

BRIDGE
of Eta Kappa Nu

2000

Millennium Collector's Edition

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Welcome to this special millennium collector's edition of the BRIDGE. As we cross into the new millennium, Eta Kappa Nu finds itself in a period of great transition. Changes in the Executive Secretary office are occurring this year and we are in the midst of relocating the HKN headquarters office to Lisle, Illinois. I view my new role as the latest HKN Executive Secretary and Editor of the BRIDGE with great excitement because the possibilities for growth and improvement of our society are indeed limitless.

As I look back, I am awed by the magnitude of continuous contributions from many of the HKN members that I have had the privilege to work with. As I look forward, I continue to see great individuals, great achievements and a great future for HKN. I am eager to do my part in helping to energize Eta Kappa Nu as we move forward together.

There are exciting transitions ahead. The national HKN Board of Directors have been discussing and finalizing plans to revitalize and modernize the organization. One of the most visible and exciting transitions that we will all see will be in the BRIDGE magazine during upcoming issues. As you read this, the BRIDGE committee is hard at work implementing an entire new format for the BRIDGE magazine to better serve the needs of the college chapters, new members and alumni members. You will start to see these changes take shape beginning with the next issue.

Every transition has two parts: where we are going, and where we have been. In the next issue we'll start up with the new format and concentrate on where we are going. For now though, let's take a moment and reminisce. This special millennium collector's edition is dedicated to where we have been. It follows the BRIDGE as it existed throughout the last millennium. It follows the history of our founding fathers and their goals for the society. It follows the technology advances throughout the century. But, most importantly, it follows Eta

Kappa Nu itself and how the organization has changed and how the organization and its members have adapted to the world events around them.

This edition takes you on a journey through the decades of the past century. Perhaps you can imagine yourself in the fields around Champaign discussing with the founders what type of society this should be. Perhaps you will share the desperation of finding employment during the depression or the wisdom of investing in the markets at all. Perhaps you will share the pride and the spirit as Eta Kappa Nu members represented our country in two world wars. And perhaps you can place yourself back in time where you are just learning of a new technological breakthrough such as telephones that don't require an operator or of commercial radio and television broadcasting. Then there are the stories and advice that stand the test of time and are just as true today as they were in the early parts of the century. The one trait that you are sure to pick up is the enthusiasm, spirit, and character of the men and women who gave this rich heritage to Eta Kappa Nu and made HKN the organization it is today.

Throughout this special edition you will find various references to the editor. Keep in mind that these represent the editor at the time of the original publication, unless they specifically say "2000 editor". I truly hope you enjoy reading this collection of articles from our past as much as I have enjoyed researching and putting this issue together.

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Ronald A. Spanke

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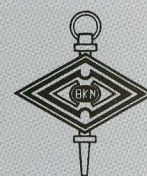
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Vol 1, No 1, p7 - 1909

Early History of Eta Kappa Nu

Vol 1, No 1, p6b - 1909



BRO. M. L. CARR
ONE OF THE FOUNDERS OF ETA KAPPA NU

It will be five years in the coming autumn since the first steps looking toward the founding of the electrical engineering fraternity, or association, now known as Eta Kappa Nu, were taken. The first "meeting" was held on the sidewalk in front of Engineering Hall at the University of Illinois after a Society meeting one Friday evening early in the college year of 1904-5. To this little gathering of five senior electrical engineering students the idea of forming a professional fraternity was explained in a few words and an agreement made to meet at a certain place in the country south of the University on the following Sunday afternoon. The members of this embryonic society were C. E. Armstrong, Supt., Cairo El. Traction Co., Cairo, Ill., R. E. Bowser, Dean Electric Co., Cleveland, O., E. B. Wheeler, Western Electric Co., New York, M. K. Ekers, Washington State College, Pullman, Wash., and the writer.

No records were kept of these early meetings, several of which were held on Sunday afternoons in the fields round about Champaign. The meetings were devoted to a discussion of the objects and nature of the organization. Gradually, ideas, hazy at first, were more clearly defined and a working constitution was evolved. The greatest secrecy was maintained, it being one of the ideas of the founders to create an organization, or fraternity, the existence of which would be known only to its members. Two more students were invited to participate in the organization proceedings before a constitution was completed. These were P. D. Smith, South Side Elevated Co., Chicago and W. T. Burnett, Illinois Traction System, Champaign, Ill.

The preparation of the ritual was going forward at the same time that the constitution was being worked into shape. The question of how many seniors were to be invited to participate in the establishment of the organization kept coming up at meetings. Finally, when the organization was considered nearly enough perfected to elect chapter officers, the question was disposed of by electing two more seniors, H. S. Green, Mgr. Nungesser Electric Battery Co., Chicago and C. K. Brydges, Chicago Telephone Co., Elgin, Ill., to membership. These men were given a sort of an initiation in that the ritual was read to them, but they are now numbered among the founders by the other members of the early organization.

Brother Otto Wiemer, a Junior and now with the Wagner Electric Co., St. Louis, enjoys the unique distinction of being the first duly elected and initiated member of Eta Kappa Nu. The initiation consisted principally of a tramp to a nearby cemetery by a circuitous route, the candidate being blindfolded all the while.

The next class of initiates consisted of five more Juniors. The men were pledged just before the Christmas holidays and were initiated shortly after returning to school. The initiation this time was held in a small hall in Urbana. Our worthy Secretary of the National Executive Council was one of the victims and no doubt has very vivid recollections of some parts of the ceremony. Pledges at that time were not decorated with the colors and were bound to secrecy regarding their invitation to join the society. This was in keeping with the early policy of the organization regarding secrecy. The adoption of an emblem, however, caused the existence of the organization gradually to become known in the college community.

By the end of the school year, Alpha Chapter was well organized and an enthusiastic quota of Juniors had been initiated to carry on the

work when the founders had passed out into the world to seek their fortunes. Before bidding their Alma Mater good bye, the founders created the National Executive Council by electing three of their number to the offices. The idea was to have the organization largely under the control of the graduate members and the parent chapter was given no more voice in the control of affairs than any other chapter. Personally I consider this something of a mistake. Experience has shown that Alumni members seem to have less time for fraternity affairs than do the brothers in school. The member just out in the world is busy adapting himself to new conditions and lacks the presence of an active chapter to bring fraternity affairs to his attention. However, I believe some of our older alumni are now so situated that they can take a more active part in the affairs of the society. The organization of Alumni chapters in Pittsburg and Chicago are evidences of this revival of interest. It is to be hoped that these two chapters may be instrumental in materially increasing the length of our Chapter roll.

Eta Kappa Nu has a place in the engineering world, a place that it is not filling today, a place that it cannot fill until many flourishing chapters are in existence. It is a place it cannot expect to occupy until a generation of members have gone out. You and I brothers, may never reap the chief benefits which the organization was created to secure for its members. Our duty is to build for the future. I do not mean that the fraternity is of little benefit to us, but it can not in the very nature of things accomplish at present the great object for which it was founded. Of these things we can not speak specifically, except in the closed chapter meeting, but I think you understand me. Let us be up and doing for the good of our brothers yet to be given the right hand of fellowship and for the glory of our Eta Kappa Nu.

M. L. CARR.

Vol 1, No 1, p20 - 1909

The Chapter at Pittsburg is endeavoring to do its share in the advancement of H. K. N. Besides keeping an interest alive in its members, it is planning an aggressive campaign in extension work. We are expecting about ten or twelve new members of the '09 class from Illinois and Ohio State to be with us this summer and with such reinforcements we hope to push our plans in extension work to a successful issue during the winter of 1909-1910.

An interesting comparison is given here-with by the tabulation of the salaries received by members of Pittsburg Chapter, May 1st, 1909, and a year ago. The range in salary is from \$40 per month to \$100 per month.

	1908	1909
\$40 to \$50.....	69.24%	7.69%
\$50 to \$60.....	7.69%	15.39%
\$60 to \$70.....	7.69%	15.39%
\$70 to \$80.....	-	15.39%
\$80 to \$90.....	7.69%	-
\$90 to \$100.....	7.69%	46.14%

The results shown here may seem low, but considering that some members are still on apprentice course and that business conditions for the past two years have been the worst, we can see that Eta Kappa Nu men are holding their own, "and then some."

Fraternally yours,
F. H. BAGLEY,

Secretary-Treasurer, Pittsburg Chapter.

Vol 1, No 1, p17 - 1909

The Year Book a Necessity

If Eta Kappa Nu stands for anything it should stand for live men in the Electrical field and such men should be able to come together and form ties of brotherhood looking to a furthering of the benefits of Eta Kappa Nu and with the end in view of making it mean the most to all of the members.

This publication will perform the first important work, that of making us acquainted with each other, and it should be published from time to time so that acquaintanceship will ripen into a real brotherhood as we watch each others steps in our chosen field. A directory of members is a necessity for there are a great many who cannot by reason of their location, take an active interest in a chapter.

To these and to the alumni and undergraduate chapters, the Year Book is essential for the continuation and promotion of a fraternal feeling among the members since. It will aid us to be of assistance to each other in securing new positions or render needed help in our present Ones.

I wish to all the brothers the best success in all their undertakings.

Fraternally yours,
F. J. STRASSNER,
Newark, N. J.

*2000 Editors Note:

The first publication of HKN that was called the *Bridge* was published in 1909 and labeled Volume 1. It is from this issue that the history as told by our Founder M. L. Carr as well as the other selections on these pages have been taken. Prior to 1909, HKN did publish a small annual newsletter called *The Electric Field*. In reality, this 1909 issue of the *Bridge* should have been labeled Volume 5 to correspond with the fifth publication and the fifth year of HKN. The 1910 issue should have been volume 6, but was not labeled with a volume number. Beginning with the 1911 issue, the volume number was corrected to Volume 7. Therefore, Volumes 2-5 of the *Bridge* do not exist.

Editorials

W. C. MADDOX, Editor.

Associate Editors: F. COFFIN, GLUNT, BAGLEY AND TALCOTT

The thanks of the editor are due to the efficient work of each of the associate editors and to all others who have assisted in getting out this issue.

The editor wishes to take this opportunity to apologize for the fact that this issue is not as complete as it should be, and for the fact that its publication should come so late. There have been a number of very discouraging delays connected with the work of editing this paper and the time since the appointment of the editorial staff has been too short to be able to do the work justice. The staff for next year's publication should be appointed at once, and the work on next year's publication started not later than the first of September.

The Fifth Annual Convention of Eta Kappa Nu was called to order at 10:00 A. M., in the rooms of Gamma Chapter at Columbus, Ohio, with the following delegates present-from Chicago Alumni Chapter, Bro. C. C. Carr; Pittsburg Alumni Chapter, Bro. B.T.Anderson; Alpha Chapter, Bro. H. G. Hake; Gamma Chapter, Bros. Heitman and Knight. The convention was one of unusual intent. Most of the meeting was taken up with a discussion of the extension work in the different parts of the country. This spring has been a wonderful revival of interest in the extension of Eta Kappa Nu. At the time of the Convention negotiations were drawing to a close for the establishing of a chapter at Armour Institute. Gamma chapter reported a prospective chapter at Case, and the Pittsburg Alumni Chapter reported that Pennsylvania State would probably soon apply for a chapter. Other schools discussed were Michigan,

Wisconsin, Minnesota, Iowa and Vanderbilt.

On the evening of Monday, May 24, 1909, ten men who had previously petitioned the National Council for a charter were given the ritual by Bros. C. C. Carr, F. L. Hanson and the editor and the chapter duly installed. By this action ten active members of high standing were added to the roll of Eta Kappa Nu, and also the beginning of a chapter which promises to be one of the strongest branches of our brotherhood.

Armour Institute of Technology was founded in 1892 by Phillip D. Armour. It is purely a technical school (no Co-eds nor courses in Campuistry.) It offers the regular courses in Electrical, Mechanical, Civil and Chemical Engineering and a course in Fire protection.

It has excellent equipment in the way of shops and laboratories and maintains an instructional force of about ninety. The total attendance is about 1200. The institution occupies several elegant buildings which are located at and near the intersection of 33rd street and Armour avenue, Chicago.

It is needless to say that the men of this institution will be heartily welcomed into our fraternal brotherhood. We of the State Universities sometimes feel slightly conceited about the superior opportunities we have had while pursuing our college courses but we need investigate but a little to see that Armour Institute has been "delivering the goods" in the way of men in the true sense of the expression.

The Electrical Show at Illinois

The first Electrical Show given at the University of Illinois, and the first of its kind attempted at any similar institution, was held early in March, 1908. "Jim" Bateman first suggested the idea, and with two or three others worked out some pretty definite plans which were presented to the E. E. Society. The interest of everyone was shown by the immediate election of a committee to take charge of the matter. It was decided to apply the proceeds to the Robert Fulton Memorial fund.

Two objects were sought for by the committee; to make the show as popular as possible, and to make it educational in nature, with these objects in mind the work was pushed rapidly and in a short time all arrangements were completed. A regular "Short course in Electricity" was planned, and carried out by men labeled "Live Conductors." The people were met at

the door, shown in turn the 100,000 volt transformer in action, the test car with its instruments, the speaking arc, the power plant, and then taken to the third floor. Here was located the lighting display room, the Physics exhibit, the high frequency and Thordarson transformers, and a number of other exhibits designed to instruct as well as to entertain.

The Physics exhibit was in many ways the most interesting one in the entire show, and the management cannot thank too heartily the members of that department, especially Dr. Kuipp for the interest taken in making everything a success. All kinds of weird effects were made to present themselves to the visitors, who seemed never to tire but rather to crowd closer in the effort to learn more.

The rounds of the third floor completed, the visitors were

last escorted to the laboratory proper, where at regular intervals an exhibition of Indian club swinging with electrically lighted clubs was given. This was followed by an electric duel. Between these exhibitions the interest of the visitors was taken up by various instructive devices such as the "Bucking Broncho," electromagnets, meter board, apple fishing and shadowgraph.

The foregoing is a very brief sketch of an undertaking that consumed nearly three months from its inception to its completion. The real object of this article is, however, not so much to describe the show itself as to tell of its cause and effects. First suggested in an H. K. N. meeting, it was worked up by H. K. N. men. The election of a committee by the E. E. Society resulted, without any attempt to bring about such a result, in all H. K. N. men being chosen. Yet the fact that the spirit of H. K. N. controlled the undertaking was kept in the back

ground. Everyone in the department, student and instructor alike was made to feel a personal pride in the show. All worked with a will that augured well for the future, and that has since given rise to the statement that between the students and instructors of no department in the University is there less reserve or more good fellowship than in the Electrical Department. The show was a success, and its success was a measure of the triumph of H. K. N. Without H. K. N. the concerted effort necessary to win out would have been lacking. Yet for all she claims no credit. It is her spirit to work for the advancement of Electrical Engineering. The sole reward is the knowledge of duty done, and the increased love and reverence of its members for the brotherhood.

LLOYD GARRISON.

Central Station Commercial Engineering

The activity of the engineer along commercial lines in the interests of central stations is of comparatively recent growth. Such being the case, a few words about this new field for the technical graduate may be of interest to some of the younger brothers who are about to start out and try and earn enough to supply at least three meals a day, and possibly to some of the brothers who have been out of school longer but for any reason feel that they are heading toward a rut and wish to try some other branch of the electrical profession.

Central station commercial engineering is simply the Americanizing of the central station commercial field. In other words, instead of waiting for the business to come to them, as has formerly largely been the case, the up to date central station is putting ginger into the business and is employing men, who do nothing else but go after all the desirable power and lighting business available. Formerly, the manager of the plant when his other duties did not demand his attention, would devote a little time to extending his company's list of customers. This together with the customers (mostly lighting customers) obtained through the efforts of the local contractors and supply men constituted the only source of increasing the company's list of consumers.

Since this method of extending the company's business, developed principally the lighting load and left the power load very largely undeveloped, it will be readily seen that a very poor station load factor resulted. Here we have the first field for the commercial engineer.

By obtaining power customers who will use power for the most part during that part of the day when the lighting load is small; by obtaining long hour lighting customers, signs, dis-

play windows, etc., the engineer will be able to increase the station load factor very materially, decrease the cost of supplying power and increase the company's earnings.

In the industrial field of electric power exploitation, we have for principal competitors the steam, gas and gasoline engines. It is the engineer's duty to study and test these plants and if possible, as is generally the case, show to the prospective customer that it will pay him to install electric motors to do his work.

For this line of work, I might mention a few things that are essential. In the first place of course the engineer or person handling the power soliciting, should know the difference between an electric motor and a church hymnal. In other words, know your own as well as the competing apparatus and machinery, as well as its designer. Here the technical man has the lead at the very beginning over the non-technical, other things being equal. Know your customer's needs better than they do themselves. Be able to meet people under favorable circumstances and gain their confidence.

As to the opportunities offered for advancement, it has been claimed, and rightly too, I believe, that they are only limited by the man himself. It will be readily recognized that the field at present is by no means overcrowded as shown by the number of advertisements in technical magazines for men for power soliciting and central station commercial work. Also the salary paid for this class of work is quite inviting especially here in the West where there seems to be a decided scarcity of college-trained technical men.

GLEN WALKER.

Vol 9, No 1, p35 - 1913

The Growth of Eta Kappa Nu

L. H. HARRIS, BETA, '07

President National Executive Council.

Vol 10, No 1, p2 - 1914



TO

THE FOUNDERS OF ETA KAPPA NU

Who, by their foresight and active and enthusiastic interest in the organization and early government of Eta Kappa Nu, command the fraternal love of all the other members, this year book is respectfully
DEDICATED



NE must needs be a better historian than the writer to present in proper form and sequence and in the proper light the growth of an idea. This is not less true in presenting the history of Eta Kappa Nu, which in its development expresses the growth of a great idea. So it is with an apology, here expressed, that we undertake even so brief an exposition of this interesting subject as the Editor demands.

For a society to grow from an idea merely, to a vigorous organization such as ours in nine years requires that it shall consist of something more than a fad. That the founders had faith in their vision is evidenced by the time, and energy, and thought, yes, and even expense that they put into it; that they saw clearly has been proven by the reception which Eta Kappa Nu has met wherever it has been introduced—not alone by the undergraduates, but by the department heads and instructors as well, who have found here a connecting, we might say a “missing,” link between the faculty and student body.

The early history has been written by Bro. M. L. Carr and was published in the 1909 Bridge. This should become a part of the available records of each Chapter. In the school year of 1905-06 a Chapter was organized at Purdue University under the amendment to the Constitution which provides that “Electrical Engineering students and Alumni of Technical Schools of recognized standing, where Chapters do not exist, who have been received into membership into Eta Kappa Nu, shall constitute a Chapter which shall be under the direct control and supervision of the National Executive Council, and which shall be designated by the Greek letter Eta.” As the Faculty did not look with favor upon the organization, its usefulness at Purdue was destroyed, and after three years of existence it was allowed to die out. Five years later, March 15th, 1913, a strong Chapter was established with the entire approval of the Faculty. This accounts for the Purdue Chapter being called “Beta,” although the tenth to be formally installed as a separate Chapter.

The Parent Chapter continued active in the extension work and on January 5th, 1907, installed Gamma Chapter at Ohio State University, Bros. Dodd and Williams officiating.

Two years later, May 24th, 1909, Alpha again added a star to her banner by installing, through Bros. Hanson, Maddox, and M. L. Carr, Delta Chapter at Armour Institute of Technology. In the meantime a vigorous Alumni Chapter had been organized at Pittsburgh, in the fall of 1908. As originally formed it contained eight Purdue and one Illinois man. Since then the personnel has changed in many ways but it is still a very active Chapter. Through its activities Epsilon was installed December 4th, 1909, at Pennsylvania State College. Bros. Anderson, Bagley, Corrington, Stoltz, and Harris made the trip.

By this time Gamma had become firmly established and had begun to look around for an outlet for her surplus energies. As a result Zeta Chapter was installed at Case School of Applied Science, February 3rd, 1910; Bros. Gillespie, Teegarten, and Grossman repre-

sented Gamma.

Theta was the direct result of the activities of two of the older alumni located at Milwaukee, viz., Bros. C. T. Evans and C. W. Yerger. Through their efforts seven seniors of the University of Wisconsin applied for a charter. The Chapter was installed April 30th, 1910, Bro. Evans being then president of the N. E. C. officiating, assisted by Bro. Yerger.

The following spring Alpha again came to the front, for it was due directly to her efforts that interest in the organization was created at the University of Missouri, resulting later in a petition for a charter. The petition was granted and on June 3rd, 1911, Bros. Sawyer and Palmquist, representing Alpha, installed Iota Chapter.

Kappa Chapter was installed January 27th, 1912, by Pittsburgh Alumni Chapter represented by Bros. Bagley, Webb and Harris, assisted by Epsilon Chapter, represented by Bros. Tobias and Cocklin. Credit is due in a large measure to Bro. C. T. Evans for it was he who showed the way to the rest of us by interesting Bro. D. S. Cole in the subject. Bro. Cole was then taking advanced work at Cornell, but gave a good deal of time and effort that Kappa might come to us well organized.

The current year has seen the establishment of our tenth Chapter, University of Pennsylvania. Lambda Chapter was installed on March 12th, 1913, by Epsilon, the whole Chapter being present. The National Executive Council was represented by Bro. A. H. Heitmann. Epsilon had been working along this line for some time and would no doubt soon have accomplished the task unaided, but the timely work of Bro. A. R. Knight of Gamma who had gone there to teach in the department of electrical engineering, greatly accelerated things and it is due largely to his individual efforts that we are permitted to read Lambda on the Chapter Roll.

Thus has the growth continued. The writer well remembers the sixth Convention at Pittsburgh in the spring of 1910. Only Alpha, Gamma, Delta, Epsilon, and Zeta were represented. The banquet table that night presented quite a different picture from the one that we saw so recently at Madison. Our organization has doubled in size in three years. It will not do that again in perhaps many years, but with the firm foundation of ten active and healthy Chapters for a foundation it would seem that our future is assured. There is danger in too much over-confidence and I want to point out again that ten years of existence does not mean ten years of accepted service in more than one school. In most of them our organization is still on trial. Every member should understand that while it is generally admitted that we do have a field of usefulness, it is pretty well limited, and the possible dangers that always accompany an organization of this kind, make it essential that we appreciate our limitations, and adhere to our own work. This work, whatever else it may include, does not contemplate taking over the social activities of the social fraternity, nor the post graduate activities of the professional society. If we are to justify our existence in the future we must encourage a high standard of work in school, and foster an esprit de corps among the students and between the students and faculty, to the end that every Eta Kappa Nu man will be the kind of a man that every other Eta Kappa Nu man will be glad to have associated with him, in undergraduate or professional life.

Vol 7, No 1, p26 - 1911

The Edison Storage Battery

BY L. F. MEISSNER, Epsilon '10.

In producing the Iron-Nickel Storage Battery, Mr. Thomas Edison has given a new impetus to storage battery engineering. A long felt want has been supplied by this type of cell and in the near future the alkaline cell will be no new thing to the engineering world.

After years of experimenting with nearly all possible combinations, Mr. Edison selected nickel and iron as the two metals from which the best results could be obtained. An alkaline solution forms the electrolyte, while nickel hydrate is the positive and iron oxide the negative element. The electrolyte is 21 per cent solution of potassium hydrate with a small amount of lithium hydrate added.

The containing vessel for the liquid and plates is constructed of nickel-plated steel. So also are the poles, grid and receptacles holding the active material. Such construction speaks for the most desirable features obtainable, viz: strength, durability, ease of handling and lightness.

The chemical action of the cell has to do with the oxidation and reduction of metals in an electrolyte which will not combine with or dissolve either the metals or their oxides and an electrolyte which although decomposed by the action of the battery, is reformed with no loss; therefore not changing in density or conductivity. The exact chemical changes are not known, although several theories have been advanced.

The types now manufactured for commercial use are: “A” and “B”. These are divided into A-4, A-6, A-8, B-2 and B-4. The A-4 type merely means that the cell consists of four positive and five negative plates. A-6 and A-8 cells are classed similarly. The B-type cells have plates one-half the size of the A-type; otherwise they are classed in the same manner as the A-type. The principal uses to which these batteries are put are: A-type, for automobiles, street cars, car lighting and industrial motors. B-type, for ignition, auto-horns and other light work.

The voltage of the Edison cell is taken at 1.2. On charge it rises rapidly from 1.5 to 1.66, then gradually increases to 1.8. On discharge it drops quickly from 1.5 to about 1.38 and then gradually decreases until it has reached its lowest working value of 1.0 volt.

The following are a few points of difference between the lead cell and the Edison cell:

1. Potassium hydrate alkaline solution instead of sulphuric acid.
2. Nickel hydrate as the positive active material instead of lead peroxide and iron oxide as the negative active material instead of sponge lead.
3. Nickel-plated steel in place of hard rubber container and lead grids.
4. Distilled water to supply loss due to evaporation instead of solution.
5. Complete discharge of 0.0 volt instead of 1.7.
6. Dead short circuit across the poles with no injurious results in contrast to disastrous effects.
7. No decrease such as sulphatation.
8. When standing, left in a discharged condition rather than charged.
9. Voltage 1.2 instead of 2.0.
10. Specific gravity constant irrespective of state of charge or discharge.
11. Longer life for the Edison cell.

In conclusion it may be said that the Edison cell is of a new character throughout. The electrolyte is directly opposite chemically to that used heretofore. The active material is composed of the two metals, namely nickel and iron, in contrast to the lead and the mechanical construction consists of nickel-plated steel instead of the hard rubber used as a container and the lead used for the grid and connectors. Innumerable experiments, many unsuccessful, were made to bring the cell to its present state and the experimental work is still carried on with the endeavor to make additional improvements.

Vol 8, No 1, p32 - 1912

The Engineering Inspection Trip as Carried Out by the Ohio State University

F. C. CALDWELL

While the inspection trip as a means of engineering education is not unique, it is believed that the Mechanical and Electrical Departments of the Ohio State University have carried the organization of such trips further than most other institutions and that some of the details may be of general interest. A week is set apart for this work shortly after the middle of the second semester, and is also used for the same purpose by the chemical engineers. Two trips are provided, each occupying six days, which are taken in alternate years. One, to the East, includes Cleveland, Buffalo, Niagara Falls and Pittsburgh, while the other to the West, takes in Chicago, Milwaukee, Gary and sometimes Ft. Wayne. In order to reduce the work of preparation and to facilitate the conduct of the trips, the same program as far as practicable, is followed from year to year, although considerable variation appears to be inevitable. As both seniors and juniors are required to take part, every mechanical and electrical student gets both trips. The Ohio State University seems to have been one of the first to make these trips compulsory, though a substitute reading course is permitted when financial conditions make going impossible. This year for the first time no one applied for this substitute course. For several years the number taking part in the trip has approximated closely to one hundred and for the past two years a special train has been furnished. Tourist sleepers are used for night runs.

All arrangements for transportation, hotels and restaurants are, as far as possible, made in advance and a detailed itinerary is published as a University Bulletin. This contains, besides the program, worked out to the minute, descriptions of the various plants visited and data and maps for the cities where stops are made. The copies of the itinerary which are furnished to the members of the party, are printed with rounded corners on bond paper. They have heavy covers and blank

interleaves for notes. Each student is also furnished with a numbered button badge of neat design in the college colors and a correspondingly numbered and properly lettered check for his bag. A coupon ticket, also numbered and to be signed, serves both for transportation and hotel registration, and another is used for such meals as are paid for as a whole.

Besides the itinerary, a booklet is provided which calls the attention of the student to the things for which he should be on the lookout, while in each of the different kinds of shop or plant visited. There are also such booklets, maps, etc. relating to the cities and plants visited as can be obtained for free distribution.

The total cost of a trip is about thirty dollars, per man, and several days before starting each makes a deposit large enough to cover that portion of this expense which is paid through the University.

Heretofore, besides the note-book, a written report of the trip has been required, but this year an oral examination has been substituted.

After his return the student is given a set of questions through which he is invited to express his satisfaction or dissatisfaction with the different hotels, restaurants, visits, etc., and to criticize and give his opinion of the trip as a whole. These, with remarkable unanimity, indicate that the trips are regarded as most profitable and beneficial. They serve not only to give the student much detailed information, but also to expand his ideas of the profession for the practice of which he is preparing himself.

This discussion would be most incomplete without mention of the remarkable kindness and hospitality which the manufacturing and power companies invariably show to this band of knowledge-seeking pilgrims.

Vol 13, No 1, p70 - 1917

ZETA CHAPTER.

Case School of Applied Science.

Established Feb. 3, 1910.

It is inevitable that interest in Eta Kappa Nu activities would take second place to the vital questions of National Welfare. This must be Zeta's explanation of a year somewhat below the average in achievement.

There were nine men in the chapter at the opening of the school year, Bros. Cameron, Farnham, Hall, Hart, Howard, McFadden, Oetzel and Post. Bro. Jenkins, our treasurer, had been married during the summer, and is living in Madison, Wis. After the first few days of glad hands and loafing, we fell in stride for the last of the four laps; and Christie and the Handbook began to look familiar.

The most important change in our department was the strengthening of a course in illumination. This comprises three lectures a week thru the entire year, and one afternoon a week of Photometry Laboratory during the second term. The lectures are given generally by men of the research and engineering departments of the National Lamp Works. Since the Nela Park Laboratories are located in Cleveland it is possible for Case to secure excellent lecturers and give students an opportunity to study the methods at close range.

The war has rather demoralized the book end of the school work. Many of the men are going to the reserve Officers' Training camp, among whom are Adams, Drake, Farnham, Homing, Howard, Pettibone and Post. Bro. Avery left school about the middle of April to train for the "Mosquito Fleet." Many more of our men are fairly certain of going to Fort Benjamin Harrison for the second training period, which begins August 1st. It is certain that Zeta will be well represented in the Army.

JOHN McFADDEN,
Associate Editor.

Vol 10, No 1, p39 - 1914

In seven years of practical experience, the writer has been associated with a large number of college men. Some of these men have failed to make good because—

1. They were not able to work with and to handle all kinds and classes of people.
2. They lacked: Initiative.
Executive ability.
A business education.
A definite idea as to the kind of work they desired to follow.
3. They did not THINK. It was so much easier to refer to a handbook.
4. They desired to achieve success in a day, not in a lifetime.
5. They entered lines of work for which they were not suited.
6. They looked for the easiest jobs.

A study of conditions as freshmen, and not as seniors or graduates, will do much toward obviating most of the failures of engineering graduates.

Vol 14, No 1, p10 - 1918

THE following extracts from letters from our men in the service and particularly those from the front, give us an interesting view of the experiences encountered and show us something of why and how our men came to be where they are:

*From Captain Vincent Pagliarulo, Delta, '12.
859 Elm- Street, Winnetka, Illinois.*

MARCH 8, 1918: I am very much interested in this military adventure, so much so that I am getting impatient waiting for the call for active duty. I do not know whether atavistic instincts have been awakened in me but I never thought I could take the military business so seriously. Of course, I intend to fulfill my duties with that earnestness and zeal becoming a faithful citizen, but I want also to see if I can discover the hidden significance of this monstrous tragedy which is going on "over there." I want to acquaint myself, if possible, with the kind of "booze" that the Kaiser administers to the German people in order to make them die so cheerfully by the millions in order to keep him in power. Also I want to see wherein the German institutions have the advantage over our own to make the people fight so doggedly to maintain them. There are lots of people in this country who do not think we have any institutions to maintain (La Follette, for instance).

How I received my commission is very simply explained. The government wanted to get together a bunch of men who, presumably, knew all about the construction, installation and maintenance of telephone equipment. The company which employs me on being appealed to furnish one man to fill the quota selected me (they probably wanted to get rid of me anyhow) so I was sent to New York to qualify for the position in question, and having qualified I was accepted and given a commission of captain in the Signal Corps.

From Corporal Carl H. Krueger, Theta, '16.

Vol 14, No 1, Inside Front Cover - 1918

**WHAT GREATER SACRIFICE CAN MAN
MAKE THAN TO OFFER HIS LIFE TO
HIS COUNTRY FOR THE BENEFIT OF
HUMANITY**

**TO THE HUNDREDS OF ETA KAPPA NU
MEN WHO HAVE RESPONDED SO NO-
BLY TO OUR COUNTRY'S CALL THIS
BOOK IS RESPECTFULLY DEDICATED**

Vol 14, No 1, p14 - 1918

Company A, 37th Engineers' Reserve Corps, Fort Meyer, Virginia.

MARCH 31, 1918: As you know I am in Co. A, of the 37th Engineers at Ft. Meyer, Va. The 37th is a special Electrical and Mechanical Regiment to be used for special service in France. The general opinion is that we will be stationed at various points in the war zone attending to the power and lighting conditions. This will involve the installation, maintenance, and operation of gas and steam engines, and electrical machinery both in the front line trenches and in the cities which are being recaptured and rebuilt by the Allies.

Vol 15, No 1, p5 - 1919

LETTERS FROM THE ITALIAN FRONT

PATON MAC GILVARY, THETA '16

JUNE 20, 1918: We are at last settled very comfortably in actual war work. This has been the happiest week of my life and here at the front I have had the first real sport since joining the army. Take it from me, flying over the lines is fun, though perhaps the more because the enemy are not very good at shooting. Our quarters are very, very comfortable; and the food of the same type only better than that I had at my last post. It has been so long since I have heard from you all at home that I feel almost out of touch. I am very happy here and having the time of my life. A letter that I will send soon I shall send some clippings concerning the work we are doing, very interesting and extremely effective. You cannot imagine how splendid a feeling it is to be really fighting the Hun, especially in this hard offensive, and more especially with the glorious results that the Italians and we allies have obtained. This is really the life for a normal man; anyone who should want to be any farther from the fray than we are I have not much use for. At last some of your mail has come through since I wrote my postal.

Vol 16, No 3, p2 - Mar 1920

Gamma's Welcome

Brothers in Eta Kappa Nu:

The 1920 National Convention of the Eta Kappa Nu Association is to be held on April 9-10 at the Hotel Deshler, Columbus, Ohio. Plans for entertaining the association are well under way and within a very few days a complete program will be mailed to each chapter.

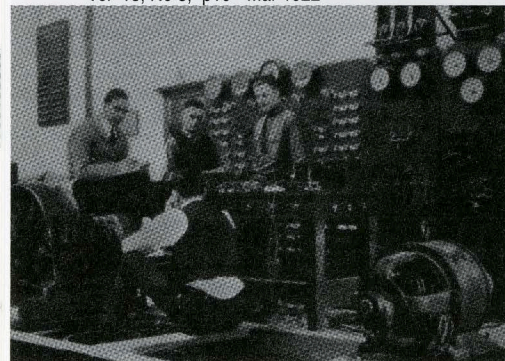
As a part of the entertainment we have made arrangements for all the brothers to attend, in a body, the Electrical which will be held during the week of April 5-10 under the auspices of the Columbus Electrical Dealers and Contractors Association, in conjunction with the Ohio State University Branch of the A.I.E.E. This is the first show of this kind to be held here since 1910 and at the present time it promises to be one of the best ever held in this part of the country.

Thomas A. Edison has been given a personal invitation to attend but as yet it is not known definitely whether or not he will accept the invitation.

Gamma extends a cordial invitation to all of the brothers to be our guests at this time and we sincerely hope that each of you will cooperate with us in making this the biggest and best convention in the history of our association.

Fraternally yours,
HARTMAN E. JENKINS,
Corresponding Secretary.

Vol 18, No 3, p10 - Mar 1922



Test Section in the A. C. Laboratory, University of Colorado.

Vol 17, No 3, p32 - Apr 1921

The Girl-less Telephone

[EDITOR'S NOTE.- Many of our brothers are now engaged in the branch of telephony known as machine switching, or, in common parlance, automatic telephony. They are, for the most part, wondering what the functions of the various relays are, and every day the faithful disciples of Citizen Hay stack high the office of THE BRIDGE with queries from these poor souls. With a heart full of compassion we have imposed on our good friend, H. I. Phillips, the Globe Trotter, to explain in monosyllables just what it is all about. So here goes:]

'At last the telephone girls are to be given a chance to laugh last.

Under a new invention subscribers are to be required to get their own connections. And if a subscriber calls himself all the names he previously called "Central," a great many men are going to cease to be on speaking terms with themselves.

The Girl-less Telephone System has been perfected and will soon be tried out in New York. In other words, there will be no hello girl at the telephone office to get you your numbers. That there have been any there in the past will be denied by most telephone users.

The new invention will make it possible for every 'phone user to have a little telephone exchange in his own home. If he can learn to play it, everything will be lovely.

Each telephone instrument will be fitted out with a set of buttons, a wheel of fortune, a set of winning numbers and an alphabet. Not all the letters of the alphabet will be included. Just enough to spell the most popular profane words.

The chief drawback to its success is that to use the new 'phone successfully one must be able to spell the names of the exchanges. Most people can't even pronounce them.

RULES FOR OPERATING THE NEW 'PHONE

1. Choose your number and exchange.

* * *

2. Spin the wheel. If it stops on the number desired you get the connection.

Three spins for a nickel. Positively no blanks!

* * *

3. You then spin it again to get the exchange. To win, you have to stop at the right number and the right exchange.

* * *

4. Any person getting the right combination the first time will be given a \$3 kewpie doll.

* * *

5. All exchange numbers will come in two colors, the red and the black. State what color you are playing when you spin the wheel!

* * *

6. Any subscriber giving himself unsatisfactory service will be expected to look at his image in the hall mirror and address it as follows:

"Whazzamattah with you? . . . Don't you know nuthin'? . . . Of all the boneheads I ever tried to get good telephone service from, you are the worst!"

* * *

7. If a subscriber gives himself particularly bad service it will be permissible for him to file a written complaint against himself with the telephone company.

* * *

8. No subscriber shall be permitted to talk back to himself under any circumstances.

"Central" will be sorely missed, we think. On the whole, it has been rather comforting for you to know that she was there and that she represented the one woman in the world you could talk snappy to-and possibly swear at-without getting all scratched up or sued.

June, 1921

Vol 17, No 4, p29 - June 1921

The Bite of the "Wireless Bug"

(BY PETER DEETS.)

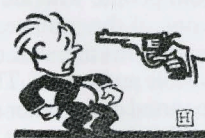
The wireless bug of which you've read, has bitten me that's clear, no serum treatment yet devised, can help me now I fear. At first I had a simple set, loose coupler and receivers, detector of galena stone, take note you unbelievers. It worked and each and every night, (the effect of the bug increasing), I'd try to understand the code, My efforts were unceasing.

Now and then I'd catch an "o", and "is" I got with ease. The signals weren't so very good, just loud enough to tease. In order to increase them, I got a two stage set. The code and music now are great, it beats a "Vic" you bet.

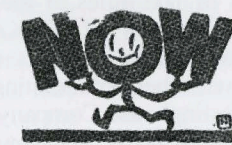
Oh! when I think of all the time I've spent in crystal gazing, in search of useful spots thereon, in truth it is amazing; and some day in the years to come, when I have learned the code, and when I get my license I'll write another ode, and tell you all about the joys, as would old Epictitus, of how it feels to have a case of genuine "Wirelessitis."

Vol 18, No 2, p41 - Feb 1922

HOW ABOUT THAT SUBSCRIBER YOU ARE GOING TO GET?



Get Him To
PAY UP



Have him fill out the blank below and mail it with \$2.00 to

107 WILSON AVE., FLUSHING, N. Y.

Enclosed find \$2.00 for 1 year's subscription to the Bridge.

Name Chapter Year

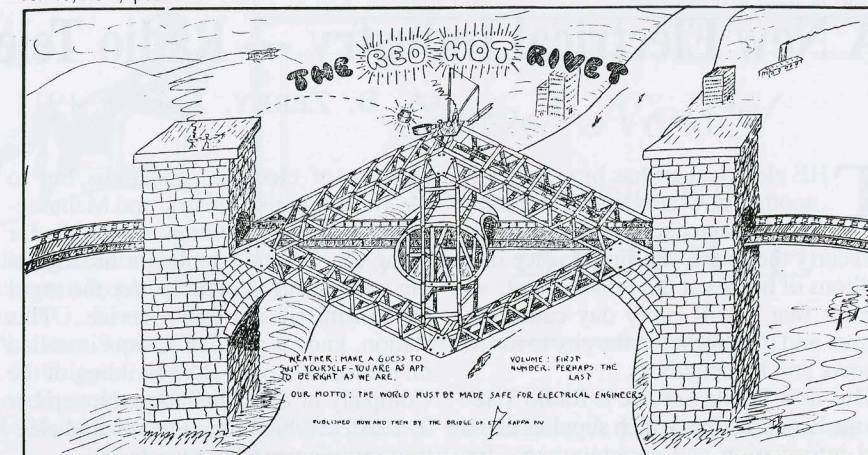
Home Address

Company Position

Business Address

Send BRIDGE to

Vol 19, No 1, p35 - Nov 1922



THE RED-HOT RIVET

UPON commencing the publication of the RED HOT RIVET, the Editor-in-Chief wishes to dwell upon the fact that this organ is intended to contain humor, wit, and satire. In obtaining such material we shall be entirely unprincipled.

HOW TO KEEP WELL

By Dr. Howe I. Connem, M.D., B.S., B.H.P.

NOTE: Dr. Connem will be glad to give advice through this column to all RIVET readers. Any medical question, the answer to which will not exclude this periodical from the mails, will be gladly discussed. (Ed.)

ELECTRICAL ENGINEER. Dear Doc.: For several months, I have been losing weight. Also, the slightest exertion tires me, and I find that by night, I am completely exhausted. Am also troubled severely by constipation. Can you advise me?

ANS. Your complaints, which are, unfortunately, only too common among gentlemen of your profession, have their origin in a common cause, known as pursus cadaverous, or atrophy of the pocket-book. Borrow a dollar and buy yourself something to eat.

YOUNG WIDOW. Dearest Doctor: Since the recent loss of my husband, I have had a feeling of loneliness and longing for companionship. I am quite attractive, and it seems to me that if I could form the acquaintance of some good looking young college man, our companionship would be mutually agreeable. My husband left me considerable wealth, which I would like above all things to lavish on some deserving man. Do you think my loneliness will wear off, or can you in any way advise me?

ANS. Your query should more properly have been addressed to our editor of Advice to the Lovelorn column, but on account of its touching pathos, I am moved to deal with it in this column. Pin a red rose on your coat and wait for me at the Times Square subway station tonight at seven.

A New Electrical Industry --- Radio Telephone Broadcasting

A. B. ZERBY, *Epsilon*, 1911

THE electrical art has brought forth another new service for the public. A service so wonderful that it will carry the sound of a single voice into millions of homes at the same instant; so useful that it will every day cause the farmer and the dweller in the city to touch elbows and be neighbors.

This new Public Service is Radio Telephone Broadcasting, which supplies news and information and entertainment for everybody, everywhere, every day.

Radio Broadcasting as a continuous and sustained service may be said to have had its beginnings in the transmission of the Presidential Election returns from East Pittsburgh in November, 1920; although its principles had been known and crudely applied for the past ten years by amateurs and experimenters.

Just prior to the outbreak of the World War, active experiments in wireless telephony were being made with some success in Germany, Italy and America. During the war further experiments were made and demonstrations actually were made from ship to ship, ship to shore, and even from airship to land. These experiments prior to, and during the World War, were successful in bringing wireless apparatus to a closer approximation to perfection, and particularly so, in adapting the vacuum tube to the work of radiophoning.

However, amateur wireless communication, both in America and abroad, was entirely shut down during the conflict, with the result that little was known of the great strides made in the work except by those manufacturers working under government jurisdiction.

The Armistice and the subsequent lifting of the ban on amateur operations changed all this, with the result that the radio telegraph and telephone were given to the public, or rather to the amateurs, which in no small measure constitute a part of the public.

However, the amateur radio operators, numerous as they are, comprise only a restricted circle, small when compared to the extensive population of the country. While these amateurs were talking to one another through the air, the average citizen was still ignorant of the great possibilities of the radio telephone.

The great utilitarian and commercial value of radio transmission was foreseen and realized by a few of the larger manu-

facturers of electrical apparatus, but to the Westinghouse Electric and Manufacturing Company belongs the credit for being the first to establish a broadcasting station and to organize for the regular transmission of radio service. This station, known as KDKA, was installed on the top of a nine-story building of the Company in East Pittsburgh, November 2, 1920, at which time Presidential election returns were broadcasted.

Steps were taken to obtain a permanent license to broadcast and the station was again started December 23, 1920. Since that day it has been in continuous operation. This means that every night, Sundays and week-days, there has been broadcasted a regular program for the public. This is a significant record for continuous operation in a new and uncharted field.

During the first few concerts public interest was not of the keenest, probably for the reason that the lay public, ever skeptical, could not bring itself to believe that catching music out of the air was a possibility. However, the radio amateurs in and about Pittsburgh, and of course from distant points as well, did grasp the possibilities of the idea and spread the news to their friends. It was not long before their friends were "listening in" to the radio concerts at the amateurs' homes and from this beginning it was but a step to the condition which exists today, an almost universal demand for radio equipment and entertainment. To indicate the great interest in Pittsburgh it is only necessary to state that every newspaper in the city, and about 100 within a radius of 100 miles of the city, carry daily programs of KDKA's concerts. This same public interest is reported from the three other broadcasting stations of the Westinghouse Company at Chicago, Springfield, Mass., and Newark, N. J. At the present stage of broadcasting, it is necessary only to look at nearly any newspaper to see the popular hold it has upon the public.

Naturally the first concerts broadcasted in the early days of the Westinghouse station were not the elaborate concerts being sent out today. They consisted of "canned" or phonograph music and some talks by the announcer. Other features were added from time to time. The church services, the news stories, grand opera broadcasting, talks by well-known

men and such statesmen as Herbert Hoover; Secretary of War, Weeks; Assistant Secretary of the Navy, Theodore Roosevelt, Jr.; Joseph Tumulty, secretary to Woodrow Wilson, and hundreds of others: all followed as public interest grew and the possibilities of radio broadcasting compelled conviction of its great value and marvelous utility.

A vision of a country-wide radio service was seen and thus other Westinghouse stations were established to expand the pioneer work of KDKA at Pittsburgh; other manufacturers started stations; and the U. S. Government has now opened one or more of these stations.

Radio has the human-interest, universal appeal to all classes of people. The millionaire and the poor man, the youth and the old man, the mother, daughter, sister, brother, father, the whole family alike are interested in broadcasting. This condition makes it imperative that all programs broadcasted should contain varied appeals. In other words, something should be in each one to appeal to some particular part of the varied audience. A well-rounded program must be sent out or radio interest will lose its universal appeal.

Much thought is given to the make-up of the programs sent out by all four Westinghouse stations. This can be observed by reading one of the daily programs printed in the newspapers.

The Westinghouse broadcasting station's call is KDKA, operating on a 360 meter wave length.

More than 300 letters are received by the Radio Division at East Pittsburgh every day, all from people who are "listeners-in," or as one of the ministers of the church whose services are sent out calls them, the "invisible audience." This same condition is reported at the other stations.

Radio interest has by no means reached the peak; it has many possibilities that have not been touched. A popular idea is that individual broadcasting stations will be started where all opera music will be sent out and which will serve as a sort of universal broadcasting station for the district. Music, news, speeches, etc., will be distributed from this central point, with each individual owner of a receiving set tuning in as he desires.



J. W. Millspaugh, T '14, attended the January meeting of the Milwaukee Alumni Chapter which was his first of the current year. January resolutions are good the entire year Jack if you keep them up.

F. R. Winders, A '05 joined the staff of the National Electric Light Association in New York City. Bro. Winders was until recently with the Railroad Commission of Wisconsin.

The Caribou Plant of the Great Western Power Co., at Beldon, Cal., seems to be fast

accumulating material for an alumni chapter. Its personnel contains D.G. Kramer, M '13, as Assistant Superintendent; R. P. Crippen, M '21, as Relief Operator; C. S. King, M '20, as Electrician.

One of our new subscribers, a 1918 man, who had never subscribed to the quarterly after reading the November issue wrote: "It certainly was a great pleasure to renew old acquaintances and recall old memories." We hope there will be more like him who start the new year right by sending in their two bucks.

Eyes Front

J. M. SPANGLER, *President*

In these so-called reconstruction days there has been much said and written concerning a return to normalcy. With an industrial condition slowly disengaging itself from its own disheveled machinery and with a world at large gradually righting itself from the folly of its own imperfections, it would seem that a return to normalcy is not as much desired as the establishing of a new and better proving ground. Our command should be EYES FRONT!

Any body of men whose bond of allegiance is either the elevating of a profession or the fostering of a brotherhood or both, cannot afford at this time to rest on their oars until the waves of adversity have subsided to determine whether they have been left stranded on a rock or again calmly rest on the Sea of Life's Affairs, ETA KAPPA NU must not return to normalcy. We must fortify ourselves against a return to what we now can recognize as unsafe territory and build our walls stronger to accommodate the future.

Our Association is basically correct. It was founded on the tried and true plan of giving something, just a little more than we hope to get, and in so doing get more than we give.

The Alumni Chapters must give to the Active Chapters the benefit of their experience, instruct them in all the ramifications of their chosen profession and by example teach them that this is an age of organization and organized effort. Just as soon as the Alumni Chapter ceases to function as an instructor and builder, just so soon will they fold up their tent and silently steal away. The graduate members of this association

Good News!

ANNOUNCING THE New BRIDGE

BEGINNING with the next issue THE BRIDGE will appear in an enlarged and improved form. A MOUTHPIECE for the Fraternity that you will be proud of.

SOME of the features are: YOU will enjoy reading it. 1. 9 inch by 12 inch size. 2. Really interesting articles by well-known Authors. 3. Who's Who Column. 4. More Personals. 5. Cartoons and Humorous Stuff. IF there is an EXPIRATION BLANK with your copy of this issue MAIL IT WITH YOUR CHECK NOW.

No Increase in Price

Send in your check TODAY!

must not depend on luncheons and dinners and picnics to be the paramount effort of their organization. They compete then with clubs, social fraternities and home cooking. This sort of competition is too keen. If they allow the giving of good professional service to the undergraduate with chef's menu, they can market a product in a virgin field. This Association is practically alone in this endeavor and with careful culture we cannot help but reap a bountiful harvest.

The Active Chapters must consistently strengthen the quality of their personnel. Frankly speaking, the unnatural conditions of the past few years have given some weak and undesirable students access to our Association, they naturally follow the laws of nature and have surrounded themselves with others of their kind. This is fortunately true only in a few cases, but it must be immediately remedied. You, who are the fountain head of our institution, must jealously guard against the admission of impure blood. You must curb your petty desires and prejudices and make your selections represent the principles for which we stand. ETA KAPPA NU is right now in the limelight of the electrical profession and only you can keep it there. We have come thru the fires of trying times, unscathed and with a firm purpose. It is your solemn duty to guard our doors.

So let us not return to normalcy, but go on, led by a vision of bigger things, with our EYES FRONT!

The Don Lee Television System

By Harry R. Lubcke, Mu '28

Director of Television, Don Lee Broadcasting System

The Broadcasting System

The Don Lee Broadcasting System forms the western terminus of the Columbia Broadcasting System. It includes eight broadcasting stations on its basic network, and as the Columbia-Don Lee System produces and feeds programs to fifteen stations. It produces several nationwide programs heard over the Columbia Broadcasting System, of which California Melodies, Woodbury's with Bing Crosby, and Guy Lombardo with Burns and Alien, are examples.

The Television System

The Don Lee Television System consists of two television transmitters: W6XS, with a power of 1,000 watts, on a frequency of 2,800 kilocycles (107 meters), and W6XAO, power of 150 watts, on the ultra-high frequency of 44,500 kilocycles (6 3/4 meters), both located in the Don Lee Building, Los Angeles.

These transmitters operate simultaneously, and broadcast television images nightly, except Sunday, from 7:00 to 9:00 p.m., Pacific Standard Time, and Monday, Wednesday and Friday mornings from 9:00 to 11:00 a.m.

Program Material

W6XS and W6XAO broadcast full-length Paramount features, Paramount shorts, and Pathe Newsreels, which are changed on a regular schedule as is common practice in theatrical work. Hour by hour programs are published daily in the Los Angeles "Times", and weekly, in advance in the "California Broadcaster", a California program weekly.

Certain local events have been put on the television in record time. Scenes of the earthquake damage of March 1933 in the Los Angeles-Long Beach area were broadcast soon after the quake.

Scenes of the Armistice Day Stanford-University of Southern California football game, one of the West's classics, were flashed on the television screen three hours and forty-five minutes after the game ended. This is believed to be the shortest time in which football scenes have reached the television screen.

History

The television research of the Don Lee Broadcasting System was started late in the year of 1930. By the last of 1931, the development and construction of a new system was completed, and on December 23, 1931, the ultra-high frequency transmitter W6XAO began broadcasting television images on a regular schedule. This was the first television transmitter in operation west of Chicago and almost the only one in the country on the ultra-high frequencies.

The transmitter operates with 150 watts on the ultrahigh frequency of 44,500 kc (6 3/4 meters), transmitting images of 80 lines repeated 15 times per second.

"This is preeminently the time to speak the truth, the whole truth, frankly and boldly. Nor need we shrink from honestly facing conditions in our country today. This great nation will endure as it has endured, will revive and will prosper. So first of all let me assert my firm belief that the only thing we have to fear is fear itself—nameless, unreasoning, unjustified terror which paralyzes needed efforts and converts retreat into advance.

"Happiness lies not in the mere possession of money; it lies in the joy of achievement, in the thrill of creative effort. The joy and moral stimulation of work no longer must be forgotten in the mad chase of evanescent profits. These dark days will be worth all they cost us if they teach us that our true destiny is not to be ministered unto, but to minister to ourselves and to our fellowmen.

"Recognition of the falsity of material wealth as the standard of success goes hand in hand with the abandonment of the false belief that public office and high political position are to be valued only by the standards of pride of place and personal profit; and there must be an end to a conduct in banking and in business which too often has given to a sacred trust the likeness of callous and selfish wrongdoing.

"Small wonder that confidence languishes, for it thrives only on honesty, on honor, on the sacredness of obligations, on faithful protection, on unselfish performance; without them it cannot live.

"We face the arduous days that lie before us in the warm courage of national unity; with the clear consciousness of seeking old and precious moral values; with the clean satisfaction that comes from the stern performance of duty by old and young alike. We aim at the assurance of a rounded and permanent national life."

From President Franklin D. Roosevelt's Inaugural Address



Figure 2: The author with the television transmitter installed in an airplane

First Television Reception in an Airplane

In order to test the system, and specifically the self-synchronized cathode-ray receiver which had been developed, the receiver was taken aloft in a Western Air Express plane on May 21, 1932, and the reception of television images attempted. As far as is known, this was the first reception of a television image ever made in an airplane, anywhere in the world.

The receiver was of the cathode-ray type, and is shown as it was installed in the airplane in Fig. 2.

The One Kilowatt Television Transmitter, W6XS

After preliminary tests on an experimental transmitter, a design was completed for a 1,000 -watt unit which was to become W6XS, the second transmitter of the Don Lee Television System. . . . Two Western Electric 279-A vacuum tubes supply a full kilowatt carrier with an available surplus of 4 kilowatts for peaks. These tubes are the largest air-cooled vacuum tubes made and operate with their plates at a bright red color.

In January, 1934 images from W6XS were received in the San Francisco suburb of Alameda and shown to, among others, Dr. Lester E. Reukema (Mu '22), professor of elec-

PLAN NOW
to visit the
CENTURY OF
PROGRESS
In CHICAGO
In OCTOBER

and attend the 1933
CONVENTION
of
ETA KAPPA NU
on
OCTOBER 20-21

DELTA CHAPTER
Will Be Host Assisted by
CHICAGO
Alumni Chapter

Low Round Trip Fares
By
RAIL-BUS-BOAT
Or Gang Up and
Drive the **LIZZIE**
DISPEL THAT
WORRY !!

and Have a **GOOD**
TIME For ONCE !

trical engineering at the University of California, Berkeley Dr. Reukema said, concerning the reception of the closeup of a motion picture star:

"One could readily see the movement of her head, causing a slight waving of the pendant earrings she wore, and could see her lips move as she spoke. . . . Considering the distance covered, approximately 350 miles airline, I was surprised that the fading was not more severe."

Instruction for the construction of a television receiver can be secured by sending a stamped, self-addressed envelope to the Television Department of the Don Lee Broadcasting System, Los Angeles.

Vol 30, No 4, p12 -Apr 1932

A Code for Investors

We have been in a "bull market" now for nearly two years. June of 1932 marked the low point of the depression, since which date almost all indexes have been on the up grade. Ordinarily after so long an advance, we should be approaching some sort of a summit in the market, but as noted elsewhere on this page these are not ordinary times. To venture any specific predictions under present circumstances would seem to be impossible. It is something like one of those differential equations that have to be solved by the trial and error method—and Heaven help our pocket-books if we err. However, there are a few generalities that can be indulged in—even today, a sort of code for investors. Some of the following comments may be very obvious, others you may disagree with; but on the whole, adherence to the following policies should be helpful in preserving your savings and in providing a reasonable income with some prospects for future appreciation.

Things to Avoid

Now, as always, avoid speculation, margin trading, buying beyond your means. This is a business for specialists and even a majority of the specialists fail in it sooner or later. Don't get the idea that you will be different. The odds are too great against you.

A Trip "Over the Coals" with Omicron's Pledges

By John Hyvarinen, O '33

Fall quarter is well under way—time for Omicron to add to its members. Eligibility checked first—bids sent out—education, mortification and excitement of pledges begins with a five-hour written exam.

Seven p.m. that fatal second day of November—five junior and five senior electricals—stripped of jackets, vests and neckties—start in to shake the cobwebs off their memories of philosophy, history, mathematics, literature, electricity and what not. Rapid fire true and false start the proceedings, followed in short order by problems, themes, problems, lunch, and lastly—more problems. At midnight all papers are collected—relieving the tired and sleepy ten of questioning and problems which would have stumped the founders of mathematics.

During the following week, each pledge has to obtain the signature of every active member in the chapter, and in so doing finds himself in the unhappy position of, "Aw! Nobody cares for me", for the signers have the privilege of assigning any task—be it a problem, preparation of a speech, or anything they judge necessary—before applying their signature to the pledge's list. Sleep is forgotten and long hours of work by aid of a desk lamp are substituted in its place.

At the critical hour—7:00 p.m.—of the informal initiation night the "doomed" ten are again gathered together in a room of the electrical engineering building. The council has declared all as "miserable failures" in the written exam, so much depends on the oral examination that is to be given this night.

One by one each pledge is led out of the room and before the council. Those that remain behind begin to think of what is being done to the others—and their imagination does the rest. Before long one or two begin pacing the floor—two play "cat and dog" to relieve the strain—and before the proceedings are two hours old, each and every pledge in the room is on the verge of a nervous breakdown. Questions begin to creep into the conversation—"Where are the pledges being taken?"—"What goes on before the council?"—"Why don't the initiated return?"—"What was that you heard said about an electric chair?"—and so on until one hears . . . "Next will be Mr. —"

The chosen pledge is blindfolded and led out of the room by one of the council members. He is led about, turned about and twisted here and there, up and down stairs, in and out of elevator cages until—well, until his innards

Below: President Milner discovers the initiate has his hands off the metal of the electrodes.



Above: Hancock and Kupka swear in the blindfolded initiate.

feel as if they're shifted 720 degrees. And all of a sudden a voice booms out, "Who goes there?" And the guard answers, "One who seeks admittance into our council." "Has he any qualifications?" "None!" "Then why does he seek our chamber doors?"

"To present his case before the council and redeem himself for what he has done in the past." "Enter!"

The chamber door opens and Mr. — hears the slow tolling of a bell far drearier than any he has ever heard. Groans begin to issue forth from the far end of the chamber hall—groans that seem to come from nowhere. Thoughts begin to creep—who is groaning—the pledges? No, it can't be—Why are they groaning? What has been done to them? But a voice bursts forth, and oral examination is on.

Still blindfolded, the pledge is sworn in, and questions are solemnly presented to him by the presiding judges. "Your hobbies, recreations, activities—your adventures in love—your attitude towards dancing—and so, on and on until the two voices—of questioner and questioned—synchronize into one—one beginning before the other stops.

The judges have finished, and call upon the assembled council for approval of the candidate's actions. "NO!" is the unanimous verdict of the council, so the bewildered pledge is politely invited to be seated over yonder. His blindfold is removed with ceremony, but he finds himself completely blinded by a glaring spotlight shining directly into his eyes.

The candidate is asked to deliver a speech on a previously assigned subject—a speech upon which he has been compelled to spend many painful hours of research and preparation. He is allowed to begin—"Dowsers and Dowsing."

"Over the Coals"

(Continued)

"A dowser is a person who by the aid of a divining rod locates—"

But alas! The silence is broken by the questions of the council—"What is divining?" "Why does he want to locate—" "Can it be used in the testing of true love?"

"Can it in any way show that the present economic depression has affected the English sparrow?" "Can it measure the square root of a tree, or differentiate between the bark of a tree and that of a dog?"—and so on and on the questions come, and every attempt at a resumption of the speech brings on a new barrage of questions.

After the pledge has been properly chastised by the council, the presiding judge interrupts with—"By the way, Mr. —, do you happen to know the resistance of your body?" "Oh, about 15,000 ohms." "About how much voltage can you stand?"

"Not very much—about 79 volts."

"Sounds unbelievably low. In order to prove whether you're right or wrong we'll have to make a test. Will someone place the high tension, electrodes in the hands of this conservative candidate?"

A robed figure comes up with the shiny spherical electrodes and gives these instructions—

"Sit back in your seat, eyes straight ahead; hold the metal electrodes out in front of you, up to the level of your eyes, one and seven-eighths inches apart." The spotlight goes out—a generator directly in back of the candidate's chair starts, bringing back memories of a visit to the Riverside power plant last spring—of unfinished E. E. Lab. reports—of the sweetheart waiting at the end of the lane—of home. The spotlight flashes on and off—then zip, crash, psst—zip—brilliant flashes of light begin to dance about on the floor at all sides of the chair. Then all is dark again, but the generator takes on a more vicious note.

More thoughts—"What were those flashes?—When will the flash occur between the electrodes?—Will my heart stand the voltage?"

The generator picks up speed—a deadly sinister note rises above its droning hum—a switch bangs in "Ee-ow! Help! Turn it off! ?||\$&c? I can't get up!" The lights come on, the devils retire from the seat of the chair, and up comes the council with hearty congratulations.

The guard turns out to be Brother Kupka; the doorman—Brother Shepherd; the bell - a ceiling lamp shade struck by a window pole; the judge - Brother Mangan; the questioner—Brother Hancock; and the council active members. The generator turns out to be a demonstration induction motor; and the ?||\$&c?- a good old Ford spark coil with wires in the seat of the chair.

Satisfaction

Now and then I may go fishing
And catch a fighting bass,
But the pleasure that it gives me
Is one that soon will pass.

Other times I may go hunting
And shoot a mountain quail,
But the thrill that this prize gives me
Is one that soon will fail.

Of all the pleasures I've experienced,
Of all the joys I've known,
There's nothing that compares with
This one I call my own:

My greatest satisfaction comes
When I've performed this feat:
When after hours of toil I find
My Lab report's complete

---Donald S. Nutter, Nu '34

A NEW USE FOR ELECTRICITY

In tests reported by Drs. L. W. Crafts and R. W. Gilbert of New York University students were given electric shocks each time they made an error in simple mechanical problems, resulting in the shocked students learning the problems more quickly and remembering their lessons better than those who were not shocked.

THE WOES OF AN EDITOR

If I publish jokes I am silly; if I don't, the readers say I am too serious. If I publish original matter they say I lack variety; if I publish things from other papers they say I'm too lazy to write. If I stay in the office I ought to be out rustling news; if I rustle for news I am not attending to business in the office. If I wear old clothes they say I'm a sloven; if I wear new ones they say I must be making a pile of money, or the clothes aren't paid for. What in thunderation is a poor editor to do anyhow? Like as not somebody will say I swiped this article from some other paper. So I did.

EMPLOYMENT

Increased production and consequent demand for technical men indicates that 1941 graduates may be in the position of those of 1928 and 1929—not a problem of where to find a job but “which job offered me shall I accept.” Our alumni chapters can help you. Try writing an officer of the chapter near the city of the offer. He will gladly write you the opinion of his members about the company you are considering—in fact, the chances are that at least one of the alumni members works for the company and can tell you first hand what you want to know.



STOP THIEF!

BURGLARS and other criminals can no longer hope that bad radio weather will increase their chances of a getaway by gumming up police radio. Atmospheric disturbances, ignition noises, street car interference—in fact all the reception devils that plague the life of radio police practically disappear with the introduction of frequency modulation, the new method of broadcasting developed by Major E. H. Armstrong. Several two way FM installations have already been made. One of the first was in Douglas County, Nebraska, which recently installed a number of G-E transmitters and receivers. Among those responsible for many of the G-E developments which have made two-way FM possible are I. R. Weir (Rose Poly, '21) and H. P. Thomas (Harvard, '25)—transmitter engineers; and W. C. White (Columbia, '12) and K. C. DeWalt (Iowa, '27)—vacuum tube engineers.

BETA-ETA CHAPTER GOES TO WAR

By Pfc. ROBERT W. BIVENS, Beta-Eta '44
Cartoons by HENRY GILMORE, JR., Beta-Eta '44

January 8, 1943—a new term at North Carolina State College starts, and with the beginning of this new term comes the news that it will be the last one that the E.R.C., advanced R.O.T.C., men will complete before going into active service, from a reserve status. With so little time

left with civilian freedoms, it was extremely difficult to decide how to appropriate the remaining days, but social life managed to receive a very adequate allotment. The next few weeks passed rapidly, the term's work was completed, and arrangements were made for the welfare of Beta-Eta chapter during and after the war.

We're in Camp

One bright spring day found six members of Beta-Eta chapter wandering around Ft. Bragg, N. C.—“soldiers in civilian clothes”; but this did not last long as they were run through the supply line and soon emerged with two barracks bags laden with G. I. equipment. Indeed they presented a comical spectacle as they trudged along, almost collapsing under the load, and having extreme difficulty persuading their G. I. shoes to go in the direction that they desired to go. Examinations — classifications — inocula-

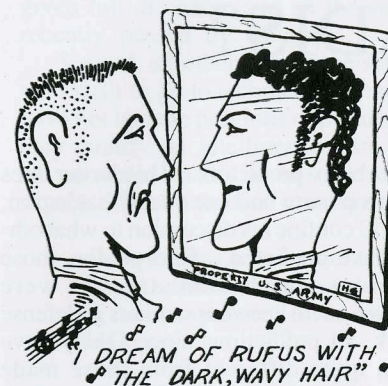


INNOCULATIONS

tions—and the men were in for a peculiar kind of let-down feeling when they found the much-talked-of three-pronged, square needle to be a simple hypodermic type.

Off to Missouri

After learning through experience that not all “duck” hunting is done with guns, that automatic potato peelers are for



“dreaming only,” and that the old home-family dish-washing was really nothing at all, Rufus McNair, Preston Page, Henry Gilmore, Jack Pinner, and Robert Bivens were transferred to Camp Crowder, Mo., where they were destined to have many interesting experiences in the Signal Corps. Flynn Menius was also in the Signal Corps but was attached to the Air Corps and sent to St. Petersburg, Fla., for his training -- all of the others wondered how “Circuit-Breaker” Menius would get along throwing the Florida brand of circuit-breakers. (It was told later that he was known in camp as the “jinx of the fuse-box”.)

In the old “happy hunting grounds” of Jesse James, the NC-State Eta Kappa Nu quintet had countless experiences. Basic training was completely filled with activity—from KP to abbreviated field maneuvers. The group almost converted from a quintet to a quartet when Jack Pinner became lost in the wilds of the Missouri Ozarks. Jack said that he would have used his compass (if he had had one) or that he would have oriented himself by the moss on the trees (if he had only known the direction of camp, and also if he had known which side the moss grows on). Under the circumstances, however, Jack decided it best to go to sleep under a tree until we could find him—his getting lost couldn't have been intentional—or could it?

Meanwhile, Gilmore and Page were becoming “dit-happy.” One day Page was heard to say to Gilmore: “Dit dah’ dit dit?” “No, dah’ dit dit,” replied Gilmore, and off they went into their two-tone conversation. Despite the constant pounding

of the interrupted tones in their heads, the two radio specialists managed to remain surprisingly sane. Command Post exercises provided 24 hours per day of excitement (?) for Preston and Henry and they still like to boast of their days and nights of toil as radio operators.

New Friends and Acquaintances Made

With the new and interesting experiences in active service, the Beta-Eta quintet made new friends and enjoyed pleasant association with some of the finest young men they had ever known —men representing other colleges and universities all over the United States. Because of very similar backgrounds in electrical engineering, it was not unusual to see fellows from Georgia Tech, Carnegie Tech, Penn State, Ohio State, Norwich, Kentucky, Clemson, and N. C. State discussing the advantages and disadvantages of the Class C amplifier over the Class A, as they reclined on a grassy lawn after a hard day's work. Among those new fellows that the NC-State men met were many brothers in Eta Kappa Nu. All of them proved to be fine men and a credit



An HKN Meeting in Camp

August 24th, ten Eta Kappa Nu soldiers met, after performing the duties of the day, and enjoyed a most successful meeting of the organization. Activities of the various chapters, and good old college days were discussed. After the meeting, the group adjourned to the PX for refreshments and more reminiscing. Those men present at the occasion were: Brothers Robinson, Pinner, Yokorn, Smith, Pogue,



McNair, Page, Mellers, Frost, and Bivens. This meeting probably has the distinction of being the first of its kind in the history of the Association.

—Days passed quickly as autumn approached, and orders for transfer soon proclaimed to the NC-State quintet the news of departure from Missouri and from their newly-formed friends. A tinge of sadness gripped the hearts of each of the men as they realized that such pleasant associations with their newly-found brothers in service were coming to a close. A conductor shouted “All aboard,” the whistle of a train pierced the clear Missouri air, and a swish of escaping steam started the Beta-Eta men on toward greater challenges - *challenges for men to help transform this world from one of chaos and barbarism to one of understanding and brotherhood!*

to the chapters they represented. There were Brothers Dick Higley and Orville Hall of Gamma chapter. Leslie Frost, Bob Pogue, Milton Daniels, Bill Schafer, and Bob Mellers representing Sigma chapter, Harry Yokorn of Epsilon chapter, Orrin Robinson and Dick Smith of Beta-Mu chapter, and Rufus McNair, Preston Page, Henry Gilmore, Jack Pinner, and Robert Bivens of Beta-Eta chapter.



ROUND AND SQUARE PEGS

When there is a shortage of food production compared to demand, prices rise and farmers sow in what is now called "sub-marginal lands." Then, when demand decreases, these sub-marginals are let stand idle—and we have the "dust bowls" of the mid-30s.

In 1932 many personnel officers of our colleges were sorry they had not had the foresight four to six years earlier to advise all but the best students to keep out of engineering. Now, some of these officers are proverbially "kicking themselves" that they did not advise more freshmen back in 1936 and 1937 to take engineering.

We are now again in a period of high demand for engineers. As a result, we can expect many "submarginals of engineering" to find employment in work for which they are not fitted. They, like the sub-marginal lands, will get-through as long as the demand endures. But after this crisis we must expect a reaction. Then many a young man, as in the 30s, will find himself a round peg in a square hole. How much better that they had learned this now and found the round holes in which to fit at the start; they may then find they must begin over again—result, young men soured at our capitalistic system.

By the method in which you, an HKN, were selected, it is reasonable to think that you will not so suffer. But even then, there are different sizes and kinds of square holes - design engineering, manufacturing engineering, operating engineering, scientific research, teaching, patent law, sales engineering, market research, and many others. It will pay you to thoughtfully and carefully analyze yourself and your abilities before accepting one of the three or more jobs that have been or will be offered to you.

ALTON B. ZERBY.

QUO VADIS?

Word has come trickling in that the engineering departments (at least) of several of America's institutions of higher education are about to close. And one or two others hint that the same is possible of happening to them. No, these are not the largest of our institutions; but they are not the smallest. The chapter of Eta Kappa Nu in one has initiated twelve on the annual average over the past five years; the chapter in the other, sixteen—thus 36 to 60 EE graduates are indicated for each.

Further, it has been reported that EVEN THE HEADS of the mechanical, civil and electrical engineering departments of one of these have been given indefinite leave of absence. *To what is this Country of ours coming? America, where is thy vision?*

What Made America Great?

Yes, there were many, many factors which contributed to America's greatness. But some of those that the Nazi overlooked were: WILL TO DO, AND THE BRAVN AND THE EDUCATION WITH WHICH TO DO IT! Is it possible that now that America is cashing-in on that education it shall cease educating?

The reason given why the one institution summarily sent away the most of its engineering faculty is that the time came when there were more members of the faculty than there were students. Granted, at least for the sake of argument! But does this indicate: "unload"—even the key men?

What of the Immediate Future?

Yes, the Army for various reasons has called to the colors all the able-bodied men in the colleges, including both those in "civies" and in uniform. Surely it did not do this blindly.

One reason given by commentators is that it wants to strike quickly and hard and have it over with. But few of those inducted in June will see action within six months.

Another reason hinted at is one of morale of those now overseas, that these were looking with envy upon the lads lucky enough to have been deferred for college or, even more, put in uniform and sent to college. Other reasons have been given; yours is as good as the next one.

We have read as many predictions of the probable length of this war as there

have been predictors. This writer does not propose to become one of that legion; he will confine his discussion to what others have predicted. Except for those cautions which unmistakably were thrown out to keep our workers at defense work, all predictions since D-day have been quite different from those made when we believed the Nazi about their hard and impregnable "west wall".

The *Magazine of Wall Street* in its issue of June 10th reported that "the inside Washington view is that the European War probably will end by November, possible by August." A recent press dispatch from London reported that military commentators there now say the next two or three weeks will decide whether Germany crumbles this summer, before the snow flies, or next spring. Even the ultraconservative Churchill told Parliament that victory can be expected this summer. But let's be safe; let's say "a year from now". Then what?

True, we shall need an army of occupation—the Army has been quoted as estimating two millions for this. We shall need an army to invade China and drive out the Japs. But both of these will not take nine million men and women.

Will Technology Be Resurrected?

Now, let's explore another angle: The "brass hats" and, especially, the Administration have been accused of many mistakes. And perhaps it was a mistake to have inducted almost all of the engineering students. (When one looks in from the outside he cannot see all.) But whether this was done thoughtlessly, with malice, or with reason, be sure that both the "brass hats" and the Administration have heard plenty—and from big men in the industries and the professions—about what they have done to the future of technology. They cannot help but have been impressed.

It is this writer's humble prediction that as soon as the struggle is over in Europe, be it one month, five months, or a year, the Army will take immediate steps to correct the harm it has done to technology: First, ways will be found to sift out the better qualified of those lads pulled out of college and to send them back—IN FULL COLLEGIATE COURSES, THIS TIME, perhaps in uniform so they can be called on extremely short notice in emergency; perhaps after having been

given full discharge and on the subsidy recently passed by Congress.

Second, all other lads in the services who wish to go to technical colleges but have not had the previous opportunity, if they qualify on intelligence tests, will be permitted to do so in same manner as suggested by the first condition.

(Note that this action, instead of disrupting civilian economy during the change-over period, will help it.)

But will our technical colleges be ready to take on this great load, perhaps on very short notice. Surely those that have "eased out" their key men will not be!

Oh! They say, we have given them leave of absence, they will come back at the snap of our fingers. Eh!!! The writer recalls a similar argument on the part of industry during the early 30s—but industry learned that many good men found other places and believed in the "bird 'in hand . . .". And how those same industries have cried for technically 'trained men the past two years!

"Too Little, Too Late"

Furthermore, even if all those key men can be called back, will this be enough? Will the lads who have seen snappy action in training and, especially, on the fronts be satisfied with the courses formerly offered by our colleges?

Think seriously, college presidents and engineering deans! Would it not be better for you to gamble on a sure future? Hold the best of your engineering faculty men. No, they need not imitate WPA! PUT THEM INTENSIVELY TO WORK AT PLANNING THE POST-WAR COURSES IN ENGINEERING, courses which will interest the soldier, the sailor, the marine who avails himself of the offer Congress has recently made him. If you don't have such courses, you will see the lads leaving your campus to find them elsewhere.

ALTON BARRICK ZERBY
July 4, 1944

**And you, presidents and deans of liberal arts colleges and liberal arts schools, can think this over too. While it is possible the service men will not be permitted as early leave or discharge to attend the liberal arts courses the same conditions of selectivity of courses will apply to them when they do—yes, it is probable that they will apply more strongly to your curricula.*

ETA KAPPA NU BRIDGE FALL 2000

Unbalances

BEING A COLUMN OF THOUGHT, HUMOR, BUNKUM—OR WHAT YOU MAY CALL IT.

FLASH!!

The town of Dillsburg's fire department is equipped with two fire dogs and an engine truck. In case of fire, the dogs help find the hydrants, the truck comes in handy during the annual picnic.

2000 ed. note: Dillsburg, PA just happens to be the location of the HKN National Headquarters in the 1940s.

ANSWERS TO SHORT QUIZ IN POLITICAL SCIENCE 301

If you have two cows:

COMMUNIST: The government takes the cows and gives you the milk.

NAZIIST: The government takes the cows, shoots you and sells the milk.

NEW DEALER: The government pays you to shoot one cow, milk the other and dump half of the milk in the sewer.

REPUBLICAN: The government milks the cows, separates the milk and feeds the cream to the fat man and the skimmed milk to the skinny men.

CAPITALIST: He sells one of his two cows and buys a bull.

SENSE AND NONSENSE

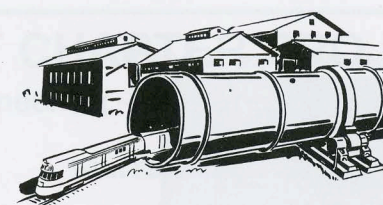
A German guard in Denmark tired of his job. "Ach," he said, "I wish the war was over." "What will you do when it is over?" asked a Dane. "I'll take a bicycle trip through greater Germany," replied the Nazi. To which the Dane retorted: "And what will you do in the afternoon?"

—Portland Oregonian.

An epitaph to an Army mule:

"In memory of Maggie, a mule, who in her lifetime kicked 1 General, 4 Colonels, 2 Majors, 10 Captains, 24 Lieutenants, 42 Sergeants, 454 Privates and 1 bomb."

—Kansas City Star.



Vol 37, No 2, Inside Front Cover - Jan 1941

GARGANTUAN GARAGE

IF Burlington Railroad officials would give their permission, you could drive their Twin Zephyrs into the newest kiln of the Permanente cement mill in California and still have enough room left over for a large freight car.

This cement kiln, one of the largest pieces of rotating machinery in industry, measures 450 by 14 feet. It will be used in furnishing 6,000,000 barrels of cement for the construction of Shasta Dam.

The kiln will be driven by a 200-hp G-E motor - the largest ever built for this purpose and representing an innovation in design as well as size.

The big motor was tested by young engineering college graduates taking the General Electric Test Course at Schenectady.

Inspection Trips

If the college chapter planning to make an inspection trip to a city in which we have an alumni chapter will write the officers of that chapter sufficiently in advance its members will find it to their benefit. It is possible that, on sufficient notice, the alumni chapter can schedule its monthly meeting that same evening so that the undergraduates can join with it - at least the officers and some of the other members of the alumni chapter will be glad to take dinner and talk over the problems of the students.

Already two chapters have thus contacted Chicago alumni (although not soon enough to have the regular meeting scheduled for the same time) - an account of the visits will appear in the next issue.

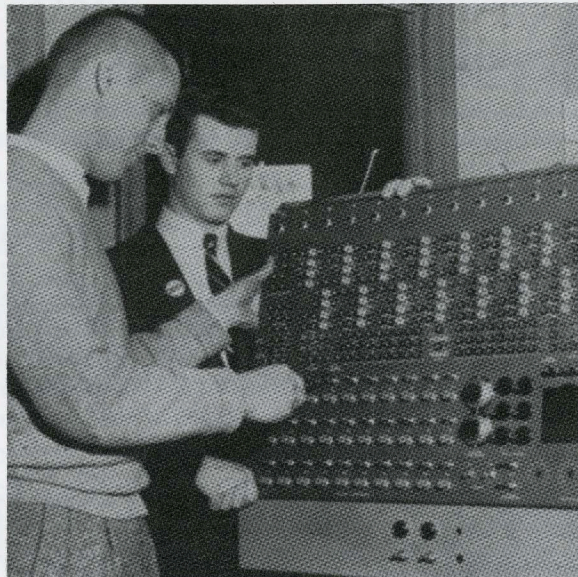


Photo by Patrick Horan

A PROJECT OF BETA-OMICRON CHAPTER

Brothers Ron O'Keefe, left, and Vance Norman are shown in the process of assembling an analogue computer kit.

Does Our Economy Require Armament?

About a month ago there were reported indications that U.S.S.R. was relenting and was ready to talk limited disarmament.

Then, the very hope that even a limited disarmament agreement may be reached and thus arms spending reduced was reported to have been used by a well known financier as an explanation of the immediate start of a nose dive in prices on the stock markets. True, the markets pulled out of the dive, apparently after more sober thought of investors and speculators—but the financier was quoted as saying: "You've been wondering how the creeping inflation will end. This is how!"

Think! What is wrong with America's economy—AND PSYCHOLOGY—that it requires wars and rumors of wars and preparation therefore to bolster its prosperity?

True, complete disarmament will make a big dent in our economy, what with decrease in our own defense and helping our allies and hoped-for allies prepare, militarily and economically. But are we

true patriots if we stop at that thought? Should we not profit by history? "A chicken in every pot and two cars in every garage" sang us to sleep in the 20s. Then when the bust came that made this writer's hair curl—clean off his head—we were unprepared. Those of us who were born before 1920 will recall that in 1932-33 business clamored that "the government must do something about it." The government did—whether good or bad depends very much on your politics. Then by 1936, business, large and small, was heard crying; "If only the government would let us alone."

Now is the time to accept that some day peace will arrive and prepare for it. Complete disarmament (except perhaps for some form of a UN "police" force) will mean many men and women out of work and many young men and some women out of the armed services and with no job in sight. This can start the vicious cycle of no work, no money with which to buy, and therefore less sales and less production—thus even less work.

Telegram To:

ALTON B. ZERBY, EXECUTIVE SECRETARY, ETA KAPPA NU ASSOCIATION, DILLSBURG, PA.

IT GIVES ME GREAT PLEASURE TO INFORM YOU THAT 100% OF OUR ACTIVE MEMBERS ARE NOW LIFE SUBSCRIBERS TO THE BRIDGE.

(Signed) L. E. HAMILTON,
PRESIDENT
UPSILON CHAPTER

For years, the national officers of HKN have been advocating to the chapters that they make a concerted effort to obtain life subscriptions to THE BRIDGE. This year Upsilon Chapter—through the efforts of Brother Peter W. Pfeiffer, Bridge Correspondent—put on the first such campaign that we were informed about, and as you can see from the telegram quoted above, their results were 100%.

"Now is the time for all men, tried and true" to be thinking and planning as to how to solve this without WPA and the like. (For instance, had what were called PWA projects been off the drawing boards in 1933, WPA would not have been needed.)

Business with labor's full cooperation can do it with very little government help if only they will plan ahead and not be caught asleep. This writer personally knew two men—one as early as 1920-21—that foresaw the debacle of the 30s; but they were laughed at. There were others, surely, but they all were as "a prophet crying in a wilderness."

Perhaps there is help for us in the fact that complete disarmament will come in gradual stages. **Anyway, to fear disarmament is to reveal a sickening lack of faith in our own economic system and especially in our own intelligence—AB.**

AN IMPORTANT CHAPTER PROJECT FOR 1956-57

"Engineering — A Career for Tomorrow"

As Upsilon chapter indicated in its report, the critical shortage of engineers is thought by our national officers to be so important that you can bet your last dollar that the jury of the 1956-57 College Chapter Activities Award will give considerable weight to this activity on the part of our college chapters:

A new brochure is in process of preparation. This not only will describe the movie: "Engineering—A Career for Tomorrow" which is the 50th anniversary project sponsored by Eta Kappa Nu and was produced at University of Illinois (the home of our founder chapter); but it will give information to prove the shortage of engineers to high-school administrations—even to reporting salaries being paid to new graduates. This brochure will be supplied our chapters (college and alumni) free on request.

Eta Kappa Nu and University of Illinois paid for the production of this movie but neither has funds and personnel sufficient to distribute it as it should be shown. Thus, Eta Kappa Nu is selling prints to "all who buy" at estimated delivered cost. Now (one year after its completion and announcement) more than fifty copies of this film have been purchased at \$156 including film, reel, can and fiber shipping carton—by chapters, engineering schools (yes, several where we don't have chapters and two to Canada), libraries and industry. But this is only a "token" of the prints that should be in circulation.

What Each Chapter Can do

1. Obtain a print of the movie—it requires 25 minutes to show and is in color (also black-and-white is available for use by television stations not equipped for transmission of color films).
 - a. If your chapter treasury is sufficient, buy it yourself.
 - b. If your department's budget can be "juggled" to buy it, excellent.
 - c. Solicit help from your Dean of Engineering.
 - d. Don't overlook the Engineer's Council on your campus.
 - e. Perhaps an electrical company friendly to your school will help you finance it.
2. Obtain a supply of the brochures when they are announced as available. Samples will be mailed each chapter at that time.
3. Write the high schools in your vicinity offering that a student will gladly bring the film to their school to present it to all junior and senior high school students. (It is in the junior high school where the student first must be interested in scheduling all the math, science and English possible. After the first year, showing to seventh- or eighth-grade students—and to seniors, as a refresher—is all that will be needed.)
4. Let each of your members write the high school he attended, even though it is more distant, offering to bring the film on a visit to his home.
5. Write the other high schools in your state offering to mail the film for exhibition

6. In each case of "3" and "4" be sure to explain that your student member will be happy to answer questions the students may have. If an alumni chapter is in your vicinity ask its cooperation by providing an alumnus to accompany the student, the latter to answer questions pertaining to college and the former, questions pertaining to jobs, salary, etc.
7. The U. S. Office of Education publishes an "Education Directory, Part 2, Counties and Cities" which lists names of county superintendents and the superintendent of the urban schools. Your library may have a copy of this directory; if not a copy can be obtained from: Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price 35c cash.

NOTE: Some engineering schools are now so overloaded that they may object to anything to interest high school students in engineering. The movie, if properly presented, will lead to better prepared engineering students. Thus, if the school is unable to turn out more engineers it at least will be better able to turn out better engineers—and experience less attrition between freshman year and graduation. Consider: This attrition now is estimated to be between 40 and 50 percent. Cut this in half and we will graduate fifty percent more engineers a year without matriculating one more than now—and our education dollars thus will go farther.

A Tribute to the Engineer

The value of engineering and engineering education in securing this peaceful world cannot be overemphasized. The engineer has made many contributions in developing our national economy and our military preparedness program. In our highly complex technological society, the engineer is the creator of our modern tools of production. His efforts are largely responsible for America's great productive capacity and industrial superiority.

DWIGHT D. EISENHOWER

THE WRITER RECALLS AN EXPERIENCE he had soon after graduating from college. He was a member of the "student course" of a large electrical manufacturer. He and another "student" were assigned to a certain department for two months. It had what the company called a "premium system"; a "limit" was set on each operation. If the workmen performed the task in less than the limit he was paid additionally for half of the time he saved. Partly in order to increase the money in the pay envelope, partly as a matter of competition between him and his buddy, but mostly

for the satisfaction of accomplishment, the two tried "to beat the limit." Soon they found that the inspector took a half hour or more to come to inspect their finished work—while they stood by. Eventually, they took the inspector to task. He replied that they must consider that they were under contract and if work became slack in that section they would be given other jobs; but the regular workmen, who had families to support, would be laid off.

An altruistic opinion of the part of the inspector, true; but from that time on in that section the "spice" of work went out of us two young men. —THE EDITOR.

How Can We Get More Engineers?*

By HAROLD A. BERGEN, Delta '50

John Paul Taylor Publishing Co.

By any yardstick we choose to use, or by citing any authority we wish to respect, there is a shortage of engineers . . . to one extent or another. Among the common mutterings and the halfhearted platitudes, at least one voice does not pussyfoot. That voice says this. . .

"In terms of the law of supply and demand, what we call a shortage of engineers could be described as a depressed wage scale for engineers. And a substantial increase in engineers' wages would exert corrective influences. Because engineers and scientists would be more expensive, employers would use them more carefully than they do now. Because they would use them more carefully, we would not need as many. And because there would be greater rewards for those who succeed, a larger supply

*Reprinted with permission from *Industry Power*, December 1958.

would develop. The net result would be that supply and demand would be brought into equilibrium." This is the voice of an honored and respected engineer . . . Fredrick E. Terman (Eminent Member of HKN), provost and dean of engineering, Stanford University.

If Dean Terman's analysis is accurate, we must ask: "Who is depressing the wage scale for engineers?" Now, an oft-overlooked fact is that most engineers are hired by other engineers. And the hiring engineers set the maximum wage for their subordinates with the salaries they are content to accept for themselves. Any shortage of engineers due to a depressed wage scale, therefore, is a shortage attributable to engineers themselves. Any depressed wage scale foisted upon engineers is attributable to the wage pattern set by those upper-echelon engineers who hire the vast majority of engineers

on private and public payrolls.

We contend that if there is an engineering shortage (and our own experiences tell us that there is), we must look to ourselves as engineers to raise depressed wage scales. We engineers meekly submitted to low wages during the Great Depression of the Thirties. Today, we fail to recognize that the Great Depression is over.

If upper-echelon engineers will not take their case to top management, top management cannot be criticized for depressed wage scales. Certainly, we cannot expect astute top management to spend any more payroll dollars than necessary. If we see a shortage in our ranks, we as engineers must take the initiative to establish wage scales that will wipe out the shortage. That is how we can get more engineers.

Organizations in Your Life

By CARL KOERNER,* Kappa '30

Chairman, New Chapters and Branches Committee

Chairman, Alumni Activities Committee

Los Angeles Alumni Chapter

How do you, the modern college student in engineering, occupy your waking day? How about you who are practicing engineers? The questions are raised with tongue in cheek.

The curricular activities of students include lectures, recitations, and labs to attend as well as reports to prepare and exams to prepare for. Extra curricular activities may include social and athletic, and organizational types. Let's not forget family life for many. Perhaps a bit of time remains for sleep in the 24 hour day. As for you professional people, don't you count your blessings on those

days on which you can exceed seven hours of slumber?

With such pressing programs, what about the organizations in your lives? What are they? Why provide time for them? What can they do for you?

What Are The Organizations?

A thorough exposition on the organizations offering opportunity for activities would be voluminous. Even a thorough story on engineering organizations is beyond the scope of this brief article. However, a few of the fields of participation are religious, cultural, social and service organizations and professional, technical and honor societies.

We might illustrate the professional category by naming the NSPE (National

Society of Professional Engineers), and the technical with AIEE (American Institute of Electrical Engineers) and IRE (Institute of Radio Engineers). There are, of course, many that we would need to add to complete the list.

Eta Kappa Nu, Tau Beta Pi, Sigma Xi, and Phi Beta Kappa are honor societies, each in its own field.

Your Time and Organizational Activities

Should you devote your valuable time to activities in organizations? The opinion is offered that the curricula makers of our institutions of higher learning have indirectly expressed their views on this question through the expressed requirements for an engineering degree.

Those responsible for assuring that you obtain the greatest possible benefit from your college work have established the requirement for technical subjects such as mathematics, physics, chemistry and principles of electricity. But a touch of the humanities, such as economics, psychology, speech and English are also required.

The importance of the humanities is hardly obvious. The point of view created through their understanding provides intangible values, the truths of which frequently are evident only in the light of time. However, a more tangible purpose of their inculcation may be stated. This is to strengthen an engineer's capacity for verbal and written expression and communication. Harmonious association with one's fellow men, which is a key to success, may be greatly enhanced thereby.

What Can Organizations Do For You?

The parallel between participation in organizational activities and the foregoing is, upon reflection, clear. Though, perhaps, more readily discernible in non-technical associations, even the technical societies have sociological overtones not to be overlooked. They provide primarily for broadened technical horizons. But practically all organizational participation, in varying degree, develops that ability of expression, communication, and harmonious association which underlies success.

What About Eta Kappa Nu?

I wish to emphasize my belief that Eta Kappa Nu is one of the most effective organizations available for the development of breadth of outlook, improved communication, and harmonious association.

What Is a Graduate Worth?

There has never been such a wonderful time to be graduated from college. For months representatives of the nation's great corporations have been haunting the college corridors, dangling lush offers before the senior students. This year, according to the Kiplinger Magazine, the lures are breaking all records.

Some types of engineering students are being offered \$430* a month to start. Accountants will average \$380, with salesmen and general business trainees close behind. A master's degree will bump a neophyte engineer's pay up another \$100 and a Ph.D. another \$150 over that.

All this is wonderful. Gentlemen in caps and gowns will step down from the platform into positions of affluence, but-tressed in some cases by bonus, pension and stock-option schemes, that their fathers couldn't achieve after 30 years of work.

Still, it might help their sense of values a bit if the reason for some of this frenetic bidding were explained. The average young engineer, for example, is not going to really be worth \$100 a week to any employer for quite some time. Why,

* And some EEs as high as \$485 and higher. --The Editor

then, such offers?

Our tax system puts a premium on bigness—bigness at almost any cost. Owners of good small companies are finding it more profitable to sell out to good big companies and to take a capital gain, than to pay income taxes in the higher surtax brackets.

The big companies are pressing to keep ahead of other growing companies in their fields. Growth calls for recruiting a backlog of scientists, engineers and researchers who, happily, can be paid temporarily more than they may be worth. For such corporations are in the 52 per cent tax bracket and growth, in this feverish era of competition, is sometimes more important than what used to be considered sound business practice.

This does not mean that the college graduate of '57 will not eventually be pulling his own weight. Obviously, he wouldn't be hired if the company bosses thought he would always be worth less than his pay-check. But it does mean that in this race to catch and hold graduates the starting salary isn't always the measure of actual value.

The father of today's graduate, who got into the labor market about the time the country was sliding into the Depression,

Eta Kappa Nu is pointed at high scholastic achievement but the humanities aspect is recognized in the emphasis on a balanced personality.

Whether student or professional those of you who give of your time and talents to Eta Kappa Nu, will be repaid many fold. The first reward is a concept of science and engineering that transcends the technical. Then will come a capacity in leadership coupled with an ability, not easily achieved in any other way, to work smoothly with others. Over all is the opportunity for acquiring a social significance and lasting friendships. These are the ingredients of a full and successful life.

One thing is abundantly clear—the returns of participation are sure to outdistance the effort.

faced a rugged world. In those days Ph.Ds held down ribbon counters and Masters of Science were lucky to work at lathes. A large percentage of the Classes of '32 and '33 went for more than a year without any work at all.

This, of course, was a great tragedy. But it had some compensations. The college graduate in those gloomy times labored under no delusion that the world couldn't get along without him. He was less concerned with what the company would do for him than with his ability to make the grade with the company. He started small and painfully, but as things gradually opened up each raise was a joyous achievement. The road behind became something to look back on with satisfaction. Horatio Alger still lived and "Work-and-Win" and "Onward-and-Upward" were valid slogans for that modest progress that was then called "success." The young graduate of today is born almost in the sports car class. The boss greets him at the door and the chairman of the board asks if his seat is comfy. This is all wonderful, indeed. But it's hard to learn to be a good plowman if you live in a Garden of Eden where the fruit drops from the sky.—*The Tulsa Tribune*, April 17.

COMPUTER TELEVISION

Computers are now flashing all sorts of information—from aircraft arrival times to student tests—on television-like screens which show the answers to your questions in just a few seconds.

The screens, called computer displays, are expected to be used more and more in many locations, including supermarkets, doctor's offices, and factories. Eventually, in fact, you may even have one in your living room, so that you can communicate with a computer whenever you wish.

At present, airlines are among the biggest users of computer displays. United Air Lines, for instance, has ordered 3,000 visual units from the Univac Division of Sperry Rand Corp. These are being set up at many check-in locations throughout the country. Each agent can instantly confirm reservations by querying, via the display, a central complex of UNIVAC 1108-11 computers near Chicago. The computers can also flash back the times of connecting flights and other data.

The computer-connected displays are already used in hospitals to show patient medical and financial records. It's entirely possible that your doctor may someday use a similar system to feed symptoms into a computer and get the computer's diagnosis of most probable illness.

Will you ever have computer television in your home? According to Univac, this, too, is very possible. Just as computers may enter the home for such tasks as mixing recipes and regulating cooking. So also the home owner may use visual displays—perhaps connected to central computers in national data libraries—to query computers and re-

ceive answers to his questions.

Likewise, business firms, especially those like supermarkets dealing with large volumes of merchandise, will employ the screens to show managers the exact status of their inventory. Architects are also using the displays in designing homes. At the University of Utah, for instance, they can ask a UNIVAC 1108 to show them various arrangements of basic features on the screens. Using control sticks like those in the old airplanes, they can then rotate the designs for viewing from all directions. The designs are three dimensional. By means of similar visual techniques, home buyers can view various alternative designs, add a feature here, or take away a feature there, all in seconds on the television-like screen.

How do computer displays work? The operation is basically very simple. An operator usually employs a keyboard device—similar to those on typewriters—to feed information to a computer. This information appears on the screen. The

computer memory supplies the answer and the reply then flashes on the screen in perhaps three seconds.

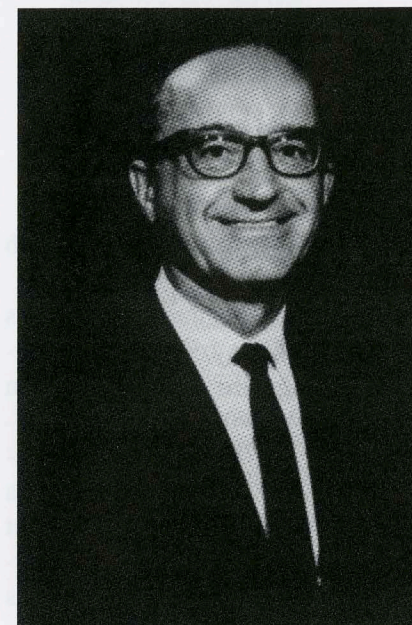
In one of the most promising applications, assisting instruction of students, the screens first show questions. Students then reply on the screens. The computer tells them whether they have answered correctly. Sometimes the students answer with devices called "light pens," which write directly on the surface of the tube.

The future of computer graphics, which includes visual reproduction of letters, figures, and line displays, is considered to be very bright.

Says Robert E. McDonald, Univac president:

"We believe graphic devices will have as large an impact on the computer in the next decade as computers in general have had on business and industry for the past ten years."

Men and computers are now communicating as ever before through television-like displays. You can now, for instance, query a computer by writing on the surface of a TV screen with a device called a "light pen," and receive an answer in seconds. Operator in picture is using a display connected to a computer for a more difficult task - designing a circuit. The UNIVAC 1557/1558 Graphic Display Subsystem is connected to a UNIVAC 1108 computer which supplies all the basic design elements and interconnections.



Sixth in a
Special BRIDGE series

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 ...

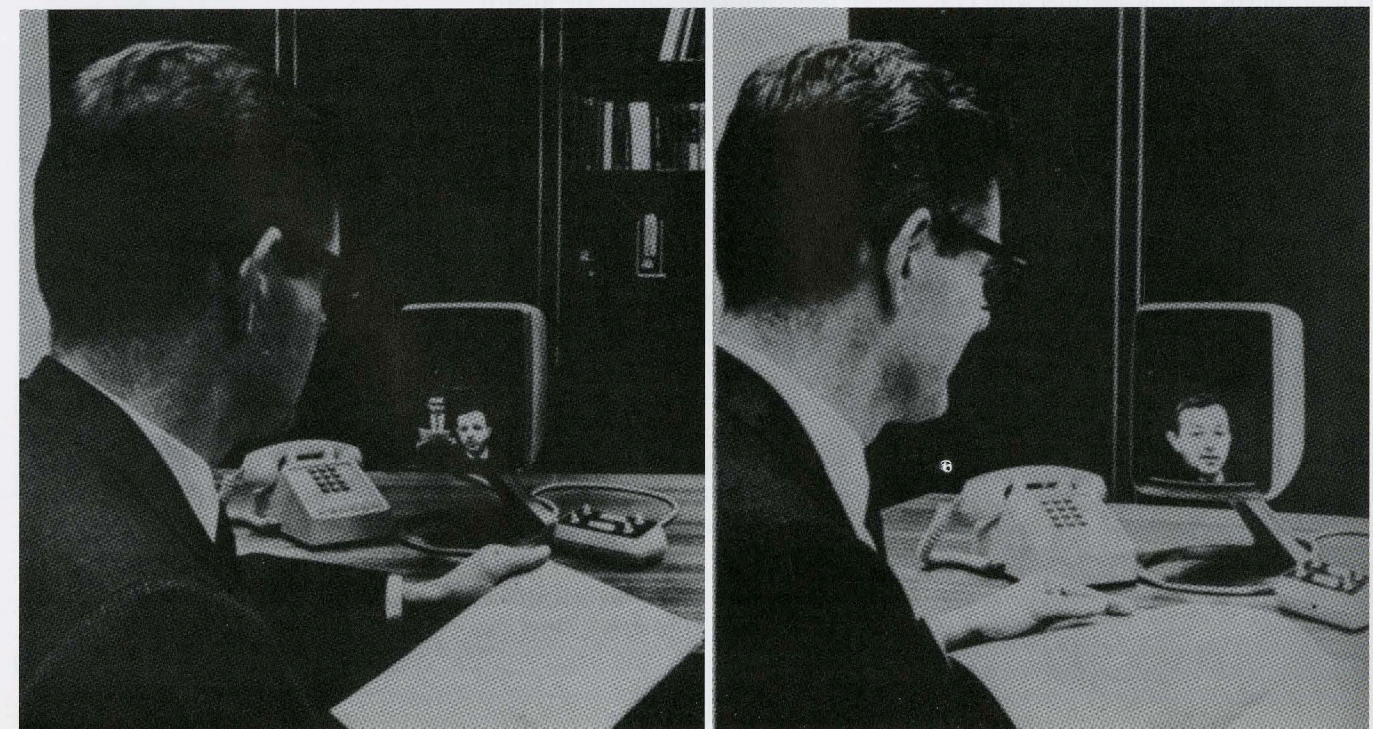
A FIRESIDE CHAT with Cleo Brunetti

Those providing equipment for the home, by 1975 will have color videotape 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 devel-

opment 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.

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



Chicago Regional Visitation

By ROBERT J. MILLER

The second ETA KAPPA NU Central Regional Meeting was held in the Chicago area and organized by the Chicago Alumni Chapter. The meeting took place at the Teletype Corporation in Skokie, Illinois, a suburb of Chicago.

The meeting was attended by W. P. Smith, President HKN, J. E. Farley, Vice-President HKN, H. H. Slocum, Member of the Movie Committee, three members of the Chicago Alumni Chapter and twenty students and faculty advisors from nine universities in the East Central Region. The following universities were represented: Bradley University, Illinois Institute of Technology, University of Illinois, Iowa State University, University of Minnesota, Northwestern University, University of Notre Dame, Purdue University, Rose Polytechnic Institute.

Following a 9:00 a. m. registration and welcoming of delegates, the meeting was convened by Mr. John Leary, President of the Chicago Alumni Chapter, who outlined the agenda for the day.

Dean William P. Smith, National President HKN, indicated that with 113 chapters it is simply not feasible to at-

tempt to get together on a national level, and, therefore, regional meetings were established to provide better communication to the college chapters. Relating to expansion activities, it was pointed out that the 113th chapter was just installed in Florida, and it is possible that some thirty to forty additional chapters may be included some time in the future.

Delegates from the nine universities each made a brief presentation of their chapter activities and mentioned problems encountered along with solutions recommended. The points made included the following:

Activities

1. Tutoring undergraduate EE's, with or without participation of other organizations such as TAU BETA PI.
2. Sponsor of "Outstanding" Freshman Project" award.
3. Award to outstanding EE Senior.
4. Preparation of a "Teacher Rating Form" to be completed by the student with appraisal of strong and weak points.
5. Recommendation of award "Outstanding Teacher Of The

Year."

6. Parents day demonstration of lab activities.

The Movie Committee activity was discussed by H. H. Slocum, who outlined events leading to the preparation of the 1954 movie on *Engineering — A Career For Tomorrow* and the desirability of updating the film with a new version incorporating significant technical changes made over the intervening decade. Script preparation is now in progress and the level of financial assistance is improved because of recent co-sponsorship and assistance provided by IEEE.

A very interesting and informative luncheon address was given by Mr. Roger Klich, Vice President, Research and Development of the Teletype Corporation, who described how management views the engineering profession and indicated to the new engineer those attributes and attitudes that he should bring to his new organization.

Following a very interesting tour of the Teletype Corporation facilities the meeting adjourned at 3:30 p.m.



Seated on the panel from left to right are, Mr. Jack Farley, Vice-President of National HKN, Dean William P. Smith, President of National HKN, Mr. Bob Miller, Treasurer of Chicago Alumni Chapter HKN, Mr. John Leary, President of Chicago Alumni Chapter HKN.



Delegates are shown participating in actual demonstrations of Teletype equipment. Mr. R. A. Neufeldt from Equipment Exhibits Department at Teletype is shown answering questions about the equipment.

A LETTER FROM HENRY S. COCKLIN

(who among other things designed our coat of arms)

Dear Professor Hudson:

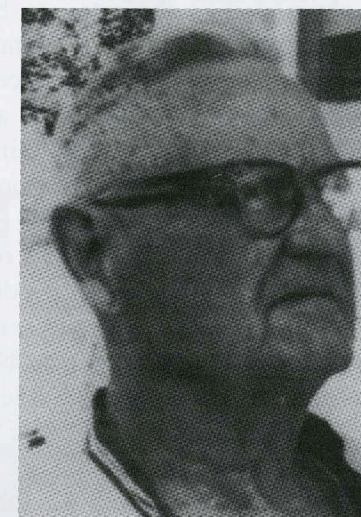
Your NEWS Letter for September 1st arrived a few days ago. This is one of several announcements that I have the pleasure of receiving. It is appreciated. As you may have guessed I am not very active in Fraternity matters. I retired from active employment early in 1957 somewhat earlier than I had planned because cataracts had to be removed; and complications involving detachment of the retinae further convinced me to take things easier. I live on the farm where I was born Febu. 20, 1892. I have two sons actively growing vegetables and fruit. I merely look on.

All the records I had retained of my early work with Eta Kappa Nu were destroyed by a fire in 1959. But because of some personal history, I am able to fit together these facts:

1915-1916 Treasurer
1916-1917 Editor
1917-1918 President.

My execution of the duties of treasurer, editor of Bridge and president were not memorable. I tried hard to arrange fiscal matters so that Chapters would be paid in full by the end of the year. A few years later I coached J M Strait when he became treasurer and he did the job perfectly. As Editor I felt we did a fair job but it cost me about 15c more than the price of 50c. A promised catalogue of members for which I charged the 15c did not get published when I ran out of funds. During the War year 1917 I had to assume the duty of the secretary as well as president.

The year of the War, I was to be President. Our secretary for years had been Leslie Harris of Beta and then at the University of Pittsburgh. He went into the service and sent me his stock of badges, paper, etc. and I had that job for the year too. I thought we'd



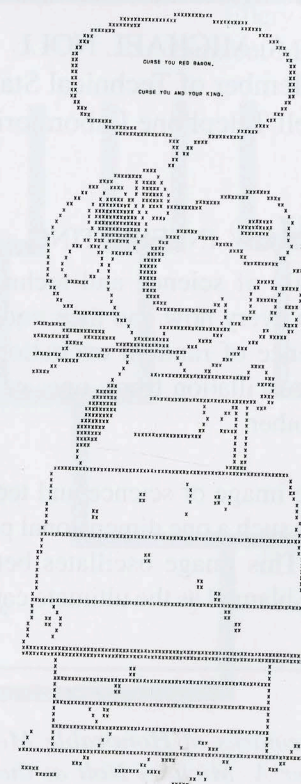
After drawing up a design, I found that it did not follow the standard heraldic forms. Fortunately I discovered my mistake before I asked for approval and returned to the drawing board. D. L. Auld did not think the design would copy well and they submitted a design. While it followed heraldic conventions it did not represent any symbolic content for HKN. I then drew up the final and present design. It was approved.

Cordially
Henry S. Cocklin
Springdale Farm
RD #3
Dillsburg, Pa.

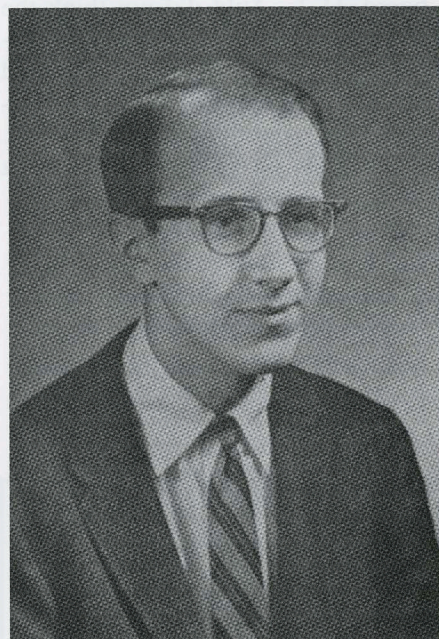
have a meeting to discuss my shortcomings as well as other things but one of the western chapters got up a round robin letter suggesting for "patriotic reasons" that we not hold an annual meeting that year. It was evident that we'd have no attendance so we did not even have a board meeting. By correspondence we picked Alton to take over the Secretaryship, which he was to hold for so many years. I believe we talked J. M. Strait into taking the Treasurership the same way but it may have been a year or two earlier. I'm not sure now.

One thing you may or may not know; I was the first to urge the adoption of a Coat of Arms. It was not received too well. I forget the actual year but the Annual Meeting was in Philadelphia that year with the University of Pennsylvania as host. I was employed by the Navy Department in Philadelphia so I was present at the sessions. A committee was appointed by the Convention to look into the matter and bring in its report the next year. I think I was not on the committee but the report was favorable and the next Convention commissioned me to draw up plans. I was not too well equipped for the job.

It was a slow day in the Computer Lab



THE PENDULA Of SCIENCE And TECHNOLOGY



A. MICHAEL NOLL
Member of Technical Staff
Bell Telephone Laboratories

HOW INTERESTING are the pendula of science and technology which every now and then under the influence of random excitations are set in oscillation from one extreme to another.

The image of science and technology is such a one dimensional pendulum. This image oscillates between being blamed as the ultimate cause of

Remarks of Honorable Mention winner A. Michael Noll at the New York Award Dinner, March 22, 1971

such ills as urban decay and environmental destruction, and being extolled as the only savior of man and his brave new world of the future. At one extreme, science and technology are claimed, like the arts, to be amoral, while at the other extreme, scientists and technologists are forced to accept total responsibility for all future and unforeseen ills resulting from their discoveries and creations.

Scientific and technological research is a two-dimensional pendulum oscillating between pure and applied in one dimension and between relevant and irrelevant in a second dimension. At one extreme, in this two-dimensional space, it is claimed that pure research is a misnomer, a non-existent idealistic situation, and all research must be based upon seeking solutions to practical problems. At another extreme, it is claimed that all important new ideas and concepts in science and technology result from unpredictable new directions of pure research, and that research must therefore not be encumbered by practicality and relevance so that it can produce the purest unpredictable results.

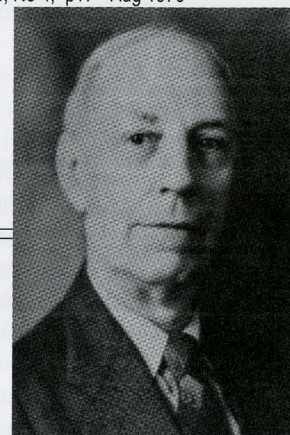
What have been the results of all these pendula pendulating? Confusion. Confusion concerning the appropriate role and relative importance of science and technology and to such an extent that complete reappraisals of science and technology are hastily made. In terms of short time goals and directions, such reappraisals are surely needed if the scientific and technological mystique of the past is to be replaced with knowledge and understanding. However, there exists a dangerous point-of-no return beyond which such reappraisals, if conducted without wisdom and compassion, could easily result in devastating blows to the scientific and technological culture which so strongly

characterizes and has become an essential part of twentieth-century Western culture as a whole.

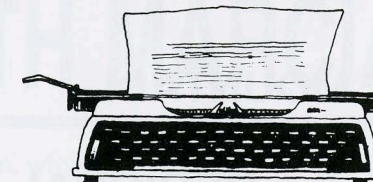
The scientific and technological pendula must be periodically critically damped to come to rest somewhere near center. Scientists and technologists must accept some responsibility for their discoveries and creations, but this should be a joint responsibility with the industrialists and politicians who must exploit these discoveries and creations. Research must not be equated with motherhood so that practically anything can be conducted in its name (although even the concept of motherhood itself is presently being reappraised). But the risks of non-need oriented, or pure, research are required if new, or unpredicted, scientific discoveries and technologies are to be made. The question of relevancy should be made irrelevant by an increased involvement and concern by scientists and technologists with the problems of the decade. But this should be a matter of free choice for each individual and should not be dictated or forced against his own individual interests.

If there is an acknowledgment, an understanding of the extreme positions of the scientific and technological pendula of morality, purity, and relevancy, then the oscillations of these pendula will have been damped and extremism will have been ceased once again. If not, what then?

HOW INTERESTING is the Eta Kappa Nu Outstanding Young Electrical Engineers Award. Its criteria, its history have never been subject to oscillations which perhaps in some way, proves the time independence of the Award itself and the creative genius of its conceivers. I am honored, and thank the Award Committee for naming me recipient of Honorable Mention.



LETTERS from Ellery



The Ancestor Problem

Did you have two parents? Of course you did. And did each of them have two parents? Certainly. Well that makes six ancestors that you probably can remember. Then how many did you have going back just to the time of Christ? That would be two to the sixtieth power, if there are three generations per century. And how would you find that number?

As a boy (about 80 years ago) I learned that "involution" the "power of a number" may be expressed in an indefinitely large number of ways. I chose to say that:

$$2^{60} = 1,024^6$$

There are other ways of expressing the value of two to the sixtieth power but I selected this one because the multiplication of 1,024 involves only six products. So yesterday I sat with a pencil and paper and worked in the old way used before Logarithms, Slide Rules, and computing devices were brought forth. My sister Olive once or twice looked at me with smiling face and I wondered if she wondered what I was doing. But when I asked her if she had asked me a question, her reply was "Did you notice who got the prize in the Rose Show?"

When at last I found the value of

$$1,024^6$$

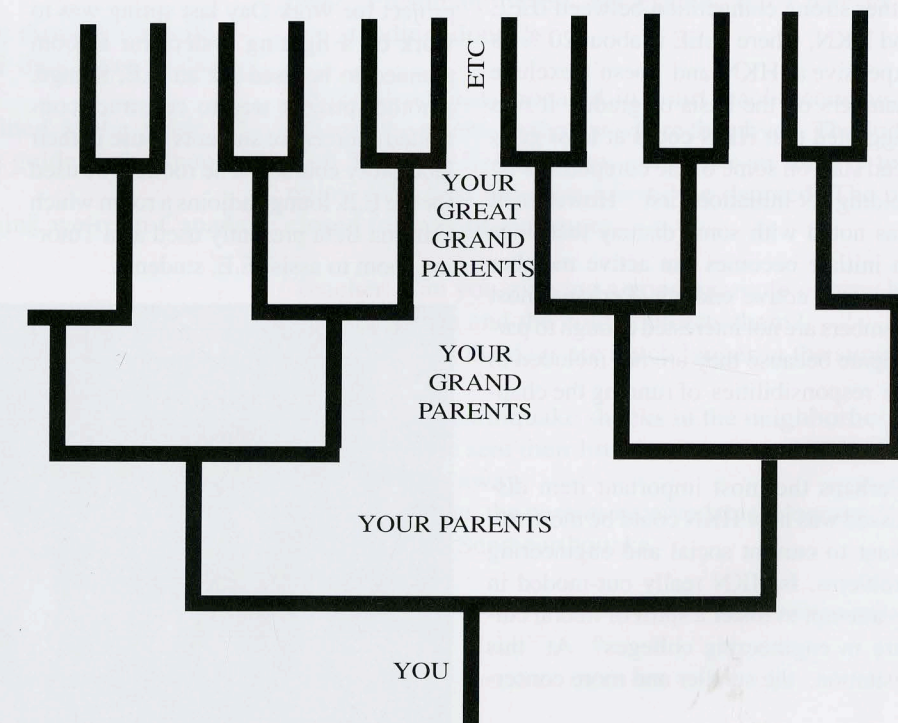
it turned out to be

$$1,152,921,504,606,846,976$$

I then found the value of 2^{60} the hard way and it was the same number so I knew that there was no mistake. Had I used Logarithms or a slide rule as engineers do for most of their computations I would have had nothing but zeros for all the places except the first four or five at the left. I think you will agree that this is a lot of ancestors—more than a million trillion, since the time of Christ, two thousand years ago. If every bit of the solid surface of the earth were used

for graves there must have been 34,000 of your ancestors buried in each grave measuring three feet by eight feet. Actually modern man goes back at least 15,000 years and on this basis you would have had trillions of trillions of trillions of ancestors, if each one had two parents. How do you explain this especially when you consider that Historians say that there have been only a few billion people on earth in its entire history? If you have any comments please pass them along to me.

Ellery Paine.
Eminent Member



ROCKY

MOUNTAIN

REGIONAL

ON Friday, October 29, 1971, Rho Chapter hosted an Eta Kappa Nu Regional Visitation at the University of Colorado. Delegates included Lee Zieroth, Sandy Chumbley, and Dr. William Lord of Delta Pi at Colorado State University; Jim Hall and Kenneth Kolegraff of Delta Chi at South Dakota School of Mines, Darwin Rice of Gamma Sigma at the University of Utah and Bob Fox, Dick Guiles, Chris Greene, Phil Woods and Professor Platt Wicks of Rho Chapter at the University of Colorado.

Also present was the regional director, Dr. Leon Zelby who opened the meeting and explained that the purpose of the visitation was for chapters to try to solve their own problems by discussing them with other chapters.

Membership was one of the first problems discussed. Since there are several honorary societies at each school, each charging about \$40.00 in dues, there is rather strong competition between IEEE and HKN, where IEEE is about 20 % as expensive as HKN and doesn't exclude members on the basis of grades. It was suggested that HKN could at least get a head start on some of the competition by holding its initiation first. However, it was noted with some dismay that once an initiate becomes an active member he is not active enough. Perhaps most members are not interested enough to participate because they are not included in the responsibilities of running the chapter.

Perhaps the most important item discussed was how HKN could be more relevant to current social and engineering problems. Is HKN really out-moded in its attempt to foster a spirit of liberal culture in engineering colleges? At this visitation, the smaller and more conser-

vative schools said No. Yet the larger, more liberal schools said Yes. At the University of Colorado, for example, some of the most promising prospective members of HKN turn down bids for membership with comments like "How can a group of electrical engineers foster a liberal spirit when they exclude liberal arts students and engineers whose grades aren't high enough to meet a magic standard." Among suggestions offered were revamping and updating of the initiation process to make it as interesting and rewarding as possible for the pledges. The University of Utah sug-

gested a plan which they used to broaden the scope of engineers where they purchased block tickets to plays and other events at a reduced rate so that members could enjoy more cultural activities. Perhaps the most salient comment on the changing scene at engineering colleges came with the disruption of the meeting by a bomb threat. The consensus of opinion was that HKN must update itself and become more meaningful to today's liberal engineer from constructive pledge projects and a relevant initiation ceremony to worthwhile chapter activities.

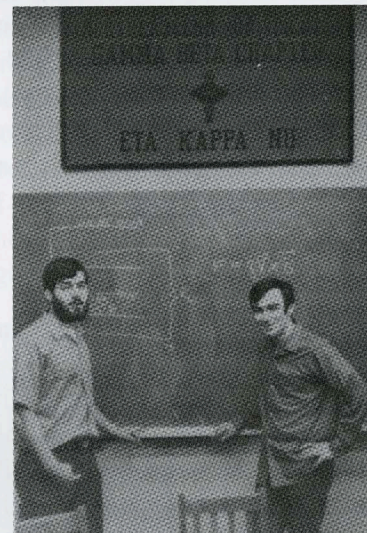
Vol 68, No 3, p11 - May 1972

Gamma Beta

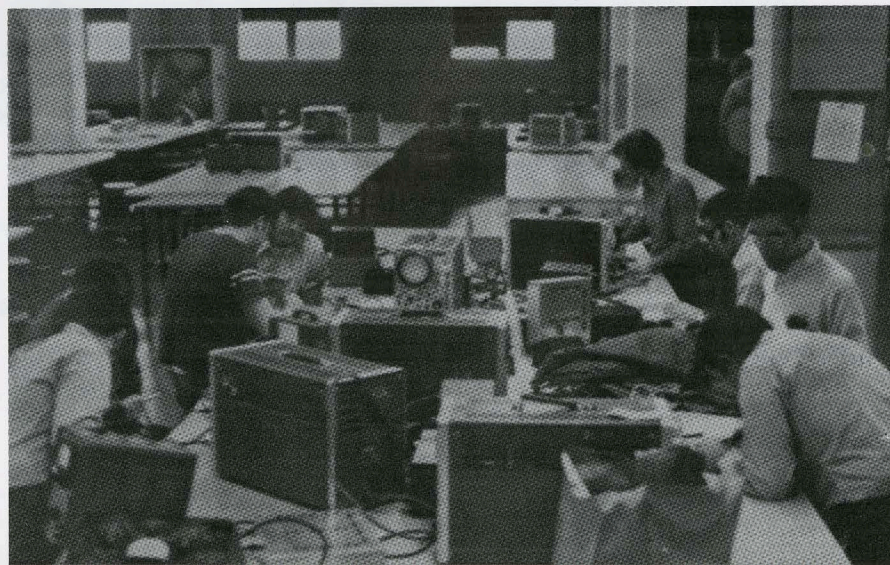
WORK DAY

by Gaspar DeGaetano
BRIDGE Correspondent

As a means of selecting new members, Gamma Beta Chapter of Northeastern University has initiated a Work Day in place of its old Consideration Day. By giving prospective members a chance to work on Chapter projects it is felt that they are given an opportunity to show that they are more than just Electrical Engineering students with high grades. One project for Work Day last spring was to work on a lighting system for a room planned to be used for an E.E. lounge. Another project was to construct controlled sources for students to use in their laboratory courses. The room to be used for the E.E. lounge adjoins a room which Gamma Beta presently used as a Tutoring room to assist E.E. students.



Two members at the tutoring blackboard - Dave DiPietro, left and Frank Antczak.



1970s-1980s

MERRY MOMENTS WITH MARCIA

When a small boy came home one evening with \$30 after selling magazine subscriptions, his father proudly asked: "How many customers did you have to go to in order to make all this money?" The boy explained: "I sold all the subscriptions to one man. His dog bit me."

A psychiatric board was testing the mentality of an old farmer. "Do you ever hear voices without being able to tell who is speaking or where the voices come from?" he was asked.

"Yes Sir."

There was a look of alarm among the board members. "And when does this occur?" one asked.

"When I answer the phone," he replied.

The man who admits he is wrong is wise; the man who gives in when he is right is married.

Department store sign: Keep Christmas with you all year — use our monthly payment plan.

One reason the dollar won't do as much for anyone as it used to is the fact that no one will do as much for a dollar as they used to.

Bill: "I just got back from a real pleasure trip."

Neighbor: "Where did you go?"

Bill: "I drove my kids to camp!"

A hunter hired a guide to lead him through the wilderness. The hunter soon discovered they were walking around in circles.

"We're lost," the hunter complained to the guide. "I thought you said you were the best guide in the state of Maine."

"I am," said the guide. "But I think we're in Canada now!"



Tim: "Look, Jim, why are you always trying to impress me? So you spoke to the waiter in French! So, big deal! So what good is it to know French?... What did he tell you, waiter?"

Waiter: "He told me to give you the check, sir!"

An employer interviewing an applicant remarked, "You ask high wages for a man with no experience." "Well," he replied, "it's so much harder to work when you don't know anything about it."

A fellow was having his first date with a new girl. Things were going pretty well when she turned to him and coyly asked: "Do you want to see where I was operated on?" "Why sure," he exclaimed. "Well, all right," said the girl, "we're just two blocks from the hospital now."

The young man had just graduated from college and went to work in the family store. The first day his father asked him to sweep the sidewalk. "But, Dad," he protested, "I'm a college graduate." "I forgot about that," replied his father, "But don't worry, I'll show you how."

Professor: "If there are any dumbbells in the room, please stand up."

(There was a long pause, then a lone freshman stood up in the rear.) "What? Do you consider yourself a dumbbell?" Freshman: "Well, not exactly, but I hate to see you standing alone."

Several women appeared in court, each accusing the other of the trouble in the flat where they lived. The Judge, with Solomon-like wisdom, called for an orderly testimony. "I'll hear the oldest first," he decreed. The case closed for lack of evidence.

Teacher: Can you give me a good example of how heat expands things and the cold contracts them?

Student: Well the days are much longer in the summer.

After several earthquake shocks in the neighborhood, a married couple sent their little boy to an uncle who lived some distance away.

A few days later, the parents received this telegram: "Am returning boy. Send earthquake."



Vol 81, No 1, p22 - Nov 1984

Eta Kappa Nu Awards in THE WORLD REGION

As part of Eta Kappa Nu's seventy-fifth anniversary celebration in 1979, a policy was established whereby we would send greetings and extend the hand of friendship and good-will to electrical engineers and electrical engineering schools in other parts of the world. The only surprising thing about it is that it took us seventy-five years to arrive at such a sensible and altogether wonderful idea.

During the last five years we have inducted new members in nine different countries through our Eta or "at large" branch. We have also established recognition awards to outstanding students at four Universities—The City University and the University College in London, the Ecole Supérieure d'Electricité in Paris, and the University of Manitoba in Canada.

A World Region of Eta Kappa Nu has been established. Dr. Ben Bennetts of the University of Southampton, England, and Dr. Paul Hagouel of the Aristotelian University, Greece, have served regular terms on our Board of Directors. Professor Arthur Ellison, Head of the Electrical Engineering Department at the City University London, is currently serving on the Board.

Eta Kappa Nu's first recognition award to an Outstanding Electrical Engineering Student at the City University London was recently presented to Mr. Nicholas Huzan. It consisted of an attractive Recognition Certificate, a substantial Monetary Gift, and a Certificate of Membership in Eta Kappa Nu. The monetary gift came from the proceeds of Trust Funds that have been established for that purpose by gifts from the Members and

Chapters of the Eta Kappa Nu COLLEGE OF BENEFACTORS. The Award was presented by Professor Ellison at a special Award Dinner, and he has filed the following report:

I am very happy to tell you that our Departmental Annual Dinner and Prizegiving was held in the University last Friday 23rd March 1984, and this time I presented the prizes myself. Some years we have a distinguished 'Captain of industry' to do it.

The evening was a delightful occasion and we had a number of alumni besides the prize-winners. When I presented the Eta Kappa Nu Association prize I explained that it was in my capacity as a

Board Member representing the Association. I first explained what the Eta Kappa Nu Association, with its aims and objects, was, and described the benefits to our prize-winners of the Memberships which you and the Association have so kindly and generously conferred on them for the last three years. I also explained that your latest generous act was to give us the Eta Kappa Nu prize for an 'outstanding electrical student'. The prize has now been officially accepted by the Senate of the University and appears on the official list. So I can now thank you and the Association officially on behalf of the whole University for your kind and generous gift."

Dr. Arthur Ellison Presenting the Outstanding Student Award to Mr. Nicholas Huzan



Vol 79, No 1, p 16 - Nov 1982 Series by P. K. Hudson

A Stranger At The Court Of Saint James

part five *Charles and Diana*

The Royal Family of England is a very secure arrangement. When popularity polls are taken, half or more of the citizens favor retaining them. Considering the nature of polls, that is a good percentage. If we took polls,

we would find that not much over half of the people favored the smell of new bread, snowflakes on eyelashes, whiskers on kittens, etc. But if push came to shove and the English people were asked by their government

for permission to dispose of the Royal Family, very few would agree. There is a good reason for this. Several, in fact.

First, and perhaps the most important, is the realization that English Royalty is much different from other Royalty. It does not pose a political problem or inconvenience because it is not in charge of the day-to-day operation and policy-making of the government. On the other hand, they are kept fully informed on a daily basis and participate in broad general decisions, especially in times of crisis. That is a good thing—a valuable thing.

When Royalty is relieved of the abrasiveness of policy making what is left can be very attractive and desirable. They can set standards of social grace and decorum throughout the land. They can promote things that are helpful and strength-giving to the nation, and discourage things that bring harm. They can confer honors that are pure and untainted by ulteriorism. Finally, they can instill a very unique kind of patriotism into the 'hearts of the people. How pleasant it must be for an Englishman to be a member of the Royal Air Force, the Royal Navy, etc. He surely would have the feeling that he belonged to something very special and that special things were expected of him. It certainly would beat, for example, being a member of Elmer's Mercenary Irregulars.

But over and above all these pragmatic considerations, English Royalty is secure for a very different and important reason—an emotional reason. They are very nice and likable people—worthwhile human beings. All Royalty is not nice and likable, and English Royalty was not always that way, but they certainly are now. There just could not be a more perfect Queen than the present Elizabeth II, and her Consort. Prince Philip leaves nothing to be desired. But without taking away anything from that wonderful couple, we have to say that the future King and Queen—Charles and Diana—have simply stolen the hearts of the world. They are the kind of people that everyone would like to know, or know better—would like to invite them to a party or out to dinner, etc. It is regrettable that when they become King and Queen they will have to limit the scope of their associations.

As a part of our special series on Great Britain we are pleased to present a group of informal photographs of this delightful couple.



The Care and Feeding of Young Engineers

Abstract

The greatest resource of any country is the mental capability of its young people. This is especially true of the engineering creativity in a country with industrial potential. It is the resource of engineering talent that will permit a nation to achieve a rate of development that will enable it to reach and maintain its proper rank in the community of industrialized nations.

Young engineers, to achieve maximum success, must receive a great measure of satisfaction through the creativity of their jobs and should not study engineering only for the possible financial reward that an engineering career offers. What matters more is the sense of accomplishment in helping the profession and their country to achieve their goals. In this system, management has a responsibility to utilize the available engineering ability in the most efficient manner otherwise the most precious resource of their country is being wasted.

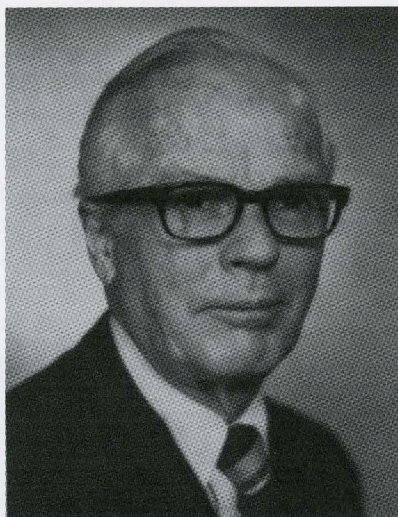
Introduction

A young engineer who has studied engineering solely for the financial reward will never be properly motivated to achieve the creative level so essential to his progress and the continued progress of his profession and country. Every one must satisfy his ego's demand for recognition; to be the best shoe shine boy in the town square, the best fisherman on the wharf, to amass a great financial fortune, or from the sense of accomplishment derived from seeing a project well engineered.

A great literary masterpiece states that "all men are created equal." This is not true, especially where creativity and motivation are concerned, otherwise every one would be an Einstein or a Rothchild. For in one case, everyone would possess equal scientific creativity and in the other case, they would have the motivation to amass a great fortune.

It is the motivation and creativity of young engineers and an appropriate plan for human

Mr. Homer E. Brown is an Adjunct Professor at North Carolina State University. He had over 20 years of experience with the Commonwealth Edison Co. in Chicago.



Homer E. Brown

resource management that is the concern of this paper.

Motivation

Unfortunately it is impossible to determine by any method of testing, the reasons why a young person decided on an engineering career. This decision is usually made before an individual has reached a sufficient age of maturity to enable him to make an adequate decision and, all too often the decision has been made for him by his father, another member of the family, or perhaps it was inordinately influenced by his peer group or the media.

Regardless of the motivation for selection of an engineering career these are the young people we have available and must use in carrying out the tasks that are ahead. Therefore, it is important that the professors in engineering schools as well as, the practicing engineers, who come in contact with these students, make every effort to mold their mental attitudes and provide the atmosphere which will permit a proper motivation to develop. What is proper motivation? Some students must be motivated to be technically creative experts and yet others must be motivated to become efficient managers. (Financial success should not be a motivation. The challenge of working out a complex technical problem or the desire to direct the work of a group for optimum effort, should be the motivation.) Herein lies a difficulty. Which young engi-

neers should be encouraged along technical lines and which should be groomed to become managers?

Early Training and Selection

Young graduate engineers should be rotated through several work assignments during the first few years of employment and carefully supervised in an effort to determine (if possible) the specific area of creativity of the individual: technical, managerial, or educational. Since good technical and management talent are known to be in short supply, the maximum utilization of the available talent is essential and can only be achieved by using each engineer in the area of his greatest competence. Equipment for system expansion can be purchased to match the rate of system growth; money is always attractable by well managed organizations; but the source of engineers is limited and must be educated, developed and used efficiently.

In the next decade the availability of equipment will surely exceed the supply of technically competent engineers and managers required to install and operate the equipment. Every effort must therefore be made to prevent a "brain drain" in which engineers will be diverted from their area of greatest competence by promise of greater financial reward in other areas. Engineers must be paid for their worth to assure that they will want to continue working as engineers; and to continue working creatively, enthusiastically, and productively.

Ladders to Climb

Should management positions be a reward for technical excellence? Should management positions carry an extra increment of financial remuneration? I believe "no" must be the answer to both these questions.

It is unthinkable that a young engineer, who has shown exceptional talent as a manager would be rewarded by promoting him to a position requiring great technical competence. For what reason then - has the promotion of an excellent engineer to a management position, as a reward, become so commonplace? (It must be remembered that there are a few exceptional men who are gifted not only technically but who are also excellent managers. These men should receive special treatment and suitable additional financial rewards.)

I know of at least two companies and maybe there are many more instances, where technically competent engineers are financially rewarded for their ability as engineers

and not "promoted" to management as their reward for an engineering work that has been well done, because, according to the Peter Principle, all too often the company then loses a fine engineer and gains a poor manager.

If this philosophy of providing two ladders to success is adapted, creativity will flourish because the technically capable engineers will know that they will not be financially penalized for being technically creative. They no longer, will strive to become "poor managers" in order to achieve financial rewards; because in those instances a technical expert in a department can command a salary which is reasonably related to that of his supervisor and in some instances it may even exceed the supervisor's salary.

The Challenge

The burden of the solution of these difficult personnel problems then seems to fall directly on the shoulders of the older engineers. We are unable to select the students enrolling in the schools for engineering instructions on the basis of being properly motivated since it is impossible to test for motives. Therefore, we must accept the young people seeking to enter our profession and mold their attitudes to a proper perspective.

Money is important to all of us; but it should not become the primary objective. The accomplishment of the assigned task in an expert fashion should be the dominant consideration but we must not forget to then give the financial adjustment that is the just reward of excellence. Here again the responsibility falls upon the older generation. We must be ready to recognize excellence and prescribe suitable recognition including financial rewards.

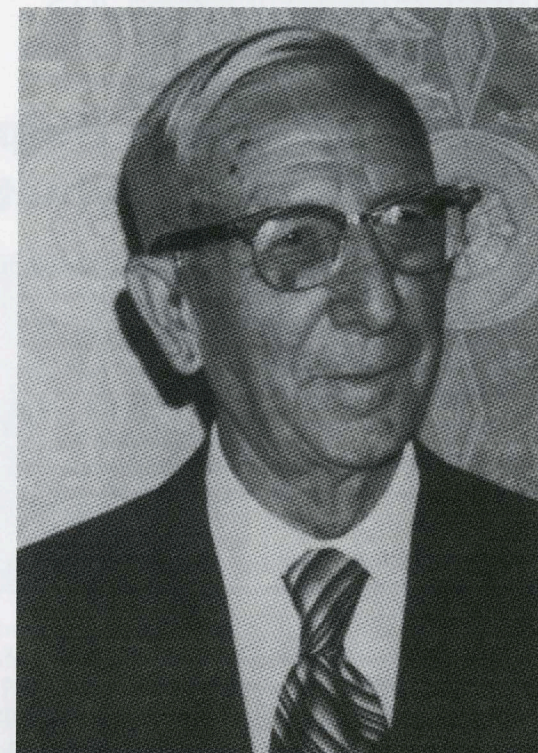
It is necessary to be on the alert to recognize both the technically capable and those who have management qualifications. Both must be nurtured to permit proper development. Care must be exercised so that the technical group does not suffer a "brain drain" to satisfy the number of bodies required in the management group. It is probably better to have an insufficient number of managers and the proper number of technical people than to have the correct number of management people (some of questionable ability because of the Peter Principle) and an insufficient number and quality in the technical group.

Summary

Nurture young persons and motivate them along the right lines.

Excellent technical ability should be given proper recognition and rewarded financially. Promotion to management should not be a reward.

Use as much caution in transferring a good technical employee to management as would be used in transferring a management employee to a position requiring great technical skill. The two skills are not interchangeable and can be mutually exclusive.



**William T. Burnett
1882-1983**

William T. Burnett, the last living Founder of Eta Kappa Nu passed away on April 19th, 1983. He celebrated his 100th birthday on June 29th, 1982. Mr. Burnett, along with the other Charter Members, founded Eta Kappa Nu on October 28th, 1904. He had a life-long interest in the Association and attended the Alpha Chapter 75th anniversary celebration in November 1979.

Mr. Burnett married Ethel Phenicie. She died in 1976. Surviving are three daughters, seven grandchildren, nine great-grandchildren, and a great-grandson.

He was employed by the Sangamo Electric Co, where he retired in 1947.

Chapter Annual Reports

Beta Epsilon:

HKN Students Help Build NASA Project

Over the past four years, a group of students at the University of Michigan, including several HKN members, has designed and built a small payload to fly aboard the Space Shuttle. Sponsored by the U of M Students for the Exploration and Development of Space (UMSEDS), the VORTEX Ring Transit EXperiment (VORTEX) attempts to answer some basic questions about liquid atomization, the process by which a liquid is converted into small droplets. Without the presence of gravity, the physics of this process can be examined as never before. The data returned will hopefully lead to better methods for atomizing fuel (important in the operation of internal-combustion engines), producing metal powders of desired characteristics (powder metallurgy), and manufacturing microdroplets for drug delivery.

The students have been working in teams to design and build the many different subsystems needed to run the self-contained payload. All power, control, and data handling must be contained within the 5 cu. ft., 200 lbs. Get Away Special (GAS) experiment carrier.

Members experience 'Vomit Comet'

In April of 1997, VORTEX was tested in Houston aboard NASA's KC-135 microgravity aircraft. The plane flies in parabolic arcs, rising up to 35,000 feet and diving down to 25,000 feet at a 45 degree angle, which creates approximately 30 seconds of weightlessness for the experiments and passengers. Because of this roller coaster-like motion, the KC-135 is also affectionately called the "Vomit Comet".

All of the weightless scenes of the movie *Apollo 13* were filmed aboard this plane. HKN member John Korsakas, who wrote the computer software for the experiment's flight, got to fly on the plane with VORTEX twice, floating through 80 parabolas. John was happy to report that he never got sick, unlike many of the others who have flown in the plane.



VORTEX Blasts into Space

After the test flight, VORTEX was prepared for its space shuttle mission with HKN members John Korsakas and Avik Basu developing the flight software. The astronauts on the shuttle only had to turn on the experiment, then turn it off eight hours later, requiring it to be completely automated.

The software was written in C++, running in DOS on a 486, and controls the entire payload, running the experiments, controlling the motors, pumping fluid, collecting voltage, accelerometer, and thermocouple data, and capturing several images per second with a digital camera.

In September, of 1997, a team of six, including Avik and John, traveled to Kennedy Space Center in Florida to deliver VORTEX to NASA for integration aboard the space shuttle Endeavour for mission STS-89. Then on January 22nd, 1998, John, his parents, and other team members were present to watch VORTEX launch into space. In February of 1998, Avik and John went to Goddard Space Flight Center to pick up the experiment and learn what sort of data that their program had collected during the flight. Much to their dismay, due to some NASA technical difficulties, the computer never booted and the program never had a chance to run. NASA granted the team a reflight aboard STS-88, the mission carrying Node 1 of the International Space Station.

Second try for VORTEX

All summer Avik and John have been improving and testing the program, and this past August, they again traveled to Kennedy Space Center to deliver VORTEX to NASA. They were also able to see Endeavour in the Orbiter Processing Facility, tour the huge Vehicle Assembly Building, and climb to the top of one of the shuttle launch pads. Currently, VORTEX waits in Endeavour's payload bay for the launch of STS-88, scheduled to fly in December, 1998.



Above: HKN members Avik Basu and John Dorsakas pose next to the space shuttle Endeavour with advisor Luis Bernal

SPEED BUMPS

by

George W. Swenson, Jr.

EDITOR'S NOTE: The author (BG '44) is Professor Emeritus of Electrical Engineering and of Astronomy at the University of Illinois at Urbana-Champaign.

Most of us motorists, I suppose, have muttered impolite things under our breaths upon encountering a "speed bump" in a parking lot or alley. Some may even slow down a bit out of consideration for the car's suspension or in the belief that a slower speed results in a gentler jolt. To me, however, the most evident thing about the typical speed bump is that it's been poorly designed for its purpose. One actually experiences less discomfort at speeds considerably above the posted limit, and the bump is a real hazard to cyclists and persons in wheelchairs.

Way back in 1952, I was teaching an evening course in linear dynamics at Washington University in St. Louis, for a group of engineers from local industries. The university is surrounded by the city, and the campus roads were inviting shortcuts for commuters, so to discourage this traffic the buildings and grounds department had sprinkled speed bumps here and there. Experienced drivers, and those with some knowledge of mechanics, paid little heed to the bumps, but to bicyclists like me it was a real annoyance to have to dismount every hundred meters or so while hustling from classroom to lab to committee meeting. It seemed a good class exercise to investigate the rational design of a speed bump.

Adjourning to the parking lot we bounced up and down on the bumpers of a number of cars to determine the resonant frequency and the rate of damping of the typical suspension system. From this and a simplified model of the system one could write directly the solution to the second order differential equation describing the vertical motion of the car. The forcing function of the equation, of course is the vertical displacement of the tires caused by the bump. It would be desirable to have the least possible stress on the tires and suspension system while causing the most annoyance to the occupants of the car at the critical speed. It would also be desirable to expose bicyclists to the least possible danger and inconvenience. The bump should introduce the wheel displacement gradually 'but should have a shape that will produce a large vertical velocity of the car body. It should also be easy to build and maintain. The function

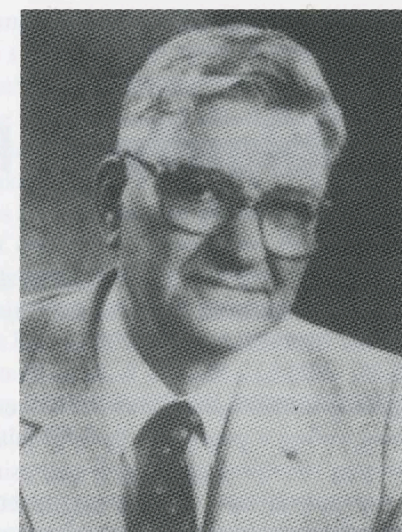
$$D=A[1-\cos(\omega t)], \quad 0 \leq \omega t \leq 2\pi$$

$$D=0, \text{ elsewhere}$$

where D is the vertical displacement, t is time, w is speed, satisfies these criteria, Doing the arithmetic shows that the bump, a biased cosinusoid, should have a period of, say 6 meters, as contrasted with the 30 centimeters of the usual bump. The car's response is that of a low-pass filter, while the excitation by the usual bump contains only higher frequencies. On the other hand, a bicycle had very "good" high frequency response.

Well, we designed our bump, and I wrote a letter to the director of the buildings and grounds department giving the details, not knowing what to expect in return. To my surprise I got a reply thanking me for my interest and saying that Dr. Compton had also designed a bump, and that they were going to build it on the main road through the campus. Arthur Holly Compton, the Chancellor of Washington University, was a physicist, a Nobel Laureate and a man of immense prestige. I could understand why they were going to build his bump! I telephoned the Chancellor and we compared notes. We had arrived at similar solutions, except that his bump had two cycles of the cosine shape and mine had one, and he'd used a Fourier transformation and I a Laplace transformation in solving for the vertical velocity.

Years later, long after I'd left St. Louis, I drove there to give a seminar talk. By this time the "Compton Bump" had achieved monumental status. It was plainly marked with a warning sign, there on the main road through the campus. The bump itself was not particularly impressive: a few inches high, just a gentle undulation in the pavement. Always the empiricist, I tried it at just above the posted speed. Big mistake! My 1960 Chevrolet almost did a somersault, and even now the term "Compton Effect" brings to mind the bruised scalp and headache I earned that day.



The Ubiquitous PC

by Andy Grove

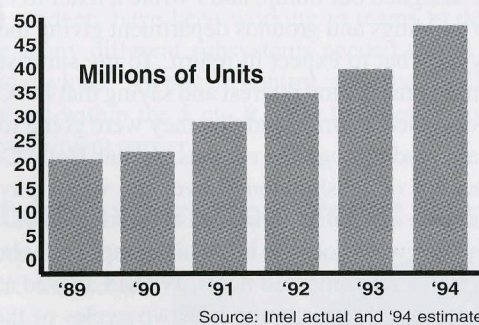
Following is a summary of the keynote speech delivered by Andy Grove, Intel's President and CEO, at PC Expo, June 28, 1994.

The PC is getting difficult to avoid, whether you are at the checkout counter, sitting at your office desk, in an airport or in your home. Around 10 million people will start using PCs this year. That works out to around 35,000 a day, the contents of a football stadium. This ubiquity is due to two factors: mass production and adaptability.

Mass Production

Like the automobile and television before it, the PC has become widespread through the economies of scale of mass production. PC components like microprocessors, disk drives and monitors are all manufactured in the tens of millions of units. Unlike the building blocks for previous computers, they are standardized and interchangeable. This requires enormous investment by suppliers, but the resulting economies of scale

Intel Architecture PC Shipments

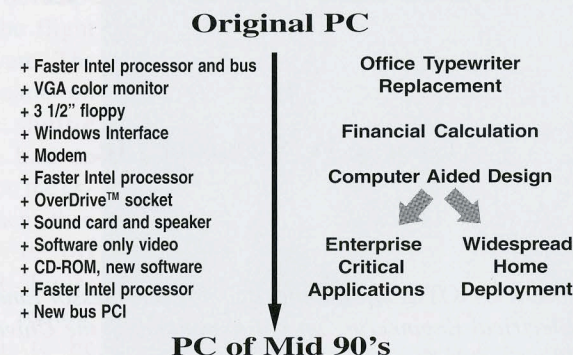


have transformed the computer industry and put computers in the hands of tens of millions of people all over the world.

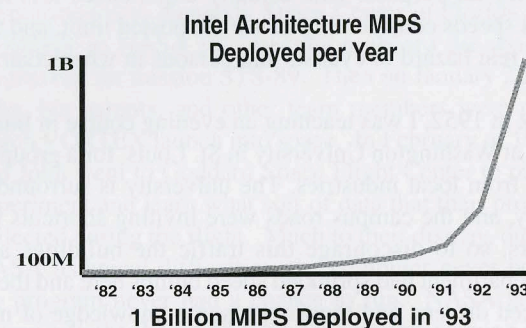
Adaptability

There is a second reason for the growth of the PC: adaptability. The PC has changed continuously since it was introduced. At the beginning, it was principally a typewriter replacement. Step by step the processor, software and I/O were upgraded, and with the development of spreadsheet software it became an indispensable financial tool. By the late 80s, with more processing power and a new graphics system, the PC had become the workhorse for Computer Aided Design, transforming the working lives of architects and designers. More recently, CD-ROMs, new applications and higher performance have made it

the highest growth product line in consumer electronics as the PC has moved into the home. All of these changes have taken place in evolutionary steps, with the newer PC designs largely compatible with the older generation.

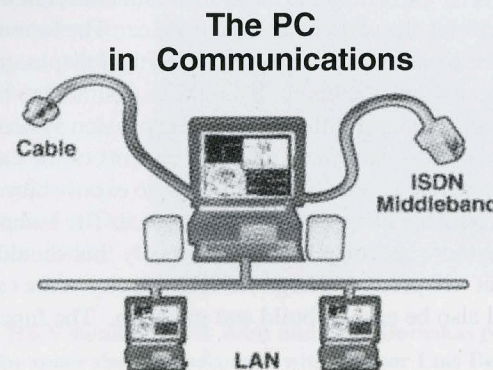


This combination of mass production and adaptability is producing stunning results. The amount of computer processing power purchased worldwide in 1993 was more than a billion MIPS, or millions of instructions per second. Roughly 90% of installed PC MIPS were shipped in the last two years. This phenomenal growth rate is making the PC the Information Appliance of our time.



Communications

The next step in the PC revolution will come in the area of communications. Over the next two to three years there will be a new generation of low cost, high speed communications links installed at home and in the office. This combination of mass produced high performance computers and new high speed communications lines will change forever the way people work with each other. This will be the reality of the "Information Highway."



ETA KAPPA NU BRIDGE FALL 2000

Arrival of "Middleband" in the Office

A major new technology in the office is Integrated Services Digital Network, or ISDN, a "middleband" digital service that runs at 128 kilobits per second, about 10 times faster than the fastest existing modem communications. Most importantly, in an industry dogged by incompatibilities, the same standard is being adopted worldwide. ISDN lines are widely available today in Europe, Asia and most of the United States. ISDN represents a clear breakthrough in communications technology. Using this middleband technology, Intel this year has released the ProShare(TM) family of personal conferencing products that allows PC users from remote sites to work together on documents, spreadsheets and other applications while seeing and talking to each other using video conferencing technology.

Better LANs at the Office

Middleband will be applied for "point-to-point" communications, such as video conferencing to a distant party. But another key method of communication is the Local Area Network (LAN). LANs made up of PCs and workstations have become an indispensable foundation of business communications. Initially used to share disk storage and printers among several users, LANs are now used by most large companies for mission critical applications. As LANs have grown, they have become more complicated and expensive to support. A recent Gartner Group study found that over five years, the cost of managing and supporting a network was higher than the total hardware and software costs of setting it up. This is an urgent issue that requires a cross industry initiative.

The Desktop Management Task Force, an industry-wide cooperative effort, has proposed the Desktop Management Interface (DMI) to meet the challenges of LAN management. DMI will help link PC platforms, components, management applications, peripherals and management consoles based on a standard supported by more than 300 companies. DMI is a landmark agreement and promises to revolutionize the way LANs operate and integrate.

Faster LANs at the Office

The capacity of the LAN, large as it is, is constraining communications. Since the introduction of Ethernet, the primary LAN standard in the early 1980s, the available bandwidth for data transmission has remained constant at 10 megabits per second (Mbps), while the PC has become 100 times faster over that same period. Ten Mbps is clearly inadequate today and is becoming a bottleneck. Intel, along with 40 other industry vendors, has announced support for a near-term upgrade to Ethernet, called Fast Ethernet. It will provide 10 times the bandwidth at about two times the cost. Fast Ethernet is able to utilize existing software.

In another three to five years, the emerging ATM (Asynchronous Transfer Mode) technology will also reach the desktop. This will provide further performance improvement, and the design is optimum for multimedia applications.

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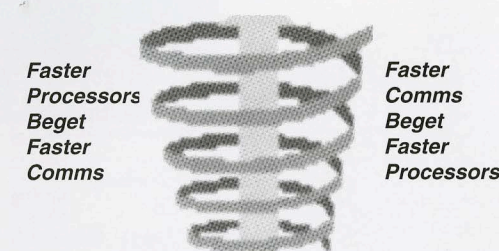
Middleband Communications in the Home

High speed modems have opened up a new world to telecommuters and other home PC users. However, the relatively slow speed of these products has constrained their use to simple text documents. Middleband ISDN services are about to take the home PC one step further. In the mid-1990s, ISDN lines are becoming the best and most reasonably priced method of connecting home-based PCs to offices, schools, libraries, government agencies and other PCs. Home users will be able to access their office-based LANs from home and access large files that were previously too big to work on from a remote location. Graphics, pictures, presentation files and lengthy text documents can be accessed from home without a lengthy wait.

Broadband Communications in the Home

As computer-based communications technology develops further, PCs will also be connected to each other and computers all over the world over installed cable lines. Coaxial cable has enormous bandwidth compared to telephone lines. Within the next two to five years, downloading five or 10 megabit files to your PC will take seconds instead of minutes over installed, always-ready cable connections. This will permit the development of a whole new class of applications, rich in pictorial and video content.

The Processor / Communications Spiral



Conclusion: The Computing/Communications Spiral

The relationship between the modern mass produced computer-the PC-and increasingly high bandwidth communications has become interdependent. The bigger the communications pipeline, the more powerful the computer needs to be to handle the data flowing through the pipeline. And the more powerful the processor, the bigger the pipe required to transmit data to it. The computing/communications spiral is the determining force for both industries in the 1990s. By the late 1990s, we expect 100 million PC units to ship worldwide each year-more than cars, and TVs. In a world that is increasingly digital, and which will be interlinked by a powerful communications infrastructure, the PC is at the center.



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