

THE
BRIDGE
of eTau
KAPPA n





“Traffic is terrible today!”

“... Accident in the left hand lane of the Queens-Midtown access ramp. Right lanes moving slowly. Fifteen minute delay at the Brooklyn Battery Tunnel. Lincoln Tunnel backed up to the Jersey Turnpike. Extensive delays on Route 46 in the Ft. Lee area. That's the traffic picture for now, Bob.”

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GENERAL  ELECTRIC



OUR COVER

Our cover introduces the holiday season as well as our special Christmas supplement in the center of the book.

ETA KAPPA NU

Electrical Engineering Honor Society

NOVEMBER, 1967, Vol. 64, No. 1

Editor and Business Manager
Paul K. Hudson

CONTENTS

The Social Consequences of Technical Progress.....	4
Outstanding Student Awards.....	7
Regional Visitations.....	8
Christmas Supplement.....	9
New Officers and Directors.....	18
New Chapters.....	20
Chapter News.....	21
The Great Sahara Mousehunt.....	23
Real and Imaginary.....	2
Cycles and Bells.....	22

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

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Member Association of College Honor Societies

Real and Imaginary

A Holiday Table

Whether or not you excel at giving bouillon brunches, tactful teas, or simple suppers, an elegant holiday sit-down dinner may seem like a moment of truth.

But fear not... we live in an age of restrained elegance. Sift the rules of table setting etiquettes, add the best of the past to the spirit of today, and your holiday table will deserve and receive glowing words of praise from your guests.

A patterned or colored table cloth helps set a festive mood and enhances your silver. English Provincial silver, a Reed & Barton flatware, is an example of design in harmony with today's uncluttered look, yet in the tradition of holiday past.

Your centerpiece may reflect the folklore of the holiday or it may be a classic dinner table arrangement. It may also be a tableau of objects that display your awareness of beauty in all things. Lower your artistic sights, however, if your centerpiece starts to rise above 12 inches. If you want your guests to see one another, keep your

centerpiece low — and your candles, if you use them high, so that they will not flicker annoyingly at eye level.

Miniatures of a holiday symbol... chocolate, papier mache or what have you... an assortment of fruits and vegetables accenting the colors of the season may be arranged on leaves, directly on the table, or on a mat or tray. Various things can be found in most households which would be suitable for flowers or fruit and vegetable arrangements. Lazy susans, pedestal cake plates, soup tureens, punch bowls, baskets, or souffle dishes are likely candidates, as is any long rectangular container.

A grouping of small potted plants, or large, fat blossoms floating in a shallow bowl makes an attractive arrangement. If you have tender feelings for an old wooden toy or seashell collection, a candied gingerbread house, or your favorite piece of driftwood, by all means, use it in your centerpiece.

The size of the centerpiece will be geared to the size of your table, as will the space allotted for each place setting. If you have enough room at the table, plates may be 30 inches apart — from center to center — otherwise 24; certainly never less than 20 inches, or your guests will really be rubbing elbows together!

Since napkin rings are now being used as decorative table appointments, and not merely to save family laundry, their use will save valuable inches and keep the table from looking crowded. Napkins are placed to the left of the forks if the first course is in place. If not, the napkin may be placed on the place plate.

Forks, of course, are placed to the left of the plate. The one to be used

(continued on page 22, col. 2)



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THE SOCIAL CONSEQUENCES OF SCIENTIFIC AND TECHNOLOGICAL PROGRESS

DR. EUGENE G. FUBINI

Vice President and Group Executive
International Business Machines Corporation

In recent years we have heard a great deal about the "technological explosion." In fact, we've heard about it so often that it's become a cliché. This is fortunate because we are inclined to treat clichés superficially and give them very little thought.

No one needs to tell us about the obvious results of the explosion — radar, computers, nuclear energy, space flight. But too many of us — especially the young engineers among us — have become so involved in making these things happen that we may be overlooking some significant ramifications of our work which transcend the most obvious results of it.

Since the beginning of this century, the average man has grown increasingly aware of the immediate impact of science and technology on his daily life. Once poles apart, these two forces have merged, and unlike biology and medicine or economics and management, they no longer represent a clear separation of inquiry and application. Polytechnic schools and universities are no longer distinct institutions. Phrases such as "applied research" and "advanced technology" have entered our language. In short, the two ends of the physical sciences have merged into a single spectrum. Each has multiplied the force of the other, and together they have penetrated the consciousness of the people.

Not too many years ago the average man didn't know about science and technology, and he didn't care. Today, technical issues have become political issues. Once, governments rose and fell almost entirely on the basis of social and economic issues — soft money versus hard money, tax cuts versus tax increases, welfare versus laissez-faire. Today, political campaigns include technical debates about nuclear power, weapons systems, communications satellites, pollution control, automobile safety, and many other such concerns once deferred almost entirely to scientists and engineers.

Yet, in spite of their special competence, too many of today's young scientists and engineers have remained spectators rather than actors in this process. They are the instruments of one of the most profound social and moral forces in our lives today, and they are essentially unaware of it.

**A talk presented March 20, 1967, at the annual award dinner of Eta Kappa Nu national electrical engineering honor society at the Belmont Plaza Hotel, New York City, N. Y.*

When businessmen make speeches, they often refer to the great opportunities and challenges enjoyed by today's scientist and engineer. One of my friends in engineering recently told me what they really mean:

If you can define both the problem and the solution, it's an opportunity.

If you can only define the problem, it's a challenge.

Now I am going to offer you a challenge. I am going to ask you to consider the broader social consequences of technological progress, and I am going to challenge you to influence those consequences. Let me illustrate my point with an historical example.

ENTER MR. WHITNEY

At the end of the 18th century a Yankee technologist created a machine so terrible that it prolonged for years the slavery of millions of human beings, precipitated the bloodiest war of the 19th century, and left us with one of the worst social problems we face today. Yet, this man is justly revered as a great American.

Of course, Eli Whitney didn't know his cotton gin would do such things. All he set out to do was to find a better, faster way to separate seeds from short-fibered cotton. And if he hadn't done it, someone else probably would have.

But imagine for a minute how different our national history might have been if Mr. Whitney's terrible machine had never been invented.

In the last decade of the 18th century slavery was dying out in the American South. The return on the basic cash crops of the day — rice, indigo, tobacco — were too small to justify heavy capital investments in slave labor. And without slave labor, large plantations were all but impossible to maintain. Only cotton could make them profitable. The booming English textile industry could use all they could grow, and more. But only short-fibered cotton could be grown in the vast interior lands of the South — short-fibered cotton so difficult to seed that it was useless as a cash crop. It looked as if most large plantations would soon be sold off into small holdings farmed by a man and his family with little or no slave labor.

But the cotton gin changed all of that. It could separate more seeds from cotton in a few hours than an experienced slave could separate in several days. Slave labor could be devoted almost entirely to cultivation and harvest. And the profits were immense.

Consider the market: From 1783 — ten years before the cotton gin — to 1790, British cotton imports grew from nine million to 28 million pounds a year. Yet as late as 1791 the southern planters produced less than 190,000 pounds and exported only a few hundred bags. Then came the cotton gin, and in 1825, the year of Whitney's death, the American South raised and ginned three-quarters of the 228 million pounds of cotton imported by Britain.

In a little more than a generation, the South had reversed its direction. It had fallen out of phase with the rest of the nation, and had become a feudal society supported by chattel slavery.

You know the rest, from civil war to civil rights. But did you know that Whitney's next great invention helped terminate the worst social effect of his first? In attempting to produce enough cotton gins to meet the demand, he conceived the principle of interchangeable machined parts, which he later used to mass-produce muskets for the government.

Interchangeable machined parts soon became essential to the rise of Northern industry, and just as Whitney equipped the South to precipitate the Civil War, he equipped the North to win it.

THREE LEVELS OF CHANGE

If we examine society's reaction to inventions — Whitney's and others — I think we can identify some important basic elements of that reaction. I think we'll find three levels of change, each more profound than the previous level, and much harder to anticipate. And we will see how the scientific and technological innovations of today may have even more far-reaching consequences.

At the first of the three levels, a new device or technique provides us with a new and better way of doing something we have done in the past. We gin cotton, or we build muskets faster and more efficiently. We use internal combustion engines to make horseless carriages.

At the second level, we do entirely new things. We clear vast tracts of wilderness and use them to cultivate cotton, or we produce not only horseless carriages, but trailer trucks, tractors, and bulldozers.

At the third level, we make fundamental changes in our way of life to take into account these new technologies, and we revise our political and social moralities. We justify slavery and go to war, or we buy a reliable, inexpensive automobile, move to the suburbs and take our children back to the country. We invent the supermarket and the shopping center; we group new cities around airports; we create urban ghettos.

Nikolaus Otto devised the four-stroke cycle and invented the modern internal combustion engine in 1876. It would have been as difficult then for him to visualize the supermarket and the ghetto as it would have been for Whitney to visualize the Civil War in 1793.

Of course, every invention doesn't cause such obvious consequences. The safety pin, for example was an ingenious development. Anyone who's ever changed a diaper will swear to it. But we'd be hard-pressed to find much significant in the way of second and third-level change.

Higher levels of change normally occur only when some significant technical parameter is changed by a factor of ten or more at the first level. Even then, unless the change occurs in a relatively small span of time — a few generations at the most, or a few decades — it will create very little, if any, disruption in our lives.

There are exceptions to this observation. The stirrup, for example, revolutionized society in the early years of the post-Roman world. It was a device as simple as the safety pin, but it made cavalry possible, and provided the middle ages with a weapons system capable of supporting feudalism. In general, however, both the factor of ten and the factor of time are necessary ingredients for significant social change.

Improvements in bridge building, for example, meet the factor-of-ten criterion. In fact, if we compare the 4,600-foot span of the Verrazano Narrow bridge in New York City to the 200-foot span of a Roman stone bridge, we get a factor of 23.

(continued next page)



But it took 2,300 years to go from stone arches to air-spun steel cables, and society has adjusted to the change very nicely.

Our mechanical engineers have been a little rougher on us, and the effects of their work have been much more obvious. From Kitty Hawk until the end of the Second World War, for example, improvements in aircraft engines provides another factor of 23.

The Wright Brothers' first engine produced one horsepower for every 13 pounds of weight. By World War I, the ratio was one horsepower to two pounds, by World War II, it was one to one, and by 1945, turboprops were generating almost two to one. Jets and rockets have progressed even faster, going from a two-to-one thrust/weight ratio for early jets to 30-to-one for today's lift engines.

Changes in the cost and speed of travel have been even more dramatic. The Kitty Hawk flight cost about \$64 a passenger mile, while today we pay about 7¢ a mile, or nearly a thousand times less, and almost anyone can afford it. What's more, with aircraft, we have increased the speed of travel by a factor of 100. The world has become a hundred times smaller, and we can already see some third-level changes.

Anyone who has been in Europe recently can see that air travel is making borders obsolete — that for passengers in a hurry, customs barriers already exist in name only. Because of technical progress, the old world of European nationalities is in ferment. The conflict between old-fashioned nationalistic forces and the unifying forces of science and technology has not yet been settled. Technology has given us the common market in Europe, but it has also helped retard the growth of such unity.

The so-called "technology-gap" between nations, for example, is becoming an important concept in international politics. It represents a very real point of conflict, and one which tends to separate nations, not unify them. Up to now, such separatist forces have had the upper hand, and I cannot predict when this trend will end. I am convinced, however, that it must end sometime.

THE ELECTRICAL ENGINEERS

So far, I have ignored the role of electrical engineers in this process of ferment and change. I don't mean to, because electrical engineers — especially outstanding young electrical engineers — have become the worst trouble-makers of all.

For example, in the last 100 years they've increased the volume of communications in this country by a factor of 10,000. Imagine a line dividing the United States at the longitude of Chicago. A hundred years ago the equivalent of about one hundredth of a megacycle of information flowed across the line. Today, it's about 150 megacycles.

THE NATURE OF TECHNOLOGY

I believe that technology is essentially a benevolent force — that it tends to unify men, not separate them. The process is painful, and not always permanent. The ancient world of Alexander and the Caesars was essentially unified. But its technology — despite a highly developed governmental structure — was not powerful enough in those areas which touch the lives of the people to over-

come the political, social and moral differences of the time.

I believe that modern technology may be powerful enough to accomplish what ancient technology could not.

Look at the history of warfare: We began with limited wars because early technology did not permit large masses of people to participate over large areas. Then, over the last two centuries — from the Napoleonic wars, to the Civil War, to World War I and World War II — technology made warfare less and less limited. But observe what has happened since World War II. The very same technology that made limited war obsolete is bringing back the limitations. Today we shrink from using the full power of our weapons. In spite of the nuclear sword-rattling of the cold war, our hot wars have once again become limited. Furthermore, most of them have only been fought as contained extensions of the cold war.

Nor is limited warfare the only hidden blessing of modern science and technology.

As recently as a hundred years ago in this country, most of our population lived on farms in almost entirely self-sustaining family units. They could afford to maintain rigid, insular values and treat the rest of the world as remote, strange and probably inferior. Today, the rugged individual has been replaced by a new breed, equally rugged in his own way. He must function in a far more complex civilization. He has been deprived of many of his great grandfather's easy, black-and-white values. He has become far more dependent on other men. And yet he has survived and prospered. What's more, in spite of some healthy kicking and screaming, he's allowed his government to become increasingly strong and centralized in order to maintain and extend his progress.

Interestingly enough, the same technological forces which have moved us in the direction of a more centralized government and society have had an opposite effect on the other side of the world in Russia.

There, technological progress, with its attendant growth in communications and education, has worked in the opposite direction. It has served to give the individual a greater voice in his nation's affairs. He is demanding, and getting, more consumer goods. His industry is gradually turning from quotas to profits as a measure of success. And the individual is enjoying more and more freedom to travel, to think, to govern his own destiny.

The effect of technology on social and moral values has been so great over the last 50 years that today we can see these two apparently hostile systems of government converging. And this convergence is the belated consequence — not the cause — of the convergence of of peoples' desires.

When people are cold and hungry, the desire for freedom has little chance to express itself. But let technology meet their needs, and they will become hungry for thought, for learning, for debate and for freedom.

I can think of no better example to support my thesis.

The trend toward unity among nations, the ecumenical spirit among religions that 300 years ago were fighting in the battlefields — there are the consequences of an essentially benevolent science and technology.

I would like to conclude with an image that I have used in the past, because to me, it best represents the positive nature of our progress and its promise for the future.

(continued on page 24)



DOUGLAS JOHNSTONE

Mr. Douglas F. Johnstone, the designated Outstanding Electrical Engineering Student for 1967, ranked first of 178 Senior Electrical Engineering students at Purdue University. He has been honored with memberships in Eta Kappa Nu, Tau Beta Pi, and Omicron Delta Kappa (Senior activities honorary). Every semester he placed on the dean's list and was also honored at the annual President's Scholarship Dinner.

Mr. Johnstone has served as Publicity Chairman for the Campus Chest; Editor, National Convention Delegate, Public Relations Chairman and Pledge Trainer for Alpha Epsilon Delta; Pledge Class President and Social Chairman for Alpha Kappa Lambda. He is a member of Alpha Phi Omega (campus service fraternity) and the IEEE student chapter.

Mr. Johnstone was selected in national competition to receive a General Motors Scholarship which he has maintained since his enrollment at Purdue.

Mr. Johnstone has worked part time as a technical assistant in the Electrical Engineering Department. He also worked part time at his fraternity and did farm work on weekends to financially support his college education. His summer work has involved engineering of telemetry systems for the Allison Division of General Motors Corporation.

DOUGLAS F. JOHNSTONE

OF PURDUE UNIVERSITY

Selected by Eta Kappa Nu as the
Most Outstanding E. E. Student in the U. S.

HONORABLE MENTIONS TO
Donald Alf and John Henderson

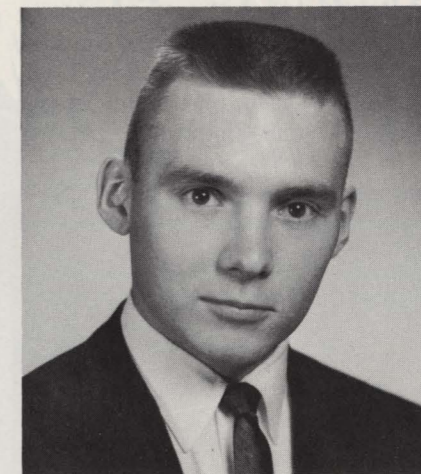
JURY OF AWARD

Serving on the Jury of Award were
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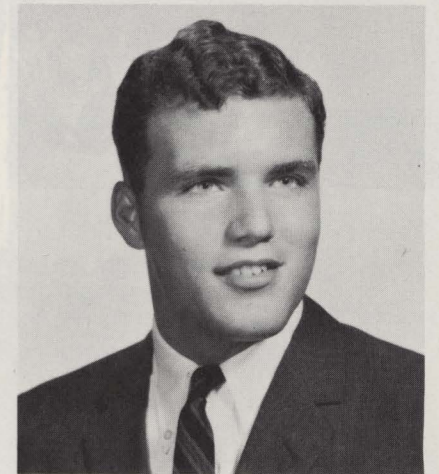
DONALD ALF

Mr. Donald Lee Alf ranked first of 173 Senior Electrical Engineering students at the University of Wisconsin. He has been honored with memberships in Eta Kappa Nu, Tau Beta Pi, Phi Kappa Phi, Phi Eta Sigma, Scabbard and Blade; received an NROTC scholarship; Sloan Foundation scholarship; Chrysler Corporation scholarship; Outstanding Freshman and Senior Engineer Awards; Outstanding Sophomore Electrical Engineer Award; Society of U. S. Military Engineer's Award; Meyer-Raeburn Award; and awards as the Outstanding Freshman, Sophomore, and Junior Naval Science Student. He has held numerous offices in the organizations already mentioned as well as Kappa Eta Kappa, U. of W. Engineering Exposition, and membership in the IEEE student chapter.



JOHN HENDERSON

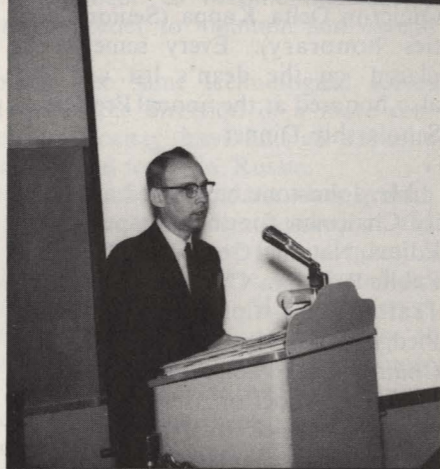
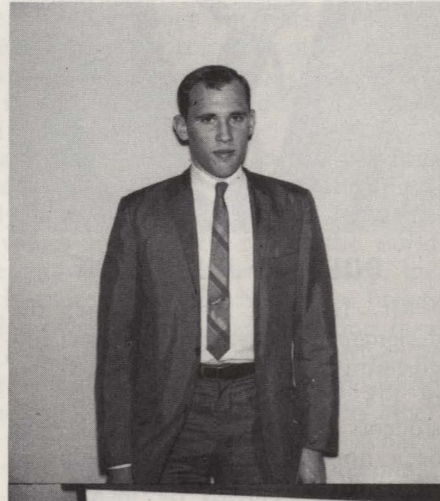
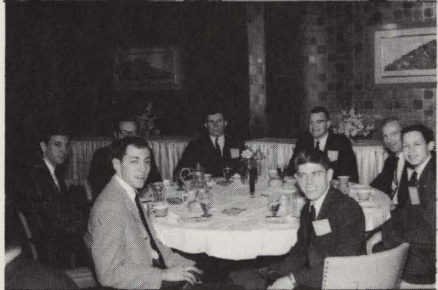
Mr. John G. N. Henderson ranked third of 36 Senior Electrical Engineering students at the University of Pennsylvania. He has been honored with memberships in Eta Kappa Nu, Tau Beta Pi, Sigma Tau, and Hexagon Senior Honor Society. He has served as President to Tau Beta Pi; Corresponding Secretary for Eta Kappa Nu; and as Treasurer for Hexagon Senior Honor Society. He has earned a University of Pennsylvania Letter as a member of the Heavyweight Varsity Crew. Mr. Henderson received the Mayor's Scholarship; placed on the Dean's List each year; received the Outstanding Engineering Sophomore Award and participated in the General Honors Program. He is actively engaged in research involving spectral measurements utilizing a Golay cell.



Regional Visitations

CHICAGO

During the 1966-67 school year Eta Kappa Nu inaugurated a new Regional Visitation Program. This program is similar to Regional Conventions but with an entirely different purpose. The Visitations are intended to supply a medium for the mutual exchange of information by chapters and to give assistance to chapters that have problems. No minutes are kept and no Eta Kappa Nu business is conducted. At least one National Officer is present. During the past year Regional Visitations were conducted at New York, Chicago, Dallas, and Rolla. All were considered highly favorable, and the program is to be expanded this year. It is hoped that all chapters will have a chance to attend at least one Regional Visitation in a two-year period. Pictured are some scenes in the highly successful Chicago Regional Visitation held on May 6th at the Automatic Electric Company. The picture at top-right is of Maurice Carr, grandson of the founder of Eta Kappa Nu. He was initiated into Eta Kappa Nu at Purdue in May. Just below are Jack Farley, National Vice President Elect, and John Leary, President of the Chicago Alumni Chapter.



The Meaning of Christmas

Did you know that Christmas was not widely celebrated until long after Christ's death? It's a fact!

There is no record of anyone celebrating Christ's birthday until 400 years after He died. At that time in Rome, an imperial edict included Christmas (with Easter and Epiphany) among the three feasts on which theatres must be closed. However, before this time, there was a great deal of contention regarding the birth-date of Christ. Various authorities claimed it was January 6th, March 25th and December 25th.

Today, it really wouldn't matter what day we celebrate Christmas. As the noted theologian, Dr. Oswald Hoffman, has pointed out, "We do not argue about whether He was actually born on that day, for we celebrate the fact that Jesus was born and *now is* Lord and Christ."

Birthdates were unimportant 2,000 years ago. We do not know the birth-date of any of the famous people of that period. No mention is made in the New Testament of the observance of Christ's birthday by the early church; in fact, Christians were exhorted to remember His death more than His birth.

Why, then, did December 25 come to be celebrated as Christ's birthday? Because many of the earth's inhabitants were once sunworshippers, since the course of their lives depended on the sun's yearly round in the heavens. Feasts were held to mark its return from distant wanderings.

In the south of Europe, in Egypt and Persia, the sun gods were revered with elaborate ceremonies at the season of the solstice. In northern lands, too, the middle of December was a critical time, for the days became shorter and shorter, the sun weaker and weaker. So these ancient people held feasts at the same period that Christmas is now observed. They built great bonfires to give the winter sun god strength and to bring him back to life again. Thus, the central idea of the winter solstice—the return of light—made it a "natural" for a new Christian feast

celebrating the hope of the world in the birth of Christ, the Light of the world.

The exact day and year of Jesus' birth have never been satisfactorily settled. But when the fathers of the Christian Church, in 440 A.D., decided upon a date to celebrate, reluctantly chose the day of the winter solstice which was firmly fixed in the minds of the people as the most important festival up to then.

The Son of God was made man. That is why we keep Christmas: the Son of God was made man for us all, to make every day a new day of genuine love and service toward God as well as toward everyone with whom we live and work. This is what gives us Christmas: not the trees, the lights, the ribbons, the candles, the gifts, or the greeting cards—but the incarnation of the Son of God.



Letter to Virginia

Dear Mr. Editor: I am eight years old. Some of my little friends say that there is no Santa Claus. Papa says "If you see it in the SUN, it's so." Please tell me the truth, is there a Santa Claus? Virginia.

VIRGINIA, your little friends are wrong. They have been affected by the skepticism of a skeptical age. They do not believe except what they see.

They think that nothing can be which is not comprehensible by their little minds. All minds, Virginia, whether they be men's or children's are little. In this great universe of ours, man is a mere insect, an ant in his intellect as compared with the boundless world about him, as measured by the intelligence capable of grasping the whole of truth and knowledge.

Yes, Virginia, there is a Santa Claus. He exists as certainly as love and generosity and devotion exist, and you know that they abound and give you life its highest beauty and joy. Alas! how dreary would be the world if there were no Santa Claus! It would be as dreary as if there were no Virginias. There would be no childlike faith then, no poetry, no romance to make tolerable this existence. We should have no enjoyment except in sense and sight. The eternal light with which childhood fills the world would be extinguished.

Not believe in Santa Claus! You might as well not believe in fairies. You might get your papa to hire men to watch in all the chimneys on Christmas eve to catch Santa Claus, but even if they did not see Santa Claus coming down, what would that prove? Nobody sees Santa Claus. The most real things in the world are those that neither children nor men see. Did you ever see fairies dancing on the lawn? Of course not, but that's no proof that they are not there. Nobody can conceive or imagine all the wonders that are unseen and unseeable in the world.

You tear apart the baby's rattle to see what makes the noise inside, but there is a veil covering the unseen world which not the strongest man, nor even the united strength of all the strongest men that ever lived, could tear apart. Only faith, fancy, poetry, love, romance, can push aside that curtain and view and picture the supernatural beauty and glory beyond. Is it all real? Ah, Virginia, in all the world there is nothing more real and abiding.

No Santa Claus! Thank God! he lives, and he lives forever. A thousand years from now, Virginia, nay, ten times ten thousand years from now, he will continue to make glad the heart of childhood.

Christmas Long Ago

ELLERY B. PAINE

I have recently been thinking of the first Christmas I can remember. It was about 85 years ago when I was a small boy. I don't think I had begun to go to Sunday School but I had heard Mother read to me from some paper or magazine which told of the lameness of one of the Reindeer of Santa's team. I now forget whether it was Dancer or Prancer or one of the others. But I was troubled to hear of it. It meant the possibility that maybe Santa wouldn't be able to come to fill the stocking I intended to hang behind the stove when I went to bed. The only good thing about the situation was that if Santa didn't come he wouldn't put the switches in the stocking I supposed would be left by him if I had done something wrong and needed to be whipped.

Sister Ethel was too small to hang a stocking so mine was the only one hanging when at 7 o'clock I went to bed. And the next morning as I went to look I wondered if Santa had been able to come. Yes, the stocking was filled and overflowing with wonderful things. It was not until years later that I learned the truth about the things I found in my stocking. I did not recognize that the apples, popcorn, walnuts, butternuts and cookies were exactly the same as what we usually had. I supposed they came from Santa and considered them superior. And I did not that Christmas realize the gilt-paper covered "Wand" was a stick Father formed as he whittled shavings to be used in building the fire in the stove the next morning. Later (really very many years later) Mother told me that they had done nothing to get anything to put in my stocking. So when they saw me hang my stocking as I went to bed they thought it would be too bad if I found it empty. So they put things in which were close at hand. The "Wand" was made because they had noticed

my interest in a larger one Nell had got to be used in some sort of performance the young people were to give. I kept that wand with greatest pride for a long time. It was to me a wonderfully happy Christmas.

Perhaps it was because I had no associations with children a little older than I was that I never heard any suggestion that the coming of Santa was not exactly as I heard in the stories. It was not until I was seven (when I began to go to school winters) that anything came to make me suspicious of the exact truth of the Santa story. It was when Irvie at breakfast on Christmas morning told how when he came home the night before as he came up the lane he saw Santa who had come up out of the chimney and got into his sleigh that was on the roof and quickly was drawn away by his team of deer. There was a few inches in snow on the ground and roofs of buildings. After breakfast I went out to look and could see no tracks in the snow on the roof of the house. I began to wonder how Santa could have been up there without leaving tracks. I asked no questions but I did think about that evidence very seriously.

It was about that time that I wondered how the men could sit by the stove at Christmas and talk and talk about things of absolutely no interest to me. My Grandfather Paine was one of the constant talkers, my Father another, and at times another man would join. To sit and talk without doing anything else was something I couldn't understand. And after I went to bed that night at the usual 7 o'clock I heard them talking until I went to sleep.

During that night I was aware of something unusual happening. When I got up the next morning Father said "Come with me". We went into the adjoining room which was where Grandfather slept, and I saw the wooden platform used in the slaughter house with something on it covered with a white sheet. Father lifted me up and pulled back the sheet and I saw the face of Grandfather Paine who had died during that Christmas night.

All that winter I was afraid if I went through the sitting room in the dark I might see Grandfather sitting

in his chair. I had never heard of "Ghosts" but I was scared that I might see Grandfather. So for a long time if ever I was in that room in the dark I shut my eyes and felt my way without looking.

I shall not try to mention all the "Merry Christmases" I can remember. But I'll add that a great change has come during my memory in the manner this day is observed. When I was a boy where I lived there was no Christmas Vacation. School and other activities went on as usual except for the day itself. I never heard of presents being given except to children in the hung-up stockings. I remember the surprise we had that our hired man Jim Coon should receive a special card with pictures and words printed on it from some friend in England. I was about a dozen years old and wondered if Jim was ashamed to have it known he had received the card. The only such cards I ever had heard about were those given some children in connection with Sunday School exercises. But no adults had them.

Then when I lived in Worcester a man who lived next door to where I lived was working with an "Envelope company" and his company was trying to see if they could sell cards to be used in sending greetings at Christmas. What a change since that time. One wonder is that with such loads of cards being sent now how seldom do we ever receive two alike. The other day sister Olive mentioned that of the dozens coming to us no two were alike.



Nothing For Christmas

Vernie Larson Swenson

This true story of a little girl's Christmas problem occurred about 65 years ago. Vernie lived on a farm in Minnesota.
Editor.

The Christmas Eve table was set with a long white linen cloth and the best dishes. There were nuts and candies in a center bowl — with a nutcracker to show it was all right to help yourself. We had other things, too, I suppose, to make it a special meal. Even our ruby-red raspberry sauce *looked* special when served up in the pressed glass berry bowl that stood tall on its glass foot. And the cocoa-nut layer cake on its footed glass plate. But lutfisk, and rice, and meatballs — those we always had. Of course.

At long last, the dishes put away, there we all were in the parlor, now. The parlor that we were so seldom in together as a family, that just being there, with the prismed hanging-lamp lighted, and the candles being lighted, and the tree smelling so wonderfully of fir and sputtering tallow, and all of us in good clothes and everything — well it was enough to make the heart pound with the gladness and expectancy of Christmas. There were presents under the tree, which we glanced at only sidewise, pretending not to see. There might even be more, bulkier packages in the front Hall — even on the front porch. Not to seem too eager, too early, we gathered about Ella at the organ, and we sang the Christmas hymns we knew; Nu ar julen inne; Glada hogtids dag...

One very early Christmas I remember poignantly for a special reason: *I wasn't getting any presents!* Claude was handing them out one by one: For Kelly... for Ethel... For Ella... For himself... for Ella... for Ethel... For Claude... and Clarence... for Ethel... for Kelly... Ella... Ethel... Clarence... Claude...

They were busily *opening* presents now! I remember the staggering, unbelieving feeling that had taken me. There was *nothing* for me — there wasn't going to be anything for me. No one seemed *surprised* there was nothing for me. Not even Claude. Not even Ethel. Not even Mamma — everybody was busy helping everybody else unwrap presents...

I was crying, now. I didn't want to cry — it was just happening. Kelly reached me a block from his new box that was packed tight to the top with pieces of wood in odd shapes and sizes. I turned it around looking at it, but a sob like a hiccup came out of my throat, so I laid it down. Ethel was holding her new doll — the biggest, most beautiful dressed doll I had ever seen — with real curls. Claude with Papa watching, was hitching together a lot of little cars to make a train — that was Kelly's. I went and looked into a deep dark corner behind the tree. Nothing. I touched Claude on the arm and started to say "Wasn't there *any*..." but he was awfully busy. Then everybody was looking at me — looking sorry for me because I hadn't got a thing. I was starting for the sitting room — I was crawling into my corner behind the coalstove where all my old dolls were...

"Claude," Mamma's voice was saying strong and loud. "That box in the hall — did you bring *that* in?"



"No," said Claude, "Was there another box?"

"It seems to me there was," Mamma said.

I was up and out and into the long, black hallway even before Claude. What can *this* be, Claude wondered out loud. What *can* it be, I whispered inside me, seeing the box now, heaped high with packages.

Claude carried the big box as if it was terribly, terribly heavy, grunting and groaning. He set it down in front of the tree. He took out a squarish package. It didn't have a name — not that he could find — that anyone could find. So they opened it. It was a little cupboard — a sweet little cupboard with drawers — only half as big, I saw now, as the one by Ethel's big doll. It *could* be — it *had* to be — for me? They opened a drawer — they took out a slip of paper. They took it over to the lamp — it took a long moment to make out what it said on the slip —

For V — Vernie!

I had my little cupboard in my arms, rocking back and forth on the floor. It was mine — mine! I did so have a present for Christmas!

Didn't I like it? They wanted to know. Oh, yes, I loved it — Then

(continued on opposite page)

The Symbols of Christmas

Stockings hung by the fireplace... boughs of holly... a jolly little man in a red suit — no matter what your favorite Christmas symbol, you can be sure that it has a fascinating beginning.

There are several versions of the origin of one of our best loved holiday traditions — the Christmas tree — but perhaps the most unusual is an old German folktale: A branch of fir was given to a forester's family after they had offered food and shelter to a waif, who was in reality the Christ Child. According to the legend, when the forester put the branch into the ground, it grew into a tree, and bears fruit and nuts every Christmas.

While the fir has long been a Yuletide symbol, early Christmas trees bore no lights. Martin Luther began the custom around 1530. Walking in the forest one night, Luther became so impressed with the beauty of the stars twinkling among the trees, that he went home and hung candles on a small fir so that he might share the experience with his children.

Holly was once thought sacred by the ancients, who held that all evergreens

were symbols of life. Holly was first hung in the windows of English homes as a symbol of Christian worship within. The plant also was believed to keep evil spirits away from the house. The red berries came to represent the blood of Jesus, and holly has since become a symbol of well-being.

Ever wonder why we kiss under the mistletoe? Researchers at Austin Nichols & Company tell us that the ancient Druids believed mistletoe was given to the goddess of love, and to show that it was a symbol of love, every woman passing beneath it was kissed. Today, there's a popular belief that a girl kissed under the mistletoe will be married within the year — providing she allow her love only as many kisses as there are berries!

The favorite Christmas symbol of most children, Santa Claus, was a real person. The original Saint Nicholas was a bishop who lived in Turkey 1600 years ago. According to a popular legend, he once dropped a bag of gold coins down the chimney into a sock a poor girl had hung by the fireplace to dry. Santa Claus was brought to the New World by the Dutch settlers who called him *Sinter Klass*, and he's been coming with his bag of gifts each year at Christmas ever since.

When we give gifts at Christmastime, we're observing a tradition that goes back to the time the Wise Men carried gifts to the Christ Child. According to some authorities, Christmas gifts replaced a pagan custom of exchanging presents at the New Year. Early priests suggested that, instead, gifts be given at Christmas to symbolize the goodwill and generosity that are a part of the festive occasion.



Many people also express their generosity at Christmastime by extending a helping hand through the purchase of seals. A Danish postal clerk thought up the idea, in 1904, as a way to raise funds for a tubercular children's hospital, and the idea soon spread throughout Europe. When an American Red Cross official received a letter bearing one of the stamps, the idea was adopted quickly by the Red Cross as a means of raising money for its campaign against tuberculosis.

In some parts of the United States, people place lighted candles in the windows of their homes at Christmastime. It is said that there was no candle to light the stable at Bethlehem, so today there are tapers in the windows to light the way for the Christ Child. At one time, many people believed that Christ would appear at Christmas, concealing his true identity, so anyone who came to the door was invited to enter.

And holiday hospitality is still one of the favorite traditions of this festive season to people around the world — no matter what their favorite symbols of Christmas.

NOTHING FOR CHRISTMAS (cont.)

why was I crying? I didn't *know* why I was crying when I was laughing too —

Someone gave me a package that was the size of a cigar box. And there inside, was a set of dishes — just right for the little cupboard! Everything I got when Ethel and I got the same things, was proportionately smaller. I loved the "littleness" about the things, because *I* was littler. So I knew before I opened the long package, that it must be a *doll*. And it *was*. A very big doll, really, only not so big as Ethel's. But with real hair, too, and a jointed-kind body, and

go-to-sleep eyes.

What are you going to call her, they wanted to know.

"Heloise," I said out of nowhere. "Heloise." I pronounced it as it was spelled — as I must have heard it sometime — with two syllables. (Not for years was I to change the pronunciation to E-lo-ise.)

My cup was running over. Everyone had laid aside his own things to watch *me* open *mine*. I could, at this writing, name off my various childhood possessions, thinking they all were presents from that seemingly inexhaustible box. But *some* things must have been given me at other times — for there *were*

other Christmases. Only *one* more I am sure came from that box: the doll buggy that was just the right size for Heloise.

I suppose, now, one might question the psychology of putting a small child through such emotional stress. But I see more in it than that, now. I see the thoughtful planning — all aside from choosing the gifts on that pre-Christmas trip to town — to add to the surprise and rapture of the youngest in the family. This would be the work of the three oldest — conniving to make Christmas a little more entrancing and suspensive — last just a little bit longer.

Our Lady's Tumbler

Es vies des anciens peres
La on sont bones les materes
Nos raconte on d'un exemple;
Jo ne di mie c'alsi bel
N'ait on ai par maintes fois
Mais cil n'est pas ci en desfois
Ne face bien a raconter
Or vos voil dire et aconter
D'un menestrel que li avint

There is a charming story that was told often by our forefathers in years long gone by, concerning a certain professional tumbler and the Holy Saint Mary, Mother of Jesus. We certainly do not say that it is the greatest of all stories, but we think it to be a very nice one that deserves to be told again.

The tumbler was a handsome young man whose time was very successfully occupied with his profession. His great accumulation of horses, robes, and money attested to his unusual competence. He was not learned, however, in any of the liberal arts of his day.

As the years passed over him, he became aware of the superficiality of many of the hopes and desires men set their hearts upon. His worldly success did not in any measure prevent him from divining a fate other than destiny and a world other than this. At last, when he could tolerate his way of life no longer, he gave all that he had to the poor and afflicted and applied for sanctuary at the Holy Order in Clairvaux. Thus we are come upon again by that unexpected truth: Man's first real quest of the promise of a morrow comes when he finds his soul and not when he loses his purse.

When he became a novice in the order he found his orientation much more difficult that he had anticipated. First of all, this tonsured group did not talk. He assumed, therefore that they could not speak, and he felt sorry and prayed for them in his own way. Later, when he learned that they were not mute, but that their speech was sometimes forbidden as penance, there was little humor at his expense. Still more humor followed when he himself tried, for the first time in his life, to remain silent for an entire day. His second item of confusion arose much later when he heard their lamentations.

Translated from the medieval French poetry into a modern English story by Prof. Paul K. Hudson, Executive Secretary, HKN, and Prof. Charles A. Knudson, Head, Dept. of French, University of Illinois. Art by Gertrude Hudson.

"Holy Mary", he said, "what is wrong with these people? Some great sadness must have come to them to make them so humble." But when he learned that they were praying for God's mercy and forgiveness, he said, "Dear Father, forgive me most of all. There is no one here so unhappy that he does not serve you with some occupation. Yet I can do nothing. Some read lessons, others sing hymns, and still others write chronicles. The simplest among us pray at the altar. But I can do nothing. I know no prayers, no songs, nor can I read nor write. I am worthless to the Order and to my God. Oh Holy Mary, help me. Beseech your sovereign Father that he hear me and send good counsel, so that I may learn to serve Him. I am doing wrong in taking bread here without deserving it, but I do not wish to leave. Oh Holy Mary, help me, — — help me, — —."

He grieved thus for many days. At last in the early dawn of an enchanted morning in May, when the chill of the winter was over, and springtime had fallen upon the land, he arose from a deep slumber. Guided by the wings of the morning, he explored some of the innermost recesses of the great church where he had never gone before. And, still guided by those unseen pinions of hope, he came upon a small crypt in which there was an altar and a semblance of the Virgin Mother. In deepest reverence he fell to his knees, and with eyes upward, became transfigured by the divine loveliness of the Holy Mary. In a little while he was moved from his silent worship by the notes of the Angelus bell. He jumped up dismayed and ashamed, but the sharpness of his early grief had vanished. "Sweet Lady", he said, "all will be saying their verses, but I in thy presence can say nothing sacred. If you will forgive me I will do the only thing I know how to do — I will serve God by displaying the only talent I have. Others will sing and pray. I will tumble."

He removed his cape and laid it upon the altar, but kept on a light garment that would not hinder him. He fastened his belt and prepared himself. Then he turned back to the image. "Lovely Lady I command my body and my soul into your keeping. Do not despise me for what I am. I shall perform for you my finest acts." Then he began to make artistic leaps — small ones and great ones — first farther away and then nearer — up and over. He jumped and did the marvelous Vault of Metz. Afterwards the French Trick and then the Act of Champaign. Next the elaborate Brittany and the beautiful Lorraine. He danced on his hands and whirled on his feet. As a grand finale he made a great vault that had no name. "Lady", he said, "in the name of Our Father I never did that one before. It is no ordinary feat and is completely new in this world." Then he beat his breast and wept tenderly for he knew of no other way to pray. "Sweet Mary", he said, "I can do no more. But when the bell calls all to prayer again I will return and be thy servant with this, the only gift I have."

He led this secretive life for a long time and was very happy. There was never a day when he was too weary to perform before the image. And God in his Heaven was well pleased because the service was inspired by love. God cares little for earthly treasures. He searches only for the true love in men's hearts.

Many of the monks noticed his unusual habits and reproached him for not attending the daily services. Finally one of them, out of curiosity, followed him to the crypt and discovered his secret. "By my faith," said he, "this man is a fine artist. He performs as though he truly loves the Lord. There is not one, I believe, who would not rejoice to see this great gift displayed before God. It is his penance because he does it without evil intent."

The monk went straightway to the Abbot and told him everything. The Abbot stood up and said to the monk, "By your Holy Order I command you to say nothing of this to others. Come, we will go together and view this strange thing." They went quietly and hid near an altar in a recess of the crypt. They watched with great interest the marvelous service of the novice as he leaped, danced, whirled, and bowed before Our Lady. He did not spare himself but continued on and on to the point of fainting. Finally, when completely exhausted, he fell down at the altar and did not move.

The Abbot became uneasy from the sudden fear that the Lord might be displeased with such a performance in a holy place. But as he watched, the crypt soon became bathed in a dazzling white light. And a Lady, more beautiful than Truth, came down a giant staircase that seemed to open in the far wall. Never before had anyone seen a woman so lovely, so precious, or so richly dressed. With her were a host of angels and archangels from heaven above. They gathered about the tumbler to comfort and support him. The Sweet Lady fanned him with a white cloth. Then she supported his head on her arm and wiped away the tears from his eyes. Finally she arose, pronounced a blessing, and in an instant was



For he could do no other thing,
Than to tumble, dance and spring.
Leaping and vaulting, that he knew,
But nothing better could he do.
He could not say his prayers by rote,
Not Pater Noster, not a note.
Not Ave Mary, nor the Creed,
Nothing to help his Soul in need.

gone. The tumbler, being yet in a faint, was unaware of all this and did not know that he had such fair company.

When all had departed the monk exclaimed, "Sire, mercy, this is a holy man we see here. If I have said anything wrong about him it is right that I be punished. Charge me with penance, for he certainly is a worthy man." The Abbot replied, "You speak truth. God has shown us clearly that he loves him. Now I command you, on your obedience, that you speak to no man of what you have seen."

The Abbot considered the miracle for many days before he sent for the tumbler. When the holy man heard that the Abbot had sent for him his heart was full of sorrow. He supposed that he had been found out and he knew not what he might answer. He came weeping before the Abbot and kneeled. "Sire", says he "In God's name mercy. I know you wish me to leave. Command me and I will obey." The Abbot replied "I wish to know, and I want you to tell me the truth, how you serve and by what you deserve your bread?" "Alas" said the tumbler "you do wish then to send me away?" "I haven't said that" replied the Abbot "I merely asked you how you serve the monastery?" The tumbler replied with the complete story of his deeds at the altar, his reasons, and his hope of divine approval. He wept and asked if his sins were very great. The Abbot lifted him up and kissed both of his eyes. "Brother, say no more, for you have my assurance that you will be of our brotherhood and remain with us always. I ask God to grant us the goodness to be of yourself also. Good Brother, pray for me and I will pray for you. I ask that you do your service exactly as you have done it in the past, and still better if you can."

We can well imagine the great joy that filled the tumbler's heart. With a clear conscience he did his penance every day at the first note of the Angelus.

Many years later, in the inexorable course of nature, he was taken very ill, and could not leave his bed. The Abbot honored him greatly and the monks read and sang at his bedside every day. But none could cheer him. His thoughts always returned to the little crypt and he longed to be there again. Since he could no longer serve the Blessed Mother on this earth he prayed God to receive his soul into the great beyond. He beseeched the Abbot to tell him what awaited him beyond the grave. The Abbot replied, "In the Kingdom of Heaven, if you wish it so, you will be a tumbler. And what a tumbler you will be! You will serve God with such feats as you have never before dreamed of. All the saints and angels in Heaven will gather to watch you perform. But, as on earth, you will not work for wealth and praise — only for the love of God." And as he spoke, all the monks who had gathered saw a wondrous miracle. The Virgin Mary with a host of angels and archangels surrounded the tumbler and received his soul. As music burst forth from all around, they escorted him up through the meadow of the infinite into Heaven.

Thus ends the story of Our Lady's tumbler. The monks prepared and buried his body where he would have wanted it — in the little crypt. He has departed this life forever. Yet no shadow of that infinite night will ever darken his fame, for memory has lighted up his image with her everlasting lamp. Now let us pray that we also may serve God so well as to merit his love.

Christmas Decorations

It's no wonder that the recording *White Christmas* is the largest-selling record ever — children and adults always look forward to a Yuletide that is dressed in frosty white.

This Christmas, whether the skies are clear or heavy with snow clouds, you and your family can create your own Currier & Ives-type of snowy countryside.

This wintry Christmas scene, complete with Santa and jolly snowman, lets you give vent to your imagination. You'll need:

Diamond Round Toothpicks — 2 or 3 boxes
10 — 15 paper towels
Cotton batting
Roll of aluminum foil
Can of snow spray
5 marshmallows
13 gum drops
Red, blue and green food coloring
Toothpick box
Navy blue crepe paper—one large sheet
Tiny gold or silver stars
Glue, paper, pen and ink, one index card.

Before you begin, fill a shallow bowl or a saucer with blue vegetable coloring, another one with green, and another with red. Let about one-third of the toothpicks soak in each, then dry them all on paper towels.

On an old piece of board about two feet long and a foot wide, place some crumpled towels in mounds, moistening them slightly if necessary to keep them in place. Next, cover with aluminum foil, molding the foil over the shape of the towels to create hills and valleys. Some slightly moist cotton batting goes over the foil. Spray your little countryside with artificial snow, and you have the beginnings of a Currier & Ives-type snow scene.

With some of the red-dyed toothpicks, build the walls of the log cabin by making a square on the snow; on top of this square place another square that you've glued together—and made sure the two square pieces are firmly

glued. Continue this process until the sides of the building are as high as you want them.

The roof is made by cutting an index card until it's a little wider than the distance between two walls. Fold the card in half and you can already see a two-sided roof taking shape. Paint the roof with glue, and place blue-dyed toothpicks side-by-side on it until it's covered; then glue the roof to the top of the building — and you have a log cabin ready to adorn the top of a snowy hill. Place a small chimney, fashioned from paper or a bit of lump sugar, on the roof — and it's a cozy cottage!

The jolly snowman is easy to make; the only chore will be to stop the whole family from making so many that the snowmen will screen off the rest of the scene! Connect two marshmallows, one on top of the other, with toothpicks. Make each leg with a separate marshmallow, and fasten with toothpicks. Insert a toothpick half with a gumdrop on the end for arms, feet and cap; then create jovial eyes, mouth and nose with pen and ink.

Santa's sled is made from one Diamond toothpick box from which the lid has been removed. A piece of toothpick is inserted through the box at each corner, and it then gets glued to a runner fashioned from two toothpicks glued together. In the dish filled with red vegetable coloring, dip a small square of cotton batting; this will serve as Santa's blanket.

To make old Santa, himself, use half a marshmallow for the head.



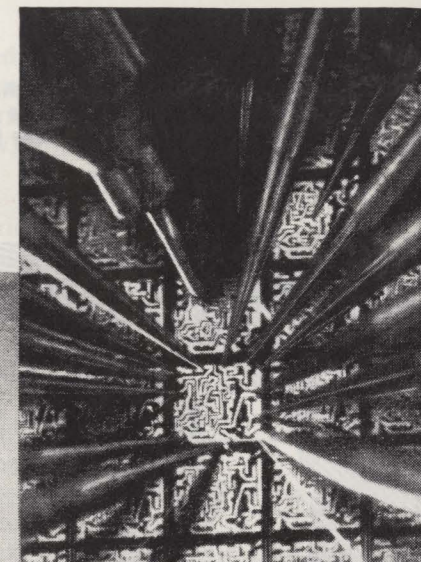
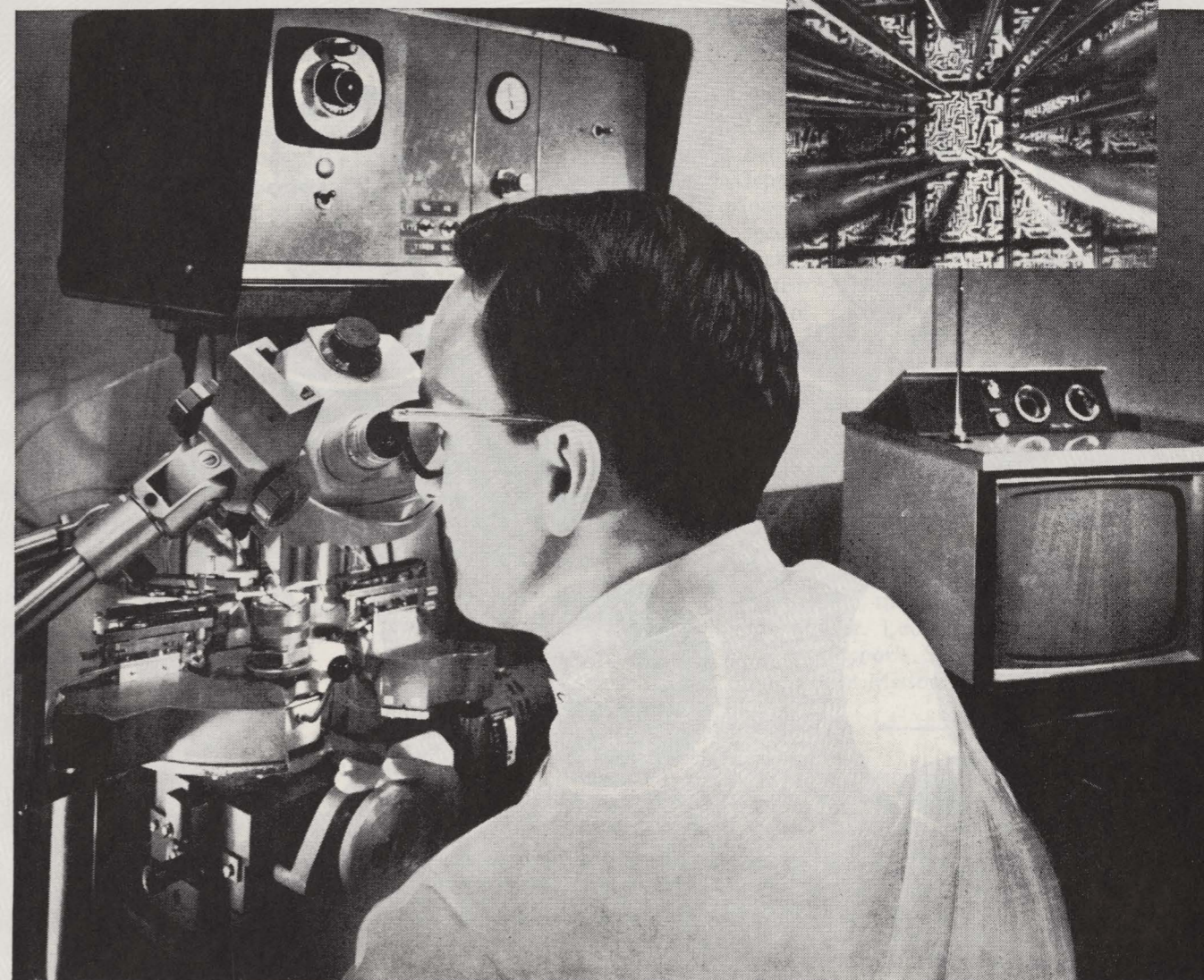
Place the marshmallow piece on the end of a toothpick, and stick the toothpick into the bottom of the sled at an angle. Snuggle the blanket up to Santa's "neck" and it won't be necessary to make a body for him. His hat is a cone of red paper, and his hair and beard are white cotton batting. Features are made with pen and ink.

You can't have Santa without at least one of his faithful reindeer, and you can make them from gum drops. Connect four gum drops with toothpicks to form the body; a gum drop with six bits of toothpick make the head; one toothpick with a gum drop on the end for each foot completes Donner — or is it Blitzen? Reins for the reindeer are made of two toothpicks glued together.

To add reality to your scene, fashion trees and shrubbery from the green-dyed toothpicks. Two of them glued together make the trunk of a fir tree, while branches are made by placing larger and larger bits of toothpick — going from top of the tree to bottom — until you have a majestic Christmas tree. As a final touch, place a piece of dark blue crepe paper behind the scene for background, and adorn the "sky" with tiny gold or silver stars (the kind that can be bought in any five-and-ten-cent store.) Spray the whole project lightly with snow.

And then you and your family can sit back and sing a mellow tune of Christmas expectation: "I'm dreaming of a white Christmas..."

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The new National President is Dr. William Smith (top right). He received the BEE degree with distinction in 1936 and the M.S. in E.E. degree in 1937 from the University of Minnesota. From 1936 to 1937 he was a teaching fellow in the Electrical Engineering Department at the University of Minnesota. He was initiated into Omicron Chapter of Eta Kappa Nu in 1934.

After leaving Minnesota he was associated with the Commonwealth Edison Company of Chicago. In 1941 he was called to active duty in the Naval Reserve and served throughout World War II at the Inspector of Naval Materiel Office in Schenectady, New York. He presently holds the rank of Captain USNR.

From 1946 until 1948 he was Dean of Pre-Engineering at Sampson College, Associated Colleges of Upper New York. He was at the University of Texas from 1948 until 1950 and received the Ph.D. from the University of Texas in 1950. He has been at the University of Kansas since 1950, Chairman of the Electrical Engineering Department since 1955, and Dean of Engineering since 1956.

He has been active on research projects for the Office of Naval Research, the Signal Corps, and the Army Engineers. He also has served as consultant for a number of industrial organizations. He has presented papers to the AIEE and ASEE. In 1962 he served as consultant on Engineering Education in Bogota and Cali, Colombia.

Mr. John E. Farley, new National Vice-President (top left) is district plant manager for Illinois Bell Telephone Company; but in his spare time, he has always been a Lake Michigan sailor. He owns a power boat but crews in sailboat races as often as possible.

Jack joined the Engineering Department of Illinois Bell Telephone Company in 1948 and worked with television and mobile radio systems. He has had a rather interesting and extensive career in the Bell system. He was at Bell Telephone Labora-

tories twice. In 1955 he worked at Bell Laboratories on the development of the first completely transistorized communication receiver in the VHF region.

During the 1958-60 time period, Jack was at Western Electric Company's Defense Project Division heading a group coordinating the solution of computer equipment and program problems connected with the SAGE system of the U.S. Air Force. In 1960 he returned to Illinois Bell in their newly formed Marketing Department as district marketing manager. In 1963 he was appointed special services engineer. At present, Jack is district plant manager of the Direct Distance Dialing and Data Service Bureaus.

Jack became a member of Alpha Chapter at the University of Illinois, where he received his BSEE in 1948. He received his Master of Science from Northwestern in 1955.

The Far Western Region will be represented by Dr. Donald Thorn. (left center) He received the B.S.E.E. degree from Texas A.&M. College. His M.S.E.E. and Ph. D. were both received from the University of Texas. In 1952 he served as a Lieutenant in the Signal Corps Engineering Laboratory at Redstone Arsenal, Alabama. From 1953-58 he was on the faculty of the University of Texas and then became Professor of Electrical Engineering at the University of New Mexico. He has just accepted the position of Head of the Electrical Engineering Department at the University of Akron.

The new Director for the East Central Region is Prof. Robert Schindler. (right center) He was born in Cleveland, Ohio, October 28, 1906. Interested in radio during its infancy and encouraged by his high school physics teacher, he decided to become a scientist. After one year at John Carroll University he changed his objective to engineering and transferred to Case School of Applied Science, now Case Institute of Technology, where he received a B.S. in E.E. in 1929 and an M.S. in E.E. in 1932.

At various times Professor Schindler has worked as an engineer at the Firestone Tire and Rubber Company, RCA, and the Brush Development Company. His teaching career began at Case in 1937 and in 1941 he moved to Fenn College, now the Cleveland State University. In 1953 he became Professor of Electrical Engineering and since 1956 has been Chairman of the Electrical Engineering Department.

Elected to represent the West Central Region is Dr. Gerald Driefke. (bottom left) Prof. Driefke received the B.S.E.E., M.S. and D. Sc. degrees from Washington University. He was a Design Engineer for Curtis-Wright Corp., a consulting engineer to several companies, and a Member of the Technical Staff of Bell Telephone Laboratories. In 1948 he became a teacher at St. Louis University and is now Chairman of the Electrical Engineering Department and Graduate Program in Electrical Engineering. He has been a member of the Electrical Examiner Board of St. Louis County, and of the Governor's Science Advisory Committee of Missouri.

Dr. Charles E. Hutchinson is the new Director for the Eastern Region (bottom right). He received a Bachelor of Science degree in electrical engineering from Illinois Institute of Technology in 1957. From 1957 to 1960 he served as a commissioned officer in the U.S. Navy. After returning to graduate work at Stanford University, Dr. Hutchinson obtained a Master of Science degree in electrical engineering in 1961 and his doctorate in 1963. While at Stanford he was responsible for analog and digital simulation in the Systems Theory Laboratory.

Since September of 1965, Dr. Hutchinson has held the appointment of Associate Professor in Electrical Engineering at the University of Massachusetts, Amherst, Massachusetts, where he conducts undergraduate courses in linear circuit analysis, and graduate courses in optimum control theory and random signal theory.

NEW CHAPTERS AT

Princeton University

Eta Kappa Nu was pleased to establish a Chapter at Princeton University on May 11, 1967 and takes particular pride upon becoming the third honor society on the campus at Princeton, being preceded only by Phi Beta Kappa and Sigma Xi.

Prior to the initiation, the visitors were treated to a tour of the beautiful new quadrangle building of the School of Engineering at Princeton, followed by a coffee hour, in the Faculty Lounge. The installation was then held in the beautifully appointed Convocation Room adjacent thereto, resulting in a most impressive setting for the installation and initiations.

Highlight of the ceremony was presentation of the local chapter's charter to Dr. Joseph C. Elgin, Dean of the School of Engineering and Applied Science, by Howard H. Sheppard, a past national president of the honor society. Richard J. Jagacinski, a junior member from Whippany, N. J., was elected first president, for the academic year beginning next September.



Undergraduate and Graduate Initiates: (front two, l. to r.) Kobayashi, Tschritzis, Shen, Jagacinski, Crawford, Kohler, (second row) Shoshani, Liu, Goodwin, Wood, Ester, Donaker, Zeitzoff, (third row) Blosser, Rossiter, Orban, Chin, Kreis, Hubbard, Dellecker. Also initiated: (not present) Kameda, Masry, Nicolls.

Following the chapter installation and dinner at the Princeton Inn, the group heard an address by Dr. Morton H. Lewin of RCA Laboratories, a Princeton resident who won the Eta Kappa Nu Award of Recognition as the 1966 "Outstanding Electrical Engineer." Dr. Lewin holds bachelor's, master's and doctoral degrees from Princeton.

A number of prominent and active HKN Members attended the installation including the Presidents of New York and Philadelphia Alumni Chapters, plus several Presidents and faculty advisors from four HKN Student Chapters.

The installation team consisted of the following: WHEATSTONE — Howard H. Sheppard, National President 1965-66; FARADAY — Professor Walter C. Johnson, Princeton University; COULOMB — S. Reid Warren, Jr., National President 1956-57 and representing the Lambda Chapter; OHM — William Hodson,

(continued on page 24)

Tennessee Tech. University



Left to Right (Standing): President Everett Derryberry and Professor Paul B. Jacob, Jr., Installing Officer.

The Epsilon Rho Chapter of Eta Kappa Nu was installed at Tennessee Technological University, Cookeville, Tennessee, on May 12, 1967.

Thirteen undergraduates, four graduate students, and two faculty members were initiated. The initiation ceremonies were conducted by Dr. S. G. Lele, faculty advisor to this chapter. He was assisted by Dr. C. O. Alford of the Department of Electrical Engineering, Tennessee Tech, and brothers Ralph N. Bussard, Joseph H. Bagley, Godfrey A. Lue, and L. Wayne Sanderson of the Epsilon Lambda Chapter at Vanderbilt University, Nashville, Tennessee.

Following the initiation ceremonies, a banquet was held at the B & B Restaurant. Professor Paul B. Jacob, Jr. of the Mississippi State University presented the charter of the Epsilon Rho Chapter to President Everett Derryberry. Among the guests at the banquet were Mrs. Derryberry, Dr. Wallace S. Prescott, Dean of Faculties, Professor James S. Brown, Dean of Engineering, Dr. James A. Wattenbarger, guest speaker, and Professor and Mrs. Richard D. Bourne of Vanderbilt University.



Left to Right: James Carlock, Thomas Brewer, Gary Lockhart, David Dryden, Ted Sowers, Joe Dunn, Robert McMillan, James Ferguson, Jon McDearman, Charles Winton, Edward Ingraham, James Dwiggin, Garry Green, Thomas Homsley, Wayne Watkins, Robert Cody, Dr. Albert Duke, James Harwell, and Professor Donald Box.

CHAPTER NEWS

GAMMA, The Ohio State University — In early February, sixteen members toured IBM manufacturing, research, and development facilities in Endicott and Glendale, New York. On May 5, the spring pledging meeting consisted of a tour through F. W. Bell Inc., the major developer and producer of Hall Effect devices, in Columbus. Pledge activities were centered about mailing the annual departmental Newsletter to all EE alumni; this Newsletter was written by last fall's pledge class. On May 19, the spring banquet was held at the Desert Inn; ten new members were initiated and Assistant Professor David L. Hutchins was awarded the Chapter's Distinguished Teaching Award.

LAMBDA, University of Pennsylvania — The activities of Lambda Chapter this year were of both a social and service nature. The annual initiation-banquet in the Fall held jointly with the chapters of Villanova University and Drexel Institute of Technology and a Spring Picnic for members of all the engineering honor societies at Penn were well-received by all. In the category of service functions, tours and exhibits were arranged for high school students invited to Engineers' Day. The tutoring program for electrical engineering students, started a number of years ago, was continued. Also, in the Fall Lambda Chapter's Sophomore of the Year Award was given to Dennis J. Picker for academic excellence and high character evidenced in his first two years work; as part of the selection process several candidates were interviewed by the Chapter at large.

BETA THETA, M.I.T. — Has provided invaluable service to the Electrical Engineering Department as well as to the entire M.I.T. community. Each year M.I.T. holds either a Parent's Weekend or an Open House at which this chapter serves as guide to direct visitors through the laboratories and exhibits which have been prepared with Eta Kappa Nu leadership. This chapter has also prepared an extensive survey on the undergraduate electrical engineering courses. By interviewing both students and faculty members, Eta Kappa Nu has developed considerable recommendations which have been transmitted, not only to the Electrical Engineering department, but also to the President of the Institute. In an effort to provide greater information to seniors, Eta Kappa Nu has also prepared a report on graduate schools and suggested thesis topics.

BETA OMICRON CHAPTER, Marquette University, Milwaukee — On Sunday, April 9, 1967, Beta Omicron Chapter initiated 19 undergraduate and 3 graduate student members. Robert Bridges, a charter member of Beta Omicron Chapter, and the present Manager of Distribution Apparatus Development at Cutler-Hammer, Inc., was the principal speaker at the initiation banquet.

BETA PI, City College of N. Y. — On April 1, 1967 a theatre party was

held to see "School for Scandal." In addition, there was a softball game held in Central Park between the new and old members. On April 22, 1967 the Induction Dinner was held at the Hotel Prince George. Twenty-two new members were inducted.

At the end of the term, the chapter will present its Outstanding Sophomore Award to the sophomore electrical engineering student who has achieved all-around excellence during his first two years in college.

BETA SIGMA, University of Detroit — The seminars on the use of the slide rule and the oscilloscope which were conducted for the underclassmen were very successful. 17 undergraduate and three professional initiates were honored at a combined honors banquet for all the honorary engineering associations. This was the first banquet of this type attempted at the campus and it proved to be highly successful. Tau Beta Pi erected its bent monument in front of the engineering building honoring all the honorary engineering societies on campus.

BETA PSI, University of Nebraska — On March 23 Beta Psi Chapter initiated 13 undergraduates into membership at our spring banquet. Our guest speaker, Dr. Don J. Nelson, gave a very interesting talk on future computer application.

The chapter is actively supporting the electrical engineering department in Engineering-Week activities to be held the week of April 23. In addition to contributing money to the general fund for E-Week, members are helping on construction of E-Week displays.

GAMMA GAMMA, Clarkson College — has been quite active during the past semester. We initiated twelve new undergraduate members, two graduate members and one professor. To raise money for our treasury, we conducted a book sale, selling review books to sophomore, junior and senior Electrical Engineers. This was a successful venture. We also set up several displays for prospective engineering students of this area on our annual Engineering Day. One of our displays which was received with much interest was a satellite tracking station.

GAMMA ZETA CHAPTER, Michigan State University — is proud of its accomplishments again this year. We have tried to provide programs that would appeal to all students of electrical engineering. We are happy to report that our efforts have been welcomed and appreciated. Some of what we have begun will be permanently a part of engineering educational policy here at Michigan State University.

GAMMA XI, University of Maryland — A new annual award recognizing outstanding instruction in Electrical Engineering has been initiated by the Gamma Xi Chapter. It consists of a large blue, high value, high wattage resistor mounted on a ma-

hogany plaque. The award is presented with humorous overtones to the instructor who provides high-value instruction, but who is an impediment to students' academic standing. The recipient of the award this year was Mr. Gerald E. Friedman.

DELTA KAPPA, University of Maine — The Fall semester of 1966 was a time of much activity here in the EE Department. Student and faculty efforts were expended in preparations for the first Northeast Regional Convention of Student IEEE Chapters. Many members of Delta Kappa assisted in this program.

Other activities for the year included: weekly tutoring of Sophomore EE students, maintaining the Department Reading Room, continuing recruitment efforts in local high schools, and initiating ten new Chapter members.

DELTA SIGMA, Notre Dame — During the first semester, Delta Sigma sponsored a seminar on Graduate School. We had faculty members from several graduate disciplines (Law, Business, Engineering) discuss the requirements of Graduate School and the prospects in several fields. In addition, we co-sponsored a series of technical lectures by several outside engineers with the IEEE branch.

During the second semester, we continued this series of lectures. In addition, we initiated a series of talks in which a faculty member would explain his specialty and the research which he is currently conducting at the University. It was hoped that this would familiarize the students with the various phases of electrical engineering. In conjunction with this, we started a series of gabfests, whereby a professor would invite a small group of students to his house for a series of discussions. The idea was to promote closer faculty-student relationships.

DELTA CHI, The Cooper Union — Delta Chi Chapter was represented at the New York Eta Kappa Nu Alumni Meeting in February, which proved to be constructive for all chapters represented. The annual Honor Societies Dinner, attended by members of all Cooper Union honor societies as well as Eta Kappa Nu, was held in May. Election of new officers was held in the spring term.

EPSILON BETA, Arizona State University — Our traditional buffet banquet was held following the initiation of some fine, promising juniors, seniors and grad students.

Our teacher evaluation program is in its second semester now. Most of the instructors appreciate this method of critical evaluation as a guide to improvement of instruction.

A major event on our campus this spring semester was the first annual Engineering Day. All the engineering societies here pitched in to make it a success. Epsilon Beta's part was the publicising of the fete, which task we carried out enthusiastically and successfully. (continued on page 22)



CHRISTMAS IN 1885

by Eva Derby —

Yesterday my granddaughter-in-law said to me, "Gram, you are 88 years old now and we are wondering what Christmas holidays and winters were like 80 years ago". This is how it was:

All five of the children were whispering and asking "Is there a real Santa Claus"? Our parents had bought a small farm and we knew the load of fat hogs and drove of turkeys had been sold to make payments on it and we felt sure they couldn't afford to buy toys at Christmas for all five of us. Yes, there must be a Santa.

Our big apple hole was opened and a basket of apples and turnips and a few pumpkins were brought out. They had been buried to keep from freezing. The apples had been peeled and cooked over a slow wood fire and each member of the family took turns stirring with the long-handled paddle with big holes in it to make our cider applebutter for the winter.

That Christmas in 1885 the snow was drifted high onto the hedge fences. We were going to the schoolhouse one mile away for our school program on Christmas eve. One of the neighbors had a string of real sleigh bells — so my father put them on the dapple gray horses, piled straw into the big bob sled with comforts over us. The neighbors all climbed in and away we went to the school program.

When our songs and recitations were over — sure enough — in bounded old Santa Claus with jingling bells and gifts for all. Our mother? — no, she was not there. She was at one of the neighbors helping to deliver another baby. This was all very mysterious, but real to us. It reminded us of the Christ-child who was born so many years ago. (next column)

WHO'S WHO IN ETA KAPPA NU

Richard H. Kaufmann (Nu Chapter '25) was named "Engineer of the Year" by the Schenectady, New York, Joint Engineering Societies Council. Described by last year's recipient as "an engineer's engineer and a teacher's teacher," Kaufmann retired from GE in May 1965 after a 39-year career during which he was awarded nine patents, authored seven books and 45 technical articles, and delivered more than 110 addresses on more than 60 electrical engineering topics throughout the country.

His last assignment was with the company's Industrial power systems component, a part of the industry sales and engineering operation here.

REAL AND IMAGINARY (continued)
first is the farthest to the left.

Knives, which are placed to the right of the plate, should have the cutting edge facing the plate. Those needed first should be farthest right.

Spoons for fruit or soup are placed to the right of the knives. The Reed & Barton experts advise that spoons for coffee or tea are not put on the table, but on the saucer at serving time, to the right of each cup handle.

Dessert spoon and fork, or dessert spoon alone, may go above the place plate, lying parallel to the edge of the table, or may be brought in on the dessert plate, when it is served.

Bread and butter plates, if used, are placed above the forks. The butter knife is usually placed at the top of the plate pointing left. It lies parallel to the table edge, cutting side towards the table edge.

Water goblets belong above the tip of the first knife, wine glass to the right. If more than one wine is served, the glasses are placed in order of their use, to the right.

CHRISTMAS IN 1885 (continued)

On Christmas morning father served us pancakes with home churned butter and sorghum. Later in the day we peeled our one orange of the year, eating one section each day to make it last and keeping the peel to smell for many days to come.

Thus passed our Christmas in 1885, filled with simplicity, but also with an abundance of love.



ENGINEER OF YEAR — Richard H. Kaufmann, left, named "Engineer of the Year" by the Schenectady Professional Engineers Society, receives his official plaque and congratulations from Dr. Leon K. Kirchmayer, last year's winner.

CHAPTER NEWS (continued)

EPSILON THETA, California State, Long Beach — The spring semester of 1967 saw many firsts for the young Epsilon Theta chapter. A tutoring program for the beginning electrical engineering course was initiated, and the response from both needy students and the faculty was encouraging. Included among the 19 initiates into the chapter were faculty members Robert B. Goldman and Herbert J. Lane, also a chapter first. Following the initiation, a banquet was held at Rochelle's Restaurant in Long Beach. Other spring activities included revision of the by-laws, participation in Engineering Day activities, and purchasing of jackets.

EPSILON IOTA, San Jose State — For the third consecutive semester, our chapter conducted the evaluation of teachers and courses in the Electrical Engineering Department. Our evaluation program has been so successful, that other engineering societies are planning to follow our example.

Since the spring of 1966, Epsilon Iota has been trying to get a study room for EE students. This study room became a reality this semester, and has led to an "All Engineering" study room at San Jose State.

During the meeting of May 25, 1967, the election of officers for Fall semester 1967 was held. Ron Blake was elected president. This meeting ended our regular activities for Spring semester of 1967.

EPSILON OMICRON, University of Delaware — Marking our first year, Epsilon Omicron chapter initiated four new undergraduate members this May and held a banquet in their honor. The chapter has been concerned with some organizational details; this fall the main item will be the resubmission of our by-laws for approval by the Student Government. During the coming year we plan to increase our activities and substantially upgrade our pledge program.



Miggs

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

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

The Great Sahara Mousehunt

Catherine Collins and Miggs Pomeroy

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

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

21ST MARCH

ONE WEEK FROM Benghazi. On our way across the sands that separate Hawari from El Gof we meet a caravan: two turbaned men in billiant blue robes, with fifteen camels and a herd of nubian goats. Each of the camels carries a full load, each a couple of garbas, which are goatskins filled with water, and one has a brilliantly striped tent strapped to its back. With a little French, a little Arabic, and a few lines in the sand the drivers tell us that they have come from Faya where we will be heading in a day or so. It has taken them forty-three days. While we think happily that it will take us only four or five, Catherine asks them when they are going back. She would like to leave us and go with them. We say, "Yes, dear," and lead her away thinking of things with which to distract her. Alan is always complaining that she is unrealistic about time and we think that he has something. He might just say unrealistic and let it go at that.

The Kufra date-processing factory is at the moment not processing dates. We drive our cars into the courtyard and commence to unpack. The men put their gear and cots into a large storeroom, already full of sorting-tables and stacks of collapsed cardboard boxes. Liv, Catherine, I and the kitchen share the second warehouse room with Herr Janni. He offers courteously to go away, but we will not hear of it.

"Why, we have been sleeping with all sorts of people," I assure him. "Catherine and I won't mind sleeping with you at all."

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Desert travellers never show a blush, but Herr Janni does rig a blanket in one corner of the great room and the area behind this blanket is as neat and immaculate as a monk's cell.

Not so the rest of the room. We have to reorganize for the next leg of our trip. We have learned something about desert travel and we think we now know how to fit a load together so that the one thing most needed, like the salt or the can-opener, is not under half a ton of stuff we won't need until we get to Zouar. The cars are completely emptied and the men are servicing them. Contents are stacked and strewn about our community bed-dining-room. In addition, Catherine and I have done an impressive quantity of laundry and this is strung across the courtyard and zig-zagging on plastic lines about the room. Water is plentiful here as there is a well in the yard. It only requires a bucket, a long rope and a strong man to wind the winch. Toilet facilities are one jump from the stone age: primitive, casual and hygienically negligible. However, the throne-like adobe outhouse has a certain charm in that rabbits are kept in it, and pigeons coo soothingly from its roof. It is fenced off from the rest of the courtyard with a garden gate. Catherine says that she found Archie leaning on the gate early one morning talking to the rabbits. He opened the gate for her without batting an eye and went away whistling.

Herr Janni, we learn, is on vacation from his job in an American library in Berlin. He goes out all day with his binoculars to study bird migrations. He says that the daytime fliers drop like stones when the sun goes down and that today he has seen the first white stork on its way to South Africa. He also studies the meteorological conditions here and in the early morning, before the rest of us are awake, he goes out to whirl his hygrometer. During the war he was a member of Rommel's Afrika Korps, and since then has returned several times to Libya on scientific expeditions. He has accepted our swarming into his domain with philosophy and good spirit, and we have been happy in return to have him share our table. Every one of us has felt the impact of what Herr Janni is, surely of the last of the individuals; a man without a foundation, grant, scholarship or Fulbright, or other hand-out backing him, pioneering on a shoestring—bird-watching in the Sahara, not knowing any more than his brother birds do whether or how he is going to get out of the place. He is trying, with the help of an Arab friend, to make arrangements to hire a camel caravan to take him to the Sudan.

The long-awaited wireless message has been received. It is from the Royal Air Force Base at El Adem, whence the plane we are expecting will come, via Benghazi. It asks how many drums of aviation petrol are on hand at the Kufra airport and requests that we kindly see that all jerboa-holes on the runway are filled in.

Liv went out to count the drums and check on the rat-holes. The hangar, or what framework is left of it after numerous bombings and twenty years of nature's sand-blasting, contains five separate dumps of petrol and oil. None bore any markings, but presently an old man shuffled up from somewhere and pointed out the drums that belong to the R.A.F. He said that the rat-holes are few and small as it has been a bad year. There are only about thirty drums, but counting them took a good half-hour as the old man had his own system, which was to scramble over the top of the stack, thumping alternately with his elbow and palms, while he chanted out a sort of counting litany. Liv counted twenty-eight, while the old man came up with twenty-six. The next time round, Liv got twenty-six and the old man twenty-five. In the next count Liv got twenty-nine, but by now the old man's antics were making him dizzy and he thinks he may have included the old boy in his count. They settled on twenty-five. Once back in the village, the old man told Liv that

the count does not mean much as some of the drums are empty and some contain oil.

We still don't know who is coming on the R.A.F. plane. It should be in tomorrow and perhaps Alan will be on it. People who don't have arthritis hopefully expect it to be cured by a call on the doctor. Liv and I are praying for letters from the children; Francis is probably praying for something to happen to the wireless, whose extra five-hundred-pounds weight is giving him nightmares. Catherine is certainly praying for Alan to drop out of the skies, and perhaps Hank is praying for oatmeal.

For the first time in a week we sleep under a roof, and the more urban the individual the louder his complaint. We are old desert rats unaccustomed to walls and ceilings. We miss our stars and cannot sleep in these enclosures.

PRINCETON UNIVERSITY (continued)



Attending initiation: (front row, l. to r.) Johnson, Salati, Engelson, Hicks, Davisson - faculty adviser, (second row) Anderson, Sheppard, Elgin, Warren, Van Valkenburg.

President, Beta-Alfa Chapter; AMPERE — Edward L. Anderson, President, Delta-Mu Chapter; VOLTA — Robert S. Breen, President, Epsilon-Omicron Chapter; CONDUCTOR — Professor M. E. Van Valkenburg, Princeton University.

Visiting Members of Eta Kappa Nu included: C. Holmes MacDonald — National Director, Eastern Region; Professor O. M. Salati — Past National Director and Faculty Advisor, Lambda Chapter; Professor F. Clyde Powell, Beta-Alfa Chapter; Professor Joseph J. Hicks, Faculty Advisor, Delta-Mu Chapter; Professor L. Paul Bolgiano, Jr., Faculty Advisor, Epsilon-Omicron Chapter; Gary Hagan, Student Member, Epsilon-Omicron Chapter; Irving Engelson, President, New York Alumni Chapter; William J. Johnson, President, Philadelphia Alumni Chapter.

FUBINI (continued)

My image is of mankind in a forward procession. When I was younger, it always amazed me to see the people around me going in all directions in a kind of Brownian motion. I soon noticed, however, that the random motion of individuals was not random as a whole. It was moving forward.

Deep in the ranks I thought that somebody in front of this procession was leading it ahead. As I grew older, I moved up — if not to the first ranks, at least in view of them. And I found to my surprise that the same type of Brownian motion existed among the leaders.

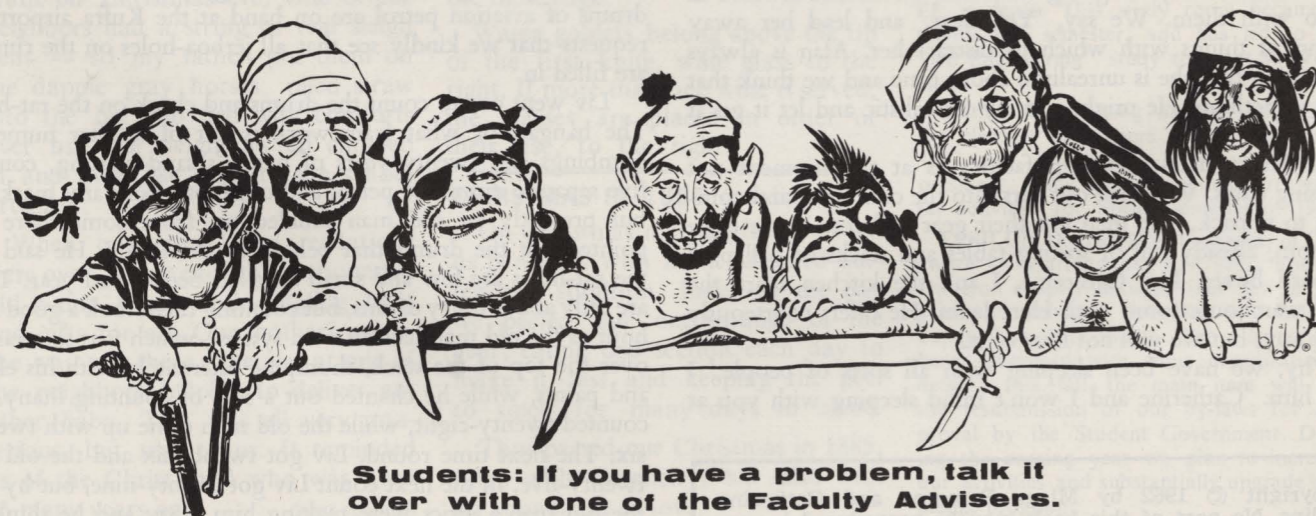
Yet the procession was moving ahead. I concluded from this that there is no way of stopping the drive of good ideas. Sooner or later they will prevail, and the best hope of mankind is to make them prevail sooner instead of later.

I have tried to convey to you my belief that, among the ideas that deserve the word "good" in its true sense, the importance of technological ideas is growing at a tremendous rate.

That the young engineers among us would make a terrible mistake if they looked at themselves only as purveyors of material things.

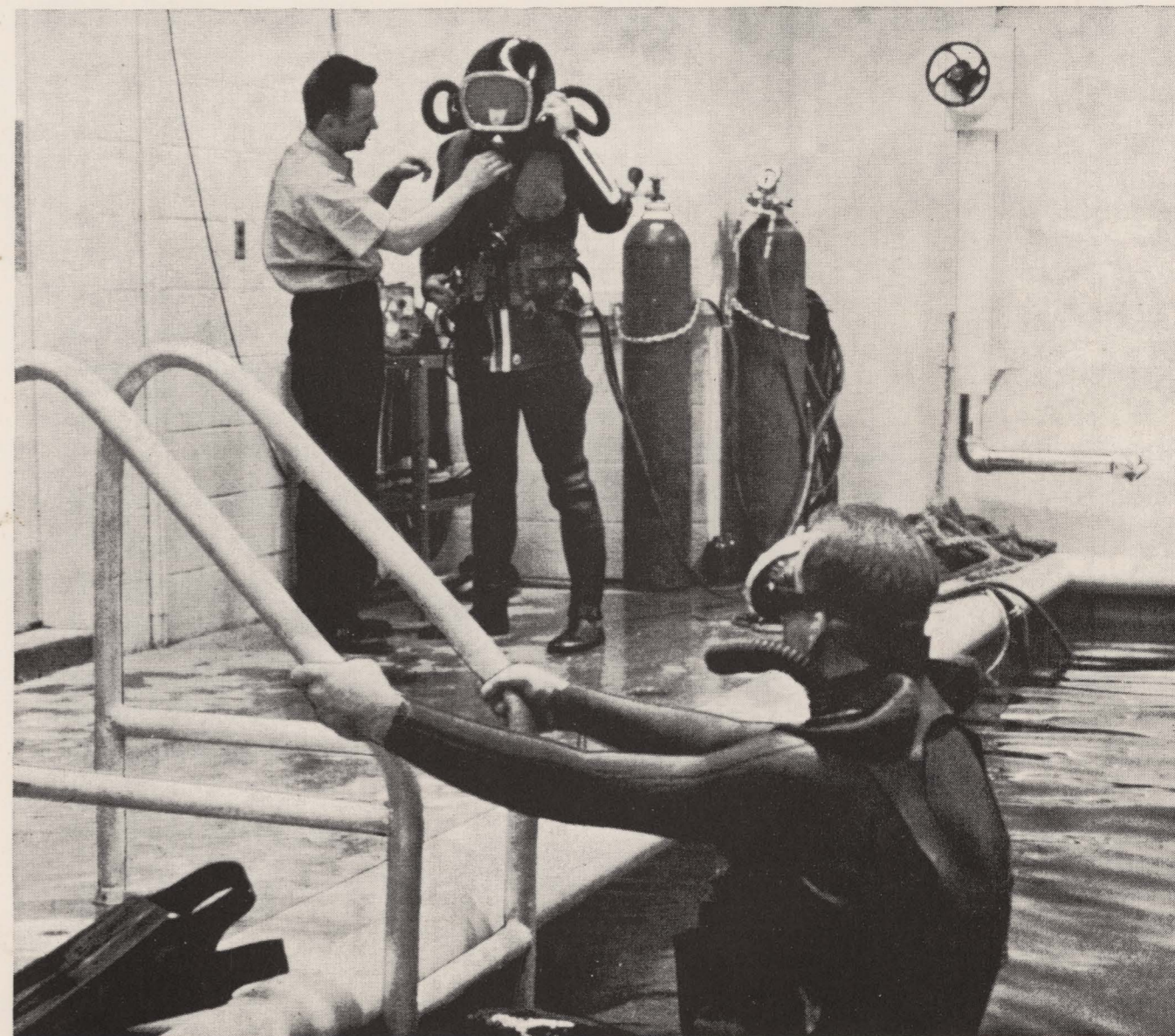
That they can no longer afford to participate in the advancement of science and technology without being aware of its total effect and without taking an active part in shaping its consequences.

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



Students: If you have a problem, talk it over with one of the Faculty Advisers.

If you think oceanography at Westinghouse is a dry subject, you may be all wet.



Practically everybody in our Underseas Division takes to the water now and then. Like these engineers at the test pool in our new Ocean Research and Engineering Center on Chesapeake Bay.

Diving at Westinghouse is all in

a day's work—on projects like deep-submergence systems, manned submersibles, sonar and underwater weapons.

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your interests. So what can you do about it? Talk to the Westinghouse recruiter when he visits your campus. Or write to Luke Noggle, Westinghouse Education Center, Pittsburgh, Pennsylvania 15221.

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Gamma Pi Chapter of HKN
Dept. of Elect. Engr.
Univ. of Virginia
Charlottesville, Va. 22903

What is there left for you to discover?

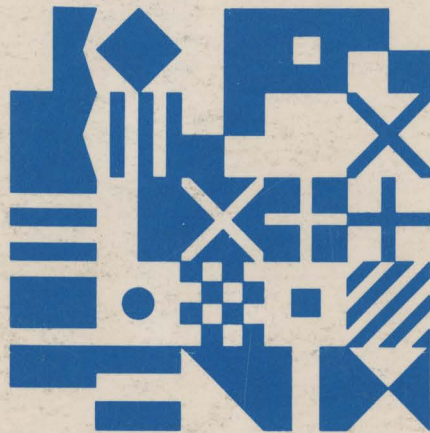
Cyrus the Great, King of Persia, built a communications system across his empire some six centuries before the Christian Era. On each of a series of towers he posted a strong-voiced man with a megaphone. By the 17th century, even a giant megaphone built for England's King Charles II could project a man's voice no further than two miles. This same king granted Pennsylvania to Admiral William Penn as a reward for developing a fast, comprehensive communications system — ship-to-ship by signal flags.

We waited for the combined theories of Maxwell, Hertz, Marconi and Morse before men could transmit their thoughts by wireless, though only in code. Only after Bell patented his telephone and DeForest designed his audion tube could men actually talk with each other long-distance. Today nations speak face-to-face via satellite. Laser-beam transmission is just around the corner. Yet man still needs better

ways to communicate across international boundaries.

In a world that has conquered distance, in a world whose destiny could hinge on seconds, man is totally dependent on the means which carry his voice and thought. It is this means that we in Western Electric, indeed the entire Bell System, have worked on together since 1882.

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