers from outside their college.



Also, as in several other chapters, the members exhibit a lackadaisical attitude towards their responsibilities.

Gamma Lambda—Columbia—Mr. R. Slusky

In order to function effectively Gamma Lambda has joined forces with the IEEE and Tan Beta Pi chapters, annually where skits, satirizing the invited faculty members, are presented. This event has proven to be quite successful.

Meetings for the Sophomores are offered such that any queries concerning the electrical Engineering curriculum can be answered.

It is the opinion of this chapter that the official induction ceremony should be rewritten to bring it up to date.

Epsilon Pi—Princeton University—Mr. D. Spencer, Jr. J. Tang

This relatively new chapter is extremely small and was instituted approximately three years ago. Their major problem consists of keeping the chapter in existence. Officers are elected in the middle of the year so that their continuity is never jeopardized.

They also expressed a desire to have the induction ceremony changed to make it more appropriate for today's students.

KAPPA—Cornell University—Mr. J. Haber

The problems experienced by this chapter are similar to those encountered by the other chapters, with apathy ranking as the major difficulty.

In order to keep the students informed on the activities of the chapter a bulletin board is maintained and a coffee hour will be instituted. Also, to improve the relationship between the faculty and students a dinner dance is to be held. The officers, due to a favorable financial position of the treasury, are contemplating a gift for the university.

BETA ZETA—New York University—Tso Q. Yip

Having at most only 20 members in one school year, Beta Zeta has encountered the problem of continuity of leadership. It is this chapter's belief that, if the graduate students could take an active part in the administration, this difficulty could be alleviated.

Due to a low financial standing this chapter has joined forces with Tau Beta Pi and IEEE in presenting social activities, such as the initiation banquet.

An interesting practice of this chapter is that the pledge members are given an entrance exam, the main purpose of which, is to show these students that they still have a great deal to learn.

—By E. Cardelli & J. Provanzana.



Sixth in a Special BRIDGE series.

A FIRESIDE CHAT with Cleo Brunetti

Those providing equipment for the home, by 1975 will have color video-tape recorders in TV sets. Video recorders are like music tape recorders except both the sound and picture are put on the same tape. Color video recorders should be on the market shortly but I am afraid they may cost as much as \$2,000 if not more. By 1975, we should have the price down to a few hundred dollars added to the cost of the regular TV sets. Combined with a color camera in which one can take color pictures at home, these recorders should be popular. They will also allow one to pick up programs at times when one cannot be home, using timers like (those on) the kitchen stove. The TV networks are considering (putting) programs on in the middle of the night which can be picked up by a recorder and played back at the convenience of the owner.

Perhaps the most interesting

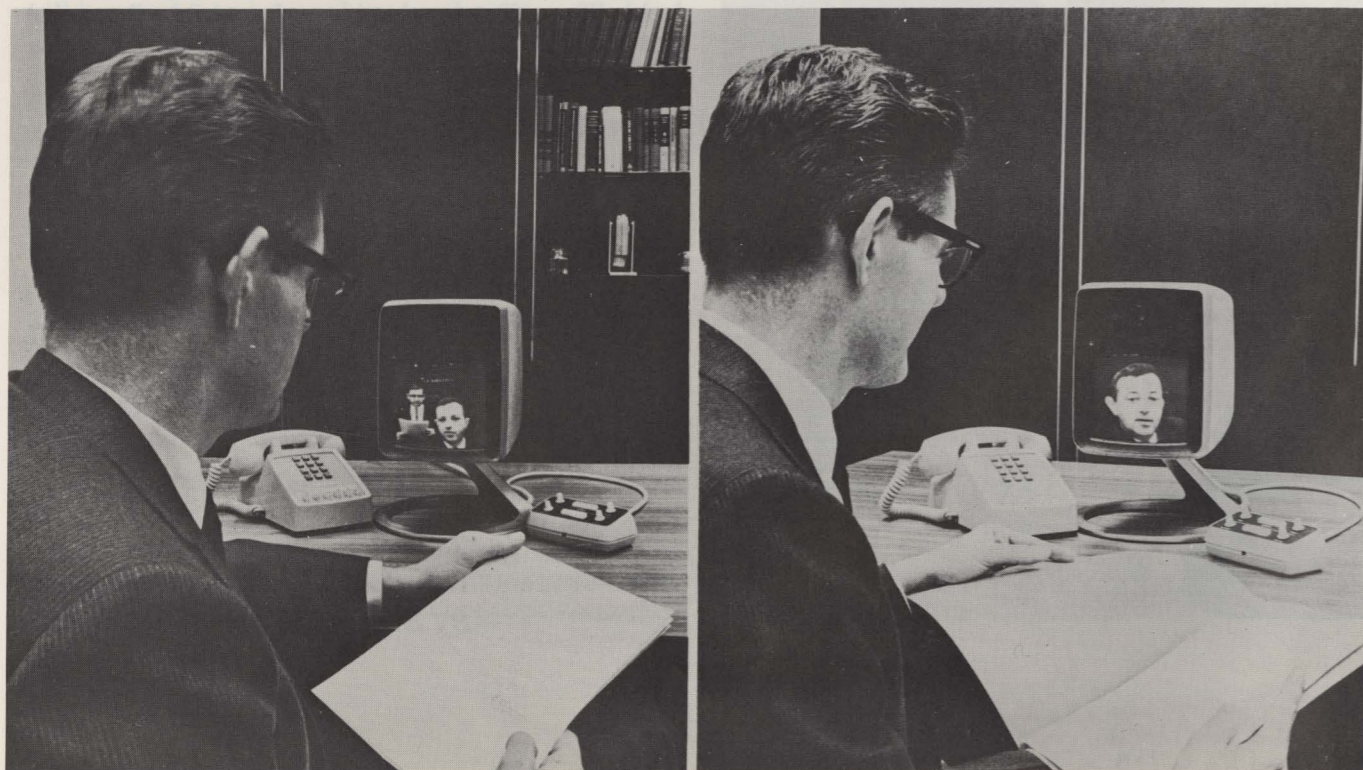
development in television will be the thin screens that can be mounted on the wall just like a picture. I saw these demonstrated years ago in television research laboratories but the price is still too high. By 1975 we should have picture size TV sets, say about 2 feet high, 3 feet wide and 3 inches thick that you can hang on the wall. By 1975 research should be well underway using the new laser technology to produce 3 dimensional pictures that will fill a whole wall of the room. The new science is called holography. The 3D pictures now being produced by the use of lenticular lenses provide a very real 3D effect on a flat picture. Holography should improve this considerably.

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

COMMUNICATION

Our education today is not confined to classrooms, teachers, and blackboards. The communications industry, radio, television and those who print our books, magazines and newspapers are well aware of the role they play in our learning . . .

A new PICTUREPHONE® see-while-you-talk set recently unveiled by Bell Telephone laboratories.



I Heard
the bells on
Christmas
day

Their
old familiar
carols
play

And wild
and sweet
the words
repeat

Of peace
on earth
good will
to men

I Heard The Bells In The Country



The Story Of Bells

Writing the history of bells and bell casting is a more arduous task than trying to relate the story of carillon playing. Carillon playing is a comparatively "young" art, and can be traced through documents, writings and prints, but most of all, through city records of The Netherlands.

But the history of bells and to a great extent, the casting of bells, is a much more elusive matter. The making of bells and the art of forging metal has been lost in the mists of antiquity. We will then have to look to the artwork of the ancient peoples and to the few discovered bells of the great cultures of the past. Long before our era, the mainland of China knew the bell in a highly developed form, and many a historian tends to approve of the theory, that the bell was created or discovered in China . . . some say by one of their emperors long before 2000 B.C.

This theory has its worth, but it does not exclude the fact that bells in all sizes, and shapes were found in the Near East. The old Chinese bells that we know of, do not in any way resemble the form of the early medieval European bell, nor is the material used in the Chinese bell of the same composition. Form, material (the bronze) and even the sound of the Chinese bells are different.

In the old European bells we come across a bell mixture of 20 — 25% tin, with the remaining percent being copper. The requirements for the Chinese bell, fixed by official Imperial decree were 1/7 or 1/6 tin. This would call for a much less sonorous sound of the Chinese bell.

We also have to keep in mind, that the bronze culture of China seems to have been not very much older than 1300 B.C. Several historians believe that this means that the Chinese bronzecasting technique was imported in an already advanced form from China's neighbors, more specific: from the middle East. This is the view of Dr. Wiesner who would like to look for the cradle of the bell in the Near East.

Then, let's look first at the nations who were in this general area and the ancient cultures around the Mediterranean sea area.

Egypt had very little to offer in the way of mineral resources. Gold was found in Nubia and goldsmith craft developed fast. As for copper, the main ingredient for bell casting; little was found in Egypt itself. Copper, which already at an early date supersedes "flint" as the material used for implements, was obtained from mines in the Sinai peninsula. In Egypt there is evidence of the use of bronze, an alloy of copper and tin, only from the Middle Kingdom onward.

Some Assyrian bells were discovered by the excavation of the ruins of Nineveh and later of Nimrud by Sir A. H. Layard, (1817-1894) presumably, they are some of the oldest bells of which we have any record. Bronze Egyptian bells discovered in tombs resemble those of the Assyrians. This points again to the theory of early bell founding in the Middle East. Trading is as old as civilization, and bells cast in Babylon could easily have been traded for Egyptian goods.

From the Bible we know that the Israelites were accustomed to work with metals and that bells, whatever their size and shape were used in their worship, together with cymbals and trumpets.

The Japanese did experiment with their own bronze designs. In the early Yayoi culture, the Chinese artistic influences through Korea were very strong. By the early third century B.C. a people of Mongoloid blood from South China came to Japan and during the following centuries expanded into most of the main islands of Japan, merging with or driving out the earlier inhabitants. These Yayoi people brought with them a knowledge not only of bronze but also of iron, which from that time onward was to be used extensively.

Chinese artistic influences through Korea were very strong, but the Japanese did experiment with their own bronze designs. The most notable are the large bronze bells "dotaku", which are entirely Japanese in shape and decoration. These bells are of all sizes. Starting as very rough products, they reached a high degree of sophistication.

Bells of bronze by the Urn-burials of Adichanallur, India, are related to the Bronze Age finds in Palestine (Gaza, Geron) and Cyprus, and bronze bowls found in the Deccan (Purandhar, India) are quite similar to those found at Nimrud, Assyria and Wan, Armenia.

This brings us to the conclusion, that China, Japan, Burma, India, Mesopotamia and other ancient civilizations knew bells and made use of them in different forms and for different purposes, so long ago that tracing their origin becomes impossible.

The use of these bells? Almost for every daily need: for calling worshippers to the temples, alarm, shipbells, animal bells. (The use of cowbells in the Alps and animal bells in the Andes.)

The Buddhists, almost invariably, use bells in connection with their worship and the Llamas of Lhasa, in Tibet, wear a tinkling bell in their hats. The Gonds have elevated the bell into a deity, in the form of Ghagh-rapen or "Bell God", and in Madras the Sacred

buffalo-bell hangs from the necks of the finest buffalo of the herd.

The Jewish historian Josephus wrote that "King Solomon had large golden (?) bells on the roof of the Temple of Jerusalem. Bells are spoken of in Jewish literature and later they are mentioned by the Greeks and the Romans. It is recorded that Octavianus, 63 B.C.-A.D. 14, who later became Emperor Augustus, hung a bell before the temple of Jupiter in Rome.

Clapper type copper bells were found in Peruvian tombs presumably dating back to the pre-Incan era. The beginning of the metal age in Peru was around 500 A.D. They point to a relationship with the Asiatic bells. Some of these bells are now preserved in the Museum of Antiquities in Lima, Peru.

Approaching the advent of our Western civilization, the bell's shape takes two different directions: the Western "cupshaped" and the Oriental "pot and bowl" bells. However, many times these forms overlap each other and some of the very early Western bells are closely related to the "pot and bowl" shape of the Oriental bell.

It may be wise to explain what is meant by "pot and bowl" opposed to "cup" shape. A "pot" is a bell with almost straight sides and a height that exceeds its diameter; a "bowl" is a bell the diameter of which far exceeds its height; and a "cup" is a bell of almost equal height and diameter, with convex sides, which means curving outward, bulging out at the foot of the bell.

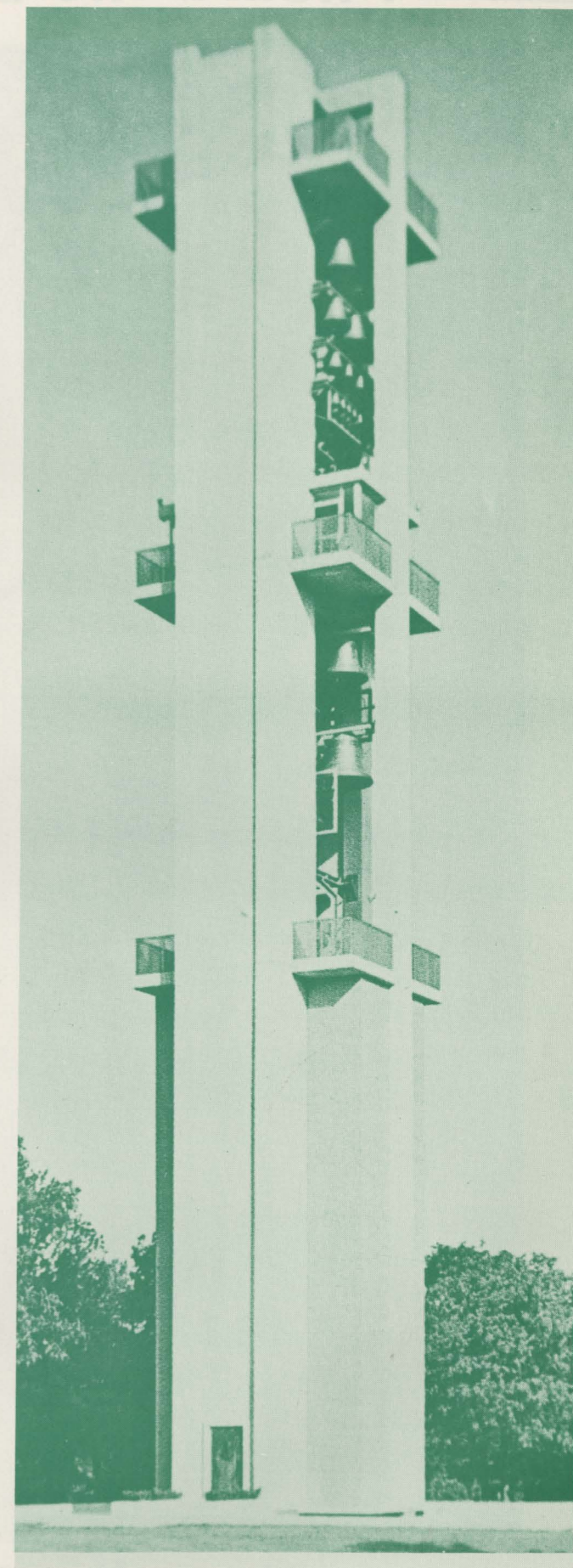
One more bell form should be mentioned, and was in use in the Orient as well as in the early Western world; the "riveted" square or oblong shaped bell. These bells were "not cast". They were made from a flat iron, later flat bronze plates with the corners cut out, then bent and riveted into an oblong form.

Many of these riveted bells were used in Western Europe for over five centuries. It was only the usefulness not the beauty of sound of the bell that counted. The most famous of these riveted bells still in existence are: The bell of St. Gallen (612 A.D.), the "Saufang" at Cologne, 9th Century, and the "Bell of St. Patrick" Will, (Clog Edachta Patraic, between 1091 and 1105, now in the National Museum of Ireland.)

Many an historian believes that the bell originated somewhere in the Near East, more specifically around the Black Sea, from where this art of bell making could have easily spread East to India, and China, South to the Mediterranean regions, and North and West to Europe and Russia. Undoubtedly the Celtic tribes played a large roll in bringing the bell to the West.

Dr. Wiesner connects this thought with the fact that in the Greek-Roman era, the vocal music developed far faster than the instrumental, while in the East, the instrumental music with an abundance of gongs, bells, cymbals, et al. came more to the foreground.

The Celtic tribes on their great move to the West could well have been the harbingers of the bell, which in due time gave rise to the glorious bells and carillons in North-West Europe.



I heard the bells - -

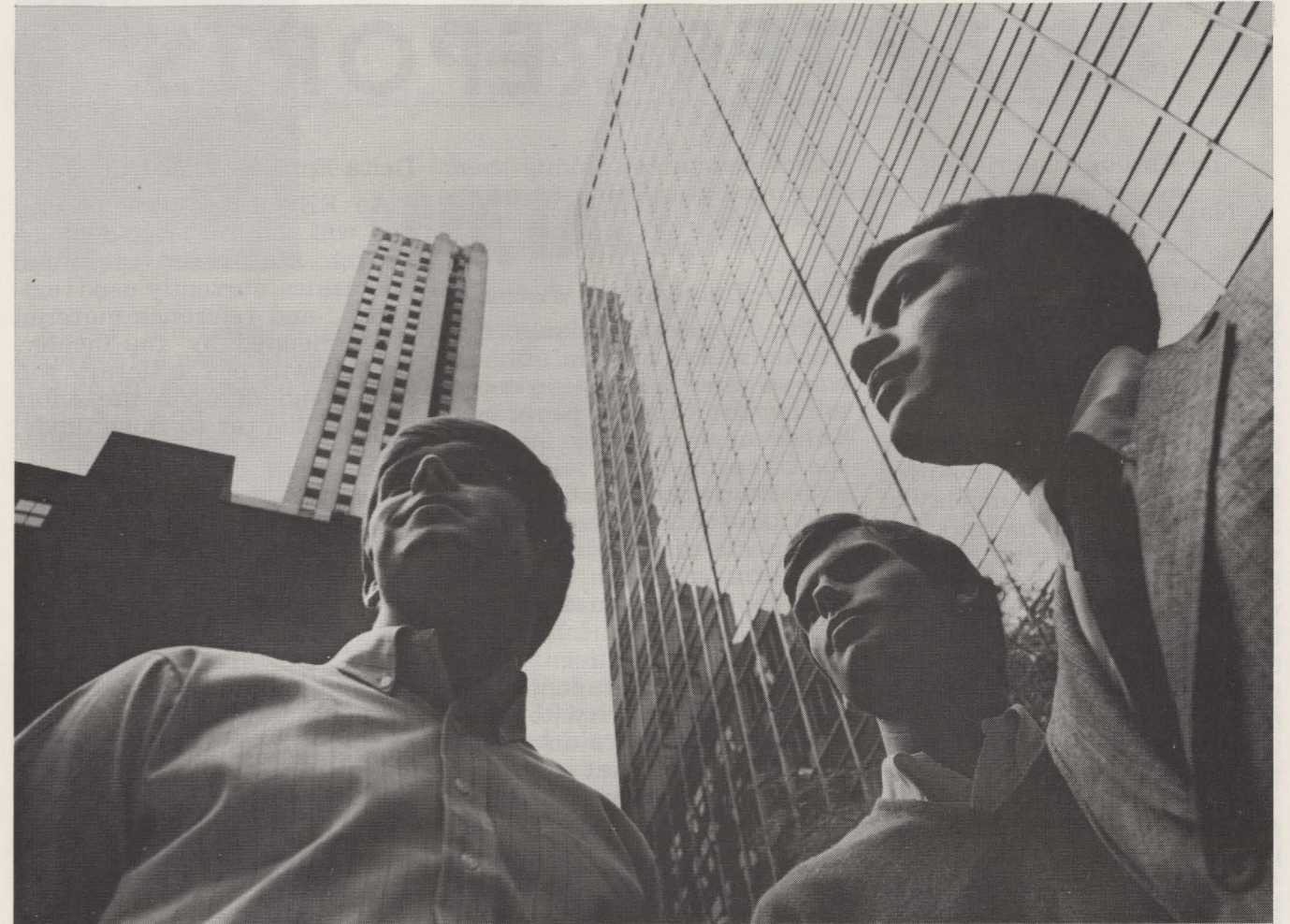


in the city

I Heard The Mission Bells



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CHAPTER REPORTS

by Anthony Gabrielle
National Vice President

Each year the Eta Kappa Nu chapters file annual reports with the national organization outlining their major activities. These reports are carefully read and evaluated by a committee. The chapters making the best showing are awarded beautiful plaques for display at their schools. The chapters that win the awards are not necessarily the ones who do the most number of things, but rather, the ones who do the most interesting and worthwhile things. Listed below are some of the interesting things that were done by chapters during the last year.

Gamma Kappa—Newark College of Engineering

A 30 minute color film with sound was produced which presented a tour of the Electrical Engineering laboratory showing the potential hazards of various procedures. The film was done in a humorous vein showing miserably wired circuits with students puzzling over them, arcs across switches resulting in the reduction of students to ashes, careless carrying of instruments, resulting in the destruction of the instruments and other humorous but instructive examples.

Beta Mu—Georgia Tech

An existing classroom was converted and furnished into a student study lounge for the EE Department. The project involved raising funds and purchasing furniture. Fund raising was accomplished primarily through the Director of Student Placement who sent a letter to

select companies asking them to contribute. This source resulted in \$1100.

Theta—University of Wisconsin

The Chapter purposes and goals were expanded and served as a guideline in determining the Chapter programs. These new purposes included the following:

- a) To promote the integration of the theoretical aspects of a formal education and the practical aspects of industry.
- b) To stimulate interest in outside activities.
- c) To provide students with the opportunity to meet other students on a basis other than that of a classroom environment.
- d) To provide an opportunity to informally meet professors and learn of their research work.

Gamma Sigma—University of Utah

Sponsored a special convocation for the wives of graduating seniors. Ph.T degrees (Put Hubby Through) were awarded by EE Department Chairman.

Delta Theta—Pratt Institute

The Chapter went beyond the limits of the campus and into the neighborhood (slum area in Brooklyn, N.Y.). An Easter Party was planned for the children in a nearby hospital. The children came from culturally deprived families, and their parents had little time to visit. The Easter Party was done as a meaningful pledge project in lieu of polishing brass bridges, etc.

Delta Epsilon—Ohio University

An EE library was initiated and will contain up-to-date research materials, technical magazines, currently used textbooks, and reference material recommended by the faculty. The growth of the library will be dependent upon the effort of the Chapter to raise funds.

Delta Iota—Louisiana State

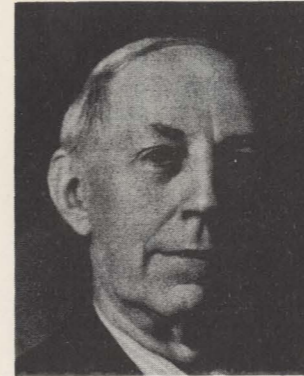
- a) Since a major function of HKN is to encourage academic excellence, a bridge monument was built at the steps of the EE Department. The monument stands 3½ feet tall.
- b) Sponsorship of an Outstanding Electrical Engineering Senior Award with the recipient receiving \$100 donated by an industrial company, was instituted. In addition, each year's winner is displayed upon a plaque in the EE Department Student study room.

Upsilon—University of Southern California

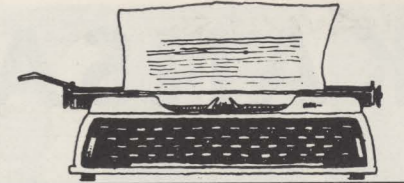
A successful fund raising scheme involved "Work Day." This day faculty members could hire HKN members for six hours at \$10.00 to carry out any household projects, yard work, etc.

Gamma Xi—University of Maryland

An annual award is presented to the EE instructor who is an excellent teacher and a person who has contributed much to the education of his students. The award is presented at the Joint Engineering Honor Societies Spring Banquet.



LETTERS
from Ellery



METALLIC TRACTORS

Every electrical engineer knows of Luigi Galvani, the Italian physician who was born in 1737, and of Alessandro Volta, the Italian scientist, who was born in 1745, but I doubt if any reader of these lines ever heard of Elisha Perkins, the American physician who was born four years after Galvani and four years before Volta and who achieved great renown in the field which made those two Italians famous. My object in writing these lines is to tell a little about this American physician.

Galvani became interested in experiments with the legs of dead frogs, possibly because he heard that the legs of a frog sometimes kicked while being cooked in a metal container and were touched by a metal knife or fork. He found that such kicks were produced when a spark from a static electric machine was sent into the frog leg.

He then hung the skinned legs of a frog on a copper hook and suspended the hook on the iron railing in his laboratory and watched to learn if atmospheric electricity would produce the muscular action. There was no action until, in adjusting the position of the suspended legs, the iron railing came in contact with the moist tissues of the legs. When that occurred the kick came. So Galvani discovered that an electric effect is produced if pieces of iron and copper are joined and the free ends are brought in contact with moist animal tissues.

Galvani's discovery attracted wide attention of scientists and physicians. Then the question arose as to whether the electric effect came from the junction of the two metals or at the point of contact of the two different metals with moist tissue. Galvani believed the electricity came from the animal tissue but Volta believed it came from the point of contact of the metals. Galvani died before that dispute was settled.

In 1791 when Galvani announced his discovery, Elisha Perkins was the physician in Plainfield, Connecticut, a rural town not far from where I grew up. Dr. Perkins became greatly interested in Galvani's discovery and at once began experiments along that line, using pieces of iron and brass

about three inches long and pointed at one end. He stroked the pointed ends of this device over the parts of his own body and that of his patients where there was pain or inflammation and was convinced that such action brought relief.

He then applied for a patent, using the name Metallic Tractor for the device. The patent was issued about 1796. The new method of treatment was tested at three American medical colleges and those colleges strongly endorsed the use of the new method for treatment of inflammation, pain in head or teeth, rheumatism and other physical troubles.

In Copenhagen Frederick's hospital also made tests and published the results in an

(Continued on page 24)



KANSAS REGIONAL

A midwestern regional meeting of Eta Kappa Nu was held on May 1 and 2 at the University of Kansas, Lawrence, Kansas. In attendance were delegates from nine chapters representing the following universities: Colorado, Kansas State, Kansas, Missouri (Columbia), Missouri (Rolla), Nebraska, North Dakota, Oklahoma State, South Dakota School of Mines.

A general meeting was held on the afternoon of May 1. The principal speaker was Mr. Jack Farley, Eta Kappa Nu National President, who discussed the country-wide aspects of the HKN activities. He emphasized the growth of HKN and the problems associated with producing the film "Careers In Engineering". The response to the film has been highly satisfactory. More than one hundred copies have already been purchased by universities and industries. Following Mr. Farley's address there was a very informative and useful discussion

by each chapter representative of their chapter activities and problems. The activities centered largely, perhaps, on the need to maintain programs which encourage participation by chapter members and which, hopefully, would be sufficiently rewarding financially to maintain the chapter solvency. The problems discussed by the representatives were almost exclusively devoted to a single item: how to achieve active participation by a substantial fraction of the chapter membership. Several interesting proposals were made.

Following the afternoon meeting, there was a banquet held on the evening of May 1. Approximately forty people attended. The speaker was Professor William Bass, a member of the Anthropology Department of the University of Kansas. Professor Bass gave a fascinating account of the evolution of some of the physical characteristics of man.

On Saturday morning, May 2, a tour was provided to acquaint the visitors with the teaching and research facilities of the Department of Electrical Engineering. In particular, the activities of the Remote Sensing Laboratory of the Center for Research in Engineering Science were presented.

Regional meetings of this type can serve a very worthwhile purpose. They allow members of HKN to become acquainted and they provide a stimulating influence which serves to strengthen each chapter. The Gamma Iota Chapter of the University of Kansas was pleased to have had the privilege of being the host of the meeting.

Photo below: The chapter delegates and faculty advisors with President Farley (sixth from left). Opposite page top, Professor Bass with unidentified friend speaking at the banquet. Bottom: Many delegates brought their ladies.





Miggs

The Great Sahara Mousehunt

Catherine Collins and Miggs Pomeroy

Copyright © 1962

1ST APRIL

THE FORT IS in an uproar. A native soldier has brought word that the Lieutenant's truck has been involved in an accident near Tekro. The Lieutenant is thought to be hurt, but the wireless connection is bad and no details are known. Salarie is busy getting together a supply convoy with petrol, water and rations. The Medical Orderly is assembling his equipment, scalpels, splints, surgical dressings and morphia. We are asked if we will take the wounded man on to Faya with us in the morning, as there is a hospital there. We plan to shift things around so that one car can be used as an ambulance. We will put inflated mattresses, blankets and sleeping-bags on the plywood that covers the petrol cans and hope to soften the bumps somewhat. But it is worrying not to know just what to expect. How badly is the Lieutenant hurt? I suppose if it is bad enough a helicopter could come up from Fort Lamy.

To while the morning away Liv joins the taxidermists, and skins a raven he has shot from the terrace. He hasn't done this kind of work for many years and decides that there are other occupations that he likes as well. He says that this is his swan-song.

Catherine and I take our personal laundry and start down the hill to the washing-spring, which is by the side of the lake near the swimming-pool. An enterprising native boy has already washed the men's things, including Francis's passport which he forgot to remove from his pocket. Their clothes are all laid out to dry on the ramparts with bits of stone and dirt to hold them down. At the spring we wait for a big black soldier to finish his wash, and when he wades out of the spring we wade in. We stand in water to our waists with laundry floating about us, and pound each piece on a great slanting rock. The fish nibble at our legs and we wonder what they make of the lather of detergent and army all-purpose soap. Two white-robed Tebu squat watching us for a while. Perhaps they are waiting their turn. Unexpectedly one of them takes off his clothes and wades out into the lake and we wonder if the Sergeant-Chef has exaggerated slightly. Also we are both impressed with the fact that a naked black is so much less nude looking than a naked white. When you come right down to it, white skin is inclined to have that under-a-rock look. Certainly massive numbers of white people spend unconscionable quantities of time and money trying to darken themselves, while you never hear of dark people bothering about a bleach. As we walk up to the fort our dripping clothes dry on our backs before we have climbed to the top.

There is pigeon for lunch, nineteen lovely mouthfuls. They were blue and downy when seen this morning, but one shouldn't

think of that, and Février has made a superlative sauce. Sergeant Salarie, his trucks ready, has rushed in to tear off a hunk of bread and gulp down a glass of wine for his lunch. As we are sitting around the table picking at the last pigeon, he bursts into the mess hall again, eyes blazing, and announces that the native soldiers have had him for an April Fool! There has been no accident, no wounded Lieutenant, and now there is no pigeon. The Sergeant-Chef rocks with laughter, and through the rest of the meal giggles, shaking and weeping. Robert Byam brings Salarie a plate of food but the latter is not to be placated. Thumping his plate, knocking over his wine, he rages that it is a poor idea of a joke. And the angrier he becomes, the merrier the Sergeant-Chef. At the moment the Sergeant-Chef is out of favour with us, too, for on returning from our morning expedition he has thumbed through his book of regulations to discover that we may not remove our lovely horde of bones and artifacts from the country. He makes up to us by getting the women of the village to dance this afternoon, on the open sand by the lake. Against the orange sands their brilliant robes and head-shawls and massive gold jewelry shimmer and clash. One girl has a diadem of a gross of large safety-pins standing in a row across her head. The girls are shy in the daylight, and have to be chased into their dance by the Sergeant-Chef, who runs around after them threatening and cajoling, smacking a rump or tickling a rib. They start at last, the drummer beating an oval drum and chanting a refrain which we are told says "The white people have come from the north by the old caravan route and they are very nice and very rich and will give us plenty of money very rich very rich. . . ."

The dance is perhaps one of the less lively of the art, the feet shuffle in little sandy circles, the head is shyly bowed and the arms wave; they seem to say, 'Come or go, come or go, we couldn't care less.' This is a slightly anaemic sex dance which livens up when a white-robed male with red cartridge-belt and gun leaps into the circle, firing what we hope are blank cartridges right and left. Having scared all of the girls into fits of giggles he ends by singling out one and chasing her round and round, firing at random; the tom-tom grows louder and the waving arms, giggles and shrieks wilder. The sun is setting beyond the lake, and the palms cast their sloping shadows across the circle of dancers. We feel as though we were on a South Sea island rather than in the centre of a great desert.

The Lieutenant returned from patrol this afternoon only mildly amused to hear of the drama that had been enacted about him. He roared up to the fort in his open Dodge Power Wagon, with eight native soldiers aboard, their faces swathed and sun-goggled against the wind and dust. We thought them wonderfully dashing. They have been patrolling the northern border in this sector on the look-out for people who slip over illegally.

'Gun-running?' I ask hopefully, but he smiles condescendingly, and says that the offenders are mostly geologists from the oil camps in Libya. There is one pass which they must come through called Rocher Noir. I think that it is the pass which we missed when we came ski-ing over the mountains, so I don't suppose it is so easy to guard after all. However, the Lieutenant has just found fresh tracks at the pass—two Land-Rovers and a Dodge Power Wagon with, according to the local Tebu, two Americans, a Frenchman and a Libyan aboard. The Lieutenant says that they have never caught any geologists yet, which he says is 'regrettable'.

'We would like to compare *cailloux*, the pebbles which the geologists have come to collect,' he says, 'and then we would send them home with, of course, a severe reprimand.' I think that he enjoys this grown-up game of hide-and-seek. (Cont.)

CHAPTER NEWS

DELTA CHAPTER, Illinois Institute of Technology—The second semester of the 1968-1969 school year saw the first successful impact of a teacher and curriculum evaluation program initiated by the Delta chapter at the Illinois Institute of Technology nearly two years ago. According to the provisions of the program, standardized rating forms are distributed at the end of the semester to students in all of the undergraduate courses taught by IIT's electrical engineering department. The form asks for student evaluation of both teacher and course. Results are tabulated and a complete report is presented to the head of the electrical engineering department. Based on these results, the department's "teacher of the year" is selected. This teacher's name is then submitted in IIT's school-wide "teacher of the year" competition.

The "successful impact" mentioned earlier was the electrical engineering department's announcement of a major undergraduate curriculum change. Through Delta chapter's evaluation program, student discontent with several courses in the curriculum was communicated to the department. As a result, these courses were either dropped entirely from the curriculum or were replaced by more meaningful courses. Some curriculum re-scheduling was also introduced so that an electrical engineering undergraduate now encounters his first EE course in his Sophomore year rather than his Junior year as was previously the case.

The success of the evaluation program thus far has encouraged Delta chapter to consider other programs for the future. Among these is a proposed tutoring program. Hopefully, this program will be initiated next semester. by John Bierbauer.

MU CHAPTER, University of California-Berkeley—The Spring Quarter has been a busy one for Mu Chapter. The first two Saturdays in April the chapter presented its bi-annual lab tours. On the first Saturday the undergraduate labs were visited and on the second Saturday tours of the graduate labs were given. The tours were given for interested electrical engineering students and any others who wished to attend. In both tours demonstrations were given and a number of the faculty gave short talks on the major fields of graduate study. A free lunch was provided for the graduate tours. Both tours had a very good attendance.

The Chapter has twenty eight new inductees to be initiated on May 17. About one-half of these are completing the traditional bridge as their pledge project, while the rest are involved in a variety

of pledge projects. Some of these are constructing an HKN bulletin board for the EE building, assembling a file of the top twenty engineering schools, and giving programs on engineering as a career in several of the local high schools. The later project includes showings of the new HKN film "Engineering—A Challenge of the Future", which was recently purchased.

On May 11, the Chapter will hold its annual Wine Tour, which will include a number of Napa Valley wineries. All members, pledges, and alumni have been invited to attend. by Nick Brixius.

UPSILON CHAPTER, University of Southern California—Upsilon Chapter at the University of Southern California has gone into high gear during the Spring Semester. Despite the fact that there are only 8 actives and 6 pledges, everybody has pitched in and contributed toward a very successful term.

On Saturday, April 28th, undergraduate and graduate members worked half a day at professors' homes doing handy man jobs. The wages earned from this Work Day went toward financing our annual Outstanding Electrical Engineering Sophomore Award. The recipient of the Award for 1968-1969 is Mr. Jerome Donald Nourse. Mr. Nourse received a certificate and a \$50 check in recognition of his high scholarship, character, and extracurricular activities.

Mr. Nourse's Alma Mater, Downey High School, also received a substantial check from Upsilon to purchase some books for its library. Each of the books will have a book plate proclaiming Upsilon Chapter and Mr. Nourse's Award. Hopefully this public relations effort will attract more of the qualified students at Downey High School to major in engineering at Southern Cal.

Mr. Terry Lee Donahue was selected as the runner-up for the Award and received a check for \$25. Mr. Donahue is presently a University Trustee Scholar, a honor accorded to only a few select undergraduate students.

Franklin Fong, the immediate past President of Upsilon, was recently named as one of the Men of Troy. This prestigious title is given only to those graduating seniors who have distinguished themselves by their scholarship, leadership, and service to the University. Upsilon is very proud of Frank and we hope that we can find and develop more members with his calibre.

Philip Hauger has done a most admirable job as President for the Spring Semester. Phil is also graduating in June. Upsilon will sorely miss his dynamic leadership and his deep personal interest in the welfare of the Chapter.

The highlight of the Spring Semester has been the announcement that Upsilon was designated as the Outstanding Chapter in the Western Region for 1968. We are very gratified by this honor and we hope that we can instill some spirit and enthusiasm into our pledges.

Match Box

Andy Lisiecki, a graduate student in Biomedical Engineering, and Linda Cramer, a senior in EE, will be married on June 14th. Andy is a past President of Upsilon Chapter. Linda has been the Recording Secretary during the Spring Semester.

Have a happy summer and see you again in Fall!

BETA GAMMA CHAPTER, Michigan Technological University—Our slide rule instruction course during the fall quarter was proven again to be successful. Some 420 students enrolled. A nominal charge was paid by the students to cover expenses.

Our January initiation ceremony was a big success as always, giving the initiates an assimilated trip down into an old copper mine with echoing organ music and voices wherein each initiate must know the sign of HKN and partake of its "food": smoked oysters. Pizzas and something to drink followed. At the banquet, the following day, Edmund Vandette, professor of social studies, spoke about the outstanding "isms" of our society and our part as leaders in such a society. We also had a distinguished guest: Dr. Henry D'Angelo from Denver Univ. who will be taking over as head of the E.E. Dept. July 1st. Twenty students were initiated into the chapter. We are looking forward to initiating fourteen in the May ceremonies.

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ELLERY . . .

octavo volume giving favorable opinion of the system which they called Perkinism. In London, under direction of Lord Rivers, an organization named Perkinian Institution, was formed, chiefly for benefit of the poor. Disinterested and intelligent characters from almost every quarter of Great Britain, including professors, regular physicians, surgeons and clergymen testified to the benefits received from the use of Metallic Tractors. It was reported that over a million cures had been effected.

In 1793 the daughter of Dr. Perkins, her husband and two children died of yellow fever in Philadelphia. This stimulated him to develop a new medicine which he hoped would be effective in treatment of fever and other diseases. In 1799 there was an outbreak of yellow fever in the city of New York, and Dr. Perkins went there hoping his medicine might help to end this terrible disease. But after about four weeks he was stricken by the fever, and died September 6, 1799.

In 1797, because of a political upheaval, Galvani lost his offices and he had serious failure of health. The death of his wife, his controversy with Volta regarding the source of the electric effect when different metals are brought in contact and other problems added to his troubles.

In our present vocabulary the words galvanic, galvanize, galvanism, galvanization, galvanometer, voltage, volt, voltaic, etc. come from the names of those two famous Italians. Do we have words in our language which came from the name of the American Perkins, who worked as they did on the effect of dissimilar metals in contact?

If one looks in our English dictionary one will see for the word Perkinism that Webster states "After Elisha Perkins of Norwich, Conn. who introduced it. Med. Tractoration."

For the word Tractoration Webster states "A kind of metallo-therapy first used by Elisha Perkins (1741-99) of Norwich, Conn. consisting in the operation of drawing over an effected part, the points of two small rods (called tractors) of different metals; Perkinism. It was used in local inflammation or pains, rheumatism etc."

CANDY . . .

place—the lollipop and chewing gum, and each created its own industrial problem.

Lollipops (which were originally known as "suckers") attained wide distribution when a machine for their manufacture came out in 1908. The firm which introduced it, was worried. "It makes almost 21,000-000 lollipops a year. That's more than we can possibly sell," they complained.

Shortly after the Curtiss brothers concocted the first sample of chewing gum on a Franklin stove, they had a real problem. What to name it? Consequently American jaws began rhythmically moving to a product which was called everything from "Licourice Lulu", and/or "Four in Hand" to the patriotic, "American Flag".

In the United States today the manufacture of candy is far from "small peanuts". About 80 ingredients go into the various confections made and each year this requires over 1.5 billion pounds of sugar, one billion pounds of corn syrup, one half million pounds of cocoa and chocolate products—and 200 million pounds of peanuts. Some 1200 established companies transform all these confections annually into 4 billion pounds of candy, and a total of 20 pounds per capita, it is predicted, will be consumed within the next 12 months.

According to the "candy scientists" at Atlas Chemical Industries there are three good reasons for the great American sweet tooth. 1 - Candy (under-

standably) has never tasted so good. 2 - Teenagers (who are top consumers) keep increasing in this country, and the more we have, the more they eat. 3 - The shelf life of candy has been prolonged considerably, and this is an essential because large candy makers are shipping greater distances than ever before. Now their product can withstand rough handling and temperature changes with two "miracle" ingredients—an Atlas Sorbitol solution and a chocolate emulsifier blend which enables the candies to withstand rough handling and temperature extremes and to preserve color, texture and flavor far longer than ever before.

So the sweet problems of candy have been boiled down to achieve much sweeter solutions—which makes the "boiled sweets" (the English term for confections) a true "sweetest story ever told."

SANTA BARBARA . . .

from Dr. Wade, their Faculty Advisor, who was recovering from eye surgery.

Dr. Skalnik greeted the new chapter and expressed some ways in which they could be an asset to the University.

Dean of Engineering Albert Conrad addressed the students and guests. He too expressed the importance of a group giving service to the school. He stated that a group cannot exist just for themselves. They must perform some service to thrive and survive.

He told of his career in engineering and in the telling, traced changes in curricula and tools of engineering. The most important instrument in the Electrical Engineering laboratory when he was in school was the Wheatstone bridge.

He used the Wheatstone bridge as a symbol that engineers should lead a balanced life, reconfirming the principles stated in the induction ceremony.

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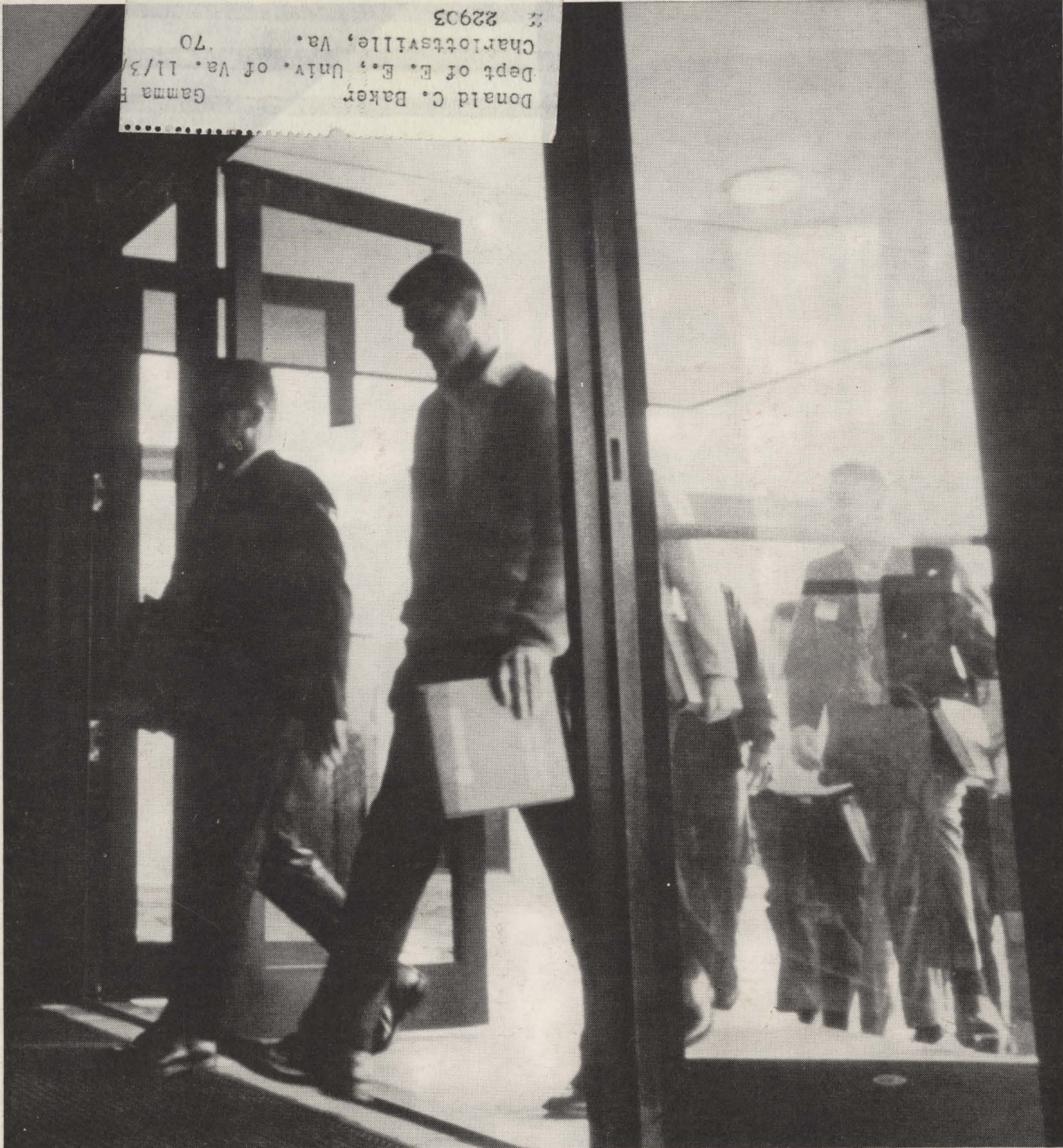
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